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RAF Langtoft, Lincolnshire

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SURVEY REPORT

COLD WAR PROJECT

SURVEY REPORT

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South Kesteven
Lincolnshire

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SUMMARY

The Radar Station at Langtoft was established during the Second World War as a Ground Control Intercept (GCI) station. It was retained after the end of the war and was substantially enlarged during the late 1940s. In the early 1950s there was a more drastic remodelling of the site under the 'Rotor' scheme to renew Britain's radar defences. The most notable addition at this date was a R6 type double-storey heavily protected bunker - one of five built in the United Kingdom. New radar plinths were also added. Minor modifications continued throughout the 1950s, including the construction of Type 80 radar modulator building, although it is unclear whether or not the radar was installed. The station was relatively short-lived and by March 1958 the unit was reduced to a care and maintenance role. It was sold during the 1960s, since which date the site has been used as a scrap yard.

HISTORY

Ground Controlled Interception

At the beginning of the Second World War Britain's early warning Radio Direction Finding or radar, the Chain Home (CH) system, was strung out along the eastern and southern coasts, facing the presumed lines of approach for enemy aircraft. This system was supplemented at the outbreak of war by the Chain Home Low (CHL) system which was able to detect aircraft flying at low altitudes (Latham and Stobbs 1996, 9-22, 48-54). CH stations were primarily designed to look out to sea for incoming intruders, and although CHL stations could scan through 360 degrees they lacked accurate height finding equipment. The weakness of the system was particularly acute in the detection of hostile aircraft at night. In late 1940 it was suggested that, to augment the coastal system, a further series of radar installations, known as Ground Control Interceptor (GCI) stations should be developed. The first of these stations became operational in early 1941. In operation the GCI stations were notified by the coastal stations of the course of the intruder; the GCI station then took over tracking it. In concert with the local fighter sector, GCI controllers were able to direct the interceptors to within about 3.2 km (2 miles) of an intruder, from which point the fighter's own airborne radar with a range of 4.8-8 km (3-5 miles) was sufficiently powerful to track the target.

Rotor period radar station

By the late 1940s it was clear that the depleted wartime radar network was inadequate to cope with the threat posed by fast jet aircraft, and the wartime radar buildings did not offer any protection against atomic weapons. In June 1950 the Air Council approved the Rotor plan to up-grade the early warning radar and give more effective fighter control; it also aimed to provide protection for personnel by placing the control and reporting centres in protected bunkers (Hartcup 1993, 228). It was an enormous programme, which in addition to the construction of protected structures also demanded a new communications network and the installation of 1620 display consoles. The plan was split into four principal construction phases carried out between 1951 and 1954, although the majority of the stations were commissioned by the end of 1953 (Wood 1992, 204). The plan called for the construction of 25 GCI stations, of which 11 were housed in underground structures while the remaining 14 were accommodated in semi-submerged structures.

The control block at RAF Langtoft was designated an R6 type bunker - a double-storey surface bunker with 3.0m (10 ft) thick reinforced concrete walls. Internally it was arranged around a square operations well, 12.2m (40 ft) across. This was fitted out with situation map tables and a fighter tote display, and was overlooked by glass-fronted control cabins. The operations room was equipped with plan position indicators, height and range displays. Also fitted were visible marker units, radiotelephone (R/T) recorders (long), one timing unit, R/T recorders, a photographic PPI projector system and a large scale viewing PPI.

The main contractors for the construction work were the Demolition and Construction Company, who also built the bunker at RAF Ash, Kent (TR 25 NE 58).

Radar arrays

Source RAF Museum Hendon, Rotor 1 Rotor site plans appendix F - FC/T544097/6

The station was designated a GCI(A) station, a plan dated to December 1950 proposed that the following radar should be installed:

Search radar	Type 7
	Type 14 mk 9 on a 25 ft gantry
	Type 14 mk 8 on a plinth
	Type 11 mk 8 mobile aerial
Height finding radar	five Type 13 mk 6

The Type 14 and Type 13 radars were mounted on gantries or plinths; together they constituted a Type 21 radar.

The late 1950s

The Rotor scheme was relatively short lived. With the advent of faster jet aircraft it was found that the manual control and reporting, and filtering systems, used to pass information up to the Sector Operation Centres were too slow. Technological advances in radar, in particular the introduction of the powerful Type 80, with a displayed range of 386 km (240 miles) and a maximum range of 515 km (320 miles), also meant that fewer radar stations were needed. Under a new scheme, initially known as the '1958' plan, it was to proposed to revamp the United Kingdom's radar defences. This plan emerged in 1959 as a system called Plan Ahead, which was intended to be a centralised and fully automated air defence system to meet the threat from manned bombers. In addition it was to co-ordinate Lightning interceptor aircraft and Bloodhound surface to air missiles, which were coming into service. Under this scheme no role was envisaged for RAF Langtoft, and after a period of uncertainty, the station was relieved of its operational role and put on care and maintenance on 15 March 1958 (AIR 29/2946 Jan 1958, 9). The station was sold in the early 1960s and has subsequently been used a scrap yard.

