

# Starlight, Southern Radar and RAF Sopley



Link : Robert Connolly's site on [Ulster Radar](#), Sopley's sister station at RAF Bishops Court, Co.Down



The story of [Radar and the Dorset coast](#)

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## THE TECHNICAL HISTORY OF STARLIGHT

### The Ground Controlled Intercept Radar Station at Sopley 1941- 45

I recently received a copy of a small booklet produced by Pat Sparkes, who was a WAAF at Starlight. Within its pages are some clues as to the technical configuration of the station.

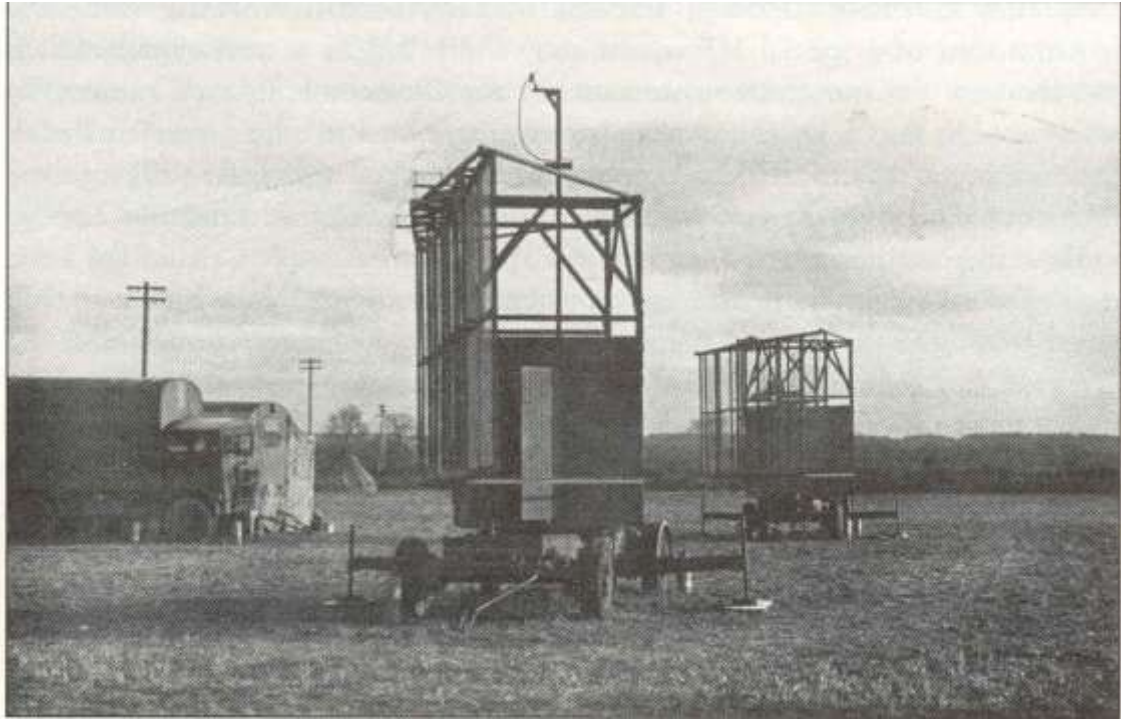
On Christmas Day 1940 a Royal Air Force mobile unit found a site suitable for a ground control intercept radar station, radio call sign Starlight, in the valley of the Hampshire Avon river, near Sopley village. The radar station had been developed at the Air Ministry's Air Defence Research and Development Establishment in nearby Christchurch. ADRDE and the Telecommunications Research Establishment at Worth Matravers in Dorset contributed to the station's upgrading in 1941 and 1942.

In early 1941, one hundred successful night interceptions were achieved by the fighter controllers at Starlight working in conjunction with Bristol Beaufighter night fighter squadrons. The staff for the station were billeted in the nearby villages of Sopley, Winkton, Bransgore and Ripley.