DESCRIPTION

RAF Langtoft is located at the western periphery of the fenland 3m (10 ft) above OD, about 4km (2½ miles) east of the north to south rising ground of the Lincolnshire Wolds. From this position it was able to track aircraft over the fenland with little radar interference from rising ground or settlements. The station is sited on Langtoft Drain Road, about 3km (nearly 2 miles) east of the village of Langtoft and a similar distance northeast of Market Deeping.

The station was enclosed by a wire mesh fence, held by concrete posts with out-turned tops supporting three strands of barbed wire. This has been removed around most of the site, but stretches survive along its south-west side. In common with other radar stations of this date, poplar trees were planted around the boundary, and these too survive best along the south-west side. In part they were planted as a wind break, but also as a screen against prying eyes. More significantly they represent a continuation of pre-war ideals about station design, also reflected in the architectural quality of the bungalow-like guardroom.

The development of the station may be traced through historic air photographs. The wartime radar station occupied three fields set perpendicular to south-eastern side of Langtoft Drain Road. In a long parallel field to the south west of the station two parallel rows of post holes are visible on air photographs (36/TUD/T/6/8-Jul-1945, F6, frame 5064). It is unclear whether or not they are associated with the radar station. The main gate leading into the site was at its north-east corner; a small hut by the gate was probably a picket hut, and a longer building adjacent to it the guard room. At the end of the war the two phases of radar development may be identified. Along the north-eastern side of the site was the earlier, standard Intermediate GCI station, which comprised a goal-post type gantry, a timber operations room, and a small brick stand-by generator building. A shadow on the air photograph, reveals that the gantry was in position, but it unclear if the array was still in place. Along the south-west boundary of the site is the later wartime operations block known as a 'Happidrome' probably came into operation in May 1943 (Bullers 1991, 14). This is brick built with a flat concrete roof and comprises two elements the first is a single storey north-western end, which housed offices, toilets, and plant rooms; this area was locked and no internal inspection was possible. The north-eastern end is a large double storey space, now empty. This originally housed the operations room and viewing galleries. Langtoft was one of 21 fixed 'Happidromes', and was one of the 12 selected to be fully equipped with searchlight and fighter control facilities (Bullers 1991, 14).

Immediately to the northwest of the 'Happidrome' were three small buildings, of undetermined function, which have been demolished, but a small brick building with a keyhole shaped plan survives. This stands about 2m (6½ ft) tall, and the circular portion appears to roofed with a flat concrete slab; in the adjacent room is a water pump. It is thought that this structure formed part of the site's sewage disposal system. In the north-west corner of the site were a couple of small huts of undetermined function (36/TUD/T/6, 8-JUL-45, F6, frame 5064). Within the station perimeter were two mounded circular pits, probably formerly containing anti-aircraft sub-machine guns. The positions of the radar arrays are less easy to determine. The concrete radar well of the Type 7 is clearly visible, at approximately the site of the surviving well, which may be wartime in date. This evidence conflicts with the lay out of the station portrayed on a

1:1000 model of the site held by the Air Defence Battle Command and Control Museum at RAF Neatishead. This shows the 'Happidrome' and its associated buildings; but omits the intermediate GCI buildings, probably signifying the model was designed to show only the operational areas of the station.

Air photographs taken in 1946 and 1947 indicate no change took place in the plan form of the site between these dates (106G/UL/1489, 09-MAY-46, RS, frame 4404; CPE/UK/1932, 17-JAN-47, RP, frame 3103). Langtoft was one of only seven GCI stations retained after the war, although only at a stage of operational readiness rather than being continuously staffed (Gough 1993, 55).

By 1947 radar coverage of United Kingdom airspace was restricted to an area of the east and south coasts known as the Defended Area, which stretched from Portland Bill to Flamborough Head. From the middle of 1948 an urgent review of radar coverage was begun. The working party set up to study the problem defined a short-term objective to increase the cover available within the Defended Area, and a longer-term goal to extend cover across the whole of the United Kingdom. In July 1948 they recommended the immediate restoration of a number of GCI and Chain Home radar stations (Gough 1993, 50). This policy is clearly evident in the modification of the plan of the site. By October 1949 a group of pre-fabricated huts had been built north east of the 'Happidrome'. At this time the two-storey section of the 'Happidrome' was extended on its north-eastern side. Two observation windows and a door were inserted in the former exterior wall, probably to provide additional control cabins overlooking the operations room. The goal-post gantry of the wartime intermediate station was dismantled, but its associated buildings were retained. To the south east of the 'Happidrome' linear disturbances indicate that a cable line was dug to a new radar head. Soil disturbances around the Type 7 radar well may indicate that a new well was installed (541/367, 31-OCT-1947,RP, frame 3121; 541/531, 23-MAY-1950, RP, frame 3019). A similar pattern of modifications is also evident at the GCI radar station at RAF Sandwich in Kent (TR 35 NW 173).

Langtoft was one of 21 sites selected to become a new GCI under the Rotor programme to renew Britain's radar defences, and one of five sites to receive an R6 type, double-level surface control bunker (Gough 1993, 97). A plan preserved in the RAF Museum at Hendon illustrates the proposed lay-out of the modified station (Rotor 1 Rotor site plans appendix F - FC/T544097/6). To the west of the 'Happidrome' the position of the new R6 operations block is shown, and to the north a stand-by set house, probably housed in an existing building. At the south-east corner of the 'Happidrome' a hard standing is marked to accommodate the operations vehicle for the mobile Type 11 mark 8 radar sited to its south east. The Type 7 radar is located either at, or very close to, the position of its wartime predecessor. Beneath the radar is a reinforced concrete well which housed the radar's turning mechanism, and transmitting and receiving equipment. This survives, but has been stripped of its equipment. The station was also to be equipped with two Type 14 centrimetric scanning radar to determine the position of aircraft. One was a Mark 9 mounted on top of a 7.6m (25 ft) steel gantry and the other a Mark 8 mounted on a standard concrete plinth. Both the Type 14 radars lay in the field to the east of main site, and have subsequently been removed. The station was also provided with five Type 13 Mark 6 height finding radars mounted on standard concrete plinths. The two Type 13 plinths in the eastern field have been demolished, but the other three remain, the best preserved being the northern-most one, which has latterly been used as an explosives magazine. It is constructed from reinforced concrete

and is square in plan, and is roofed by a flat projecting concrete slab. Its entrance is sealed by a hinged steel door which is protected by a sliding steel door about 0.30m (1 ft) thick, and its interior is sand or gravel filled. Adjacent to its door a vertical steel ladder gives access to the roof. The remaining three elevations are blank except for a ventilation grill at the top of each wall - a steel plate with circular holes drilled into it. Along the centre of the roof is a raised step on which the radar was mounted. The other two Type 13 radar plinths, south east of the 'Happidrome', are identical, but have been stripped of their metal fittings. The plan also shows that some of the wartime buildings close to the main entrance to the site were to be retained. In addition three landing strips (for small Auster liaison aircraft) were marked between the radar plinths.

An air photograph taken in May 1954 confirms that this plan was implemented with some minor modifications. The wartime buildings close to the original entrance were demolished, but the wartime buildings associated with the intermediate GCI station were retained. The main entrance was moved to the road close to the R6 bunker. Adjacent to the road a standard Rotor period bungalow-like guardroom was built. This survives, in an extended form converted, into a house. Adjacent to the bunker was placed a long, probably prefabricated hut, set obliquely to the road. To the south east of the R6 bunker a small transformer house was built, which still survives. The arrangement of the radars was as planned, except that there is no evidence for the deployment of the mobile Type 11 set. To the north east of the 'Happidrome' was a large open circular structure, perhaps a sewage settling tank (82/925, 27-May-1954, V, frame 0031).

Between 1954 and 1958 a standard Type 80 radar modulator building was built to the east of the 'Happidrome' (58/2591, 24-Sep-1958, V, frame 010). It is a brick built, single-storey, three cell structure with cement rendered walls and a flat concrete roof. At its western end is the modulator room; above, the radar was mounted on a steel gantry over the building - the concrete footings for the gantry are visible on the air photograph. It is, however, uncertain if a Type 80 radar was installed at Langtoft. No radar gantry is visible on the September 1958 air photograph - alternatively it may have been removed following the reduction in status of the station in March of that year. Some contraction in the size of the station is also evident by this date. The long building close to the guard room had been demolished, as had the wartime buildings north of the 'Happidrome', and also the surviving structures of the wartime intermediate GCI station. By the mid-1960s the outward form of the station had changed little, except that the all radar arrays had been removed (MAL/65093, 03-Nov-1965, F65, frame 038). Subsequently the radar plinths in the field to the east of the station have been demolished and the land returned to arable.

R6 Bunker

The operations block is a standard R6 double level bunker. The report on the R6 at Hack Green, Cheshire (SJ 64 NW 15) fully describes and illustrates this form of bunker. This description will limit itself to main surviving features of the R6 at Langtoft.