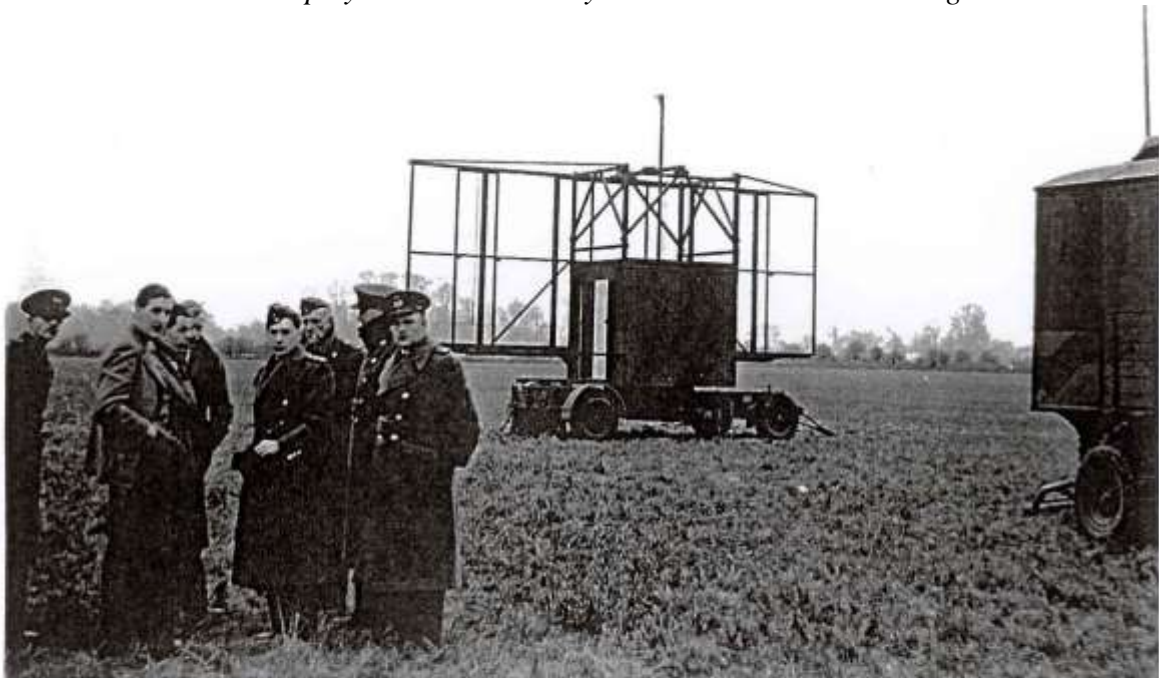
The early 1941 station was known as Sopley Mk I, the late 1941 station as Sopley Mk II or the "Intermediate". The third and "Final" phase of the wartime stations development was in 1942, it was known to the staff as "the Happidrome".

## STARLIGHT - THE WAR YEARS

### Sopley Mk I

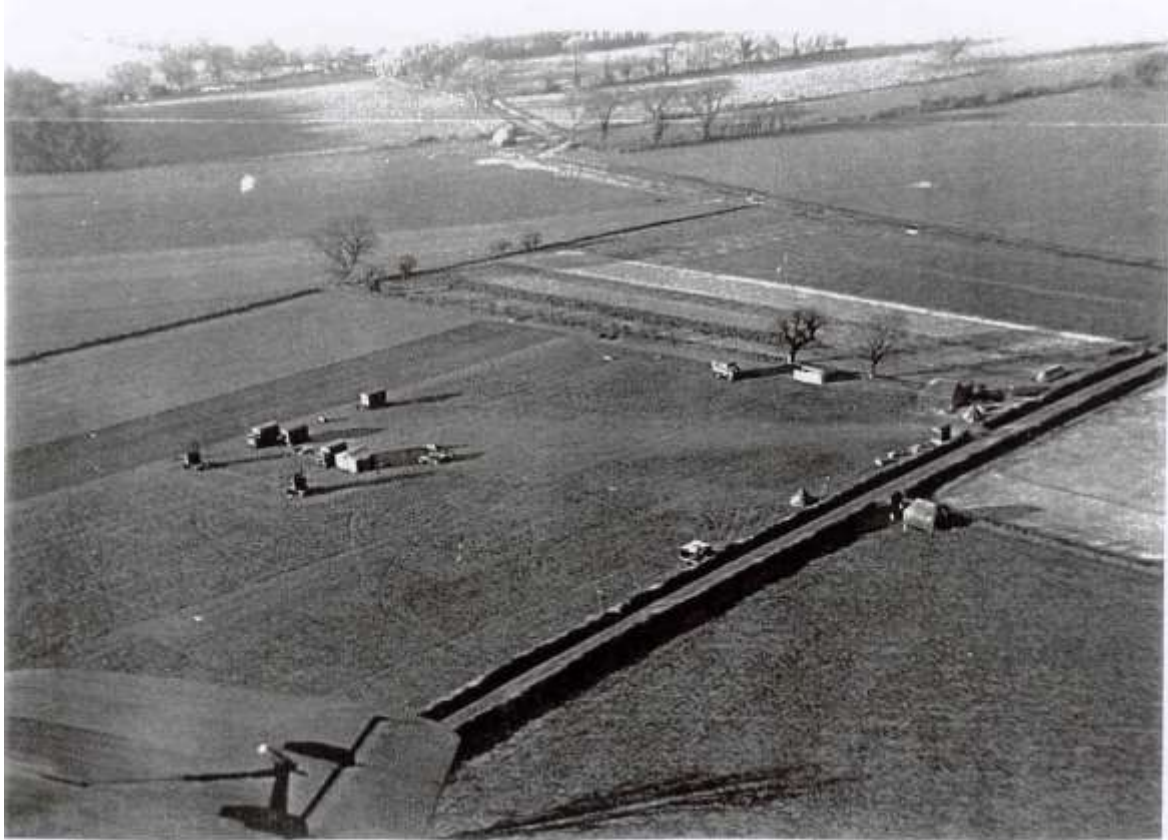


*Type 8 radars of the Mk 1 Sopley GCI station These Mobile Radar was designed at the Telecommunications Research Establishment at Worth Matravers but was built at Christchurch (presumably by the Air Defence Research and Development Establishment). It arrived at Sopley on Christmas Day 1940 and was in use during 1941*



Above; Sopley, 28th December 1940. A group of TRE staff and technicians on site during the initial installation of the GCI radar at Sopley. The young Scientist looking over his shoulder towards the camera, is Duckworth who was in charge of the TRE modification