At its southern end the original entrance has been opened up, by enlarging the doorway in the external wall and cutting a hole through the inner wall to give entry to the upper level. The original entrance was up a steep flight of stairs leading to a pair of double steel blast doors. Mounted on the roof above the steps is a steel lifting beam, used to lift heavy items of equipment into the bunker. Internally the lay-out of the bunker remains as it was left in 1958 when the station was stood down, although it has suffered

from some stripping of fittings. Both levels are divided into two unequal halves by longitudinal corridors, one above the other, running the length of the structure. Staircases at either end give access to the lower level. At the northern end of the bunker is a stair well, with a steel beam and crane over it, to allow heavy items to be lowered down. Along the eastern side of the corridor is a single large room, which was originally sub-divided; at its northern end is a square section of wooden flooring, which could be removed to provide access to the lower level. At its southern end is the operations well, which is open to the lower floor. This was formerly overlooked by control cabins on the upper floor. These have been stripped out except for a few timber window surrounds. On the opposite side, at the centre of the corridor, is the kitchen, which retains its benches. To either side were rest rooms, cloak rooms and lavatories segregated into RAF and WRAF, the facilities for the WRAF being slightly larger. At the southern end of the bunker were officer's lavatories and beyond a transformer room. Between the RAF and WRAF officer's lavatories a flight of stairs leads to the lower floor.

The lower floor corridor was carried on reinforced concrete floor sections which could be lifted to give access to cable ducting. Most of these have been removed. As on the upper floor most of the internal room divisions have been removed.

Wireless station

A detached wireless station is sited about 3.5km (2 miles) west of the main site at TF 1165 1330. It lies between Langtoft village and Baston, and is approached off a dedicated minor track on the east side of Deeping Road. It comprises a brick built rectangular single-storey structure with windows protected by steel blast shutters. It is currently in agricultural use and was not entered.

Domestic site

To house some of the personnel at the station an RAF housing estate was built about 2km (1¼ miles) southwest of the radar station at Market Deeping (TF 139 112) (Dobinson 1998, 157). This site was not investigated.

SOURCES

PRIMARY

National Monuments Record - air photographs

36/TUD/T/6, 8-JUL-45, F6, frame 5064

106G/UL/1489, 09-MAY-46, RS, frame 4404

CPE/UK/1932, 17-JAN-47, RP, frame 3103

541/367, 31-OCT-1947, RP, frame 3121

541/531, 23-MAY-1950, RP, frame 3019

82/925, 27-May-1954, V, frame 0031

58/2591, 24-Sep-1958, V, frame 010

MAL/65093, 03-Nov-1965, F65, frame 038

RAF Museum Hendon

Rotor 1 Rotor site plans appendix F - FC/T544097/6, Binding of 1.500 site plans 21-Dec-50

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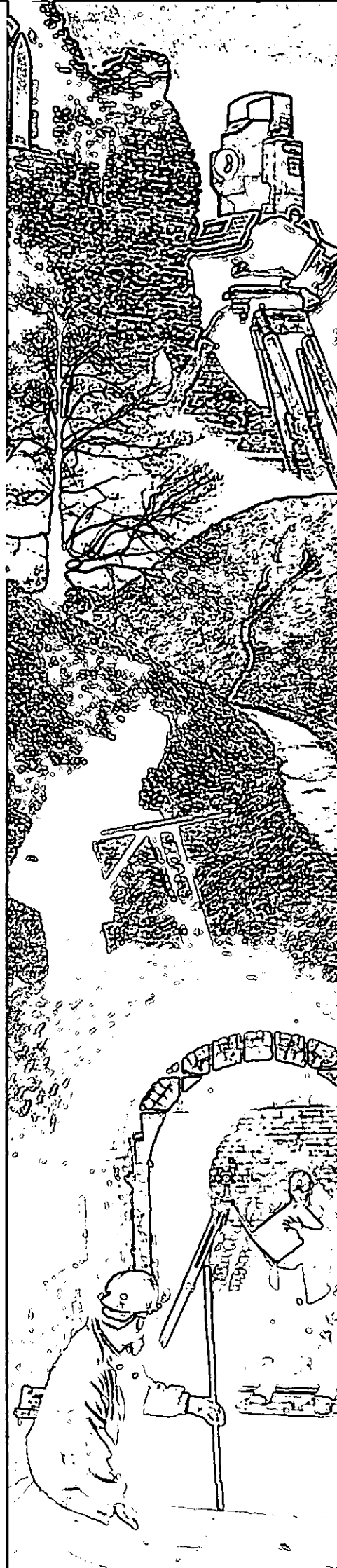

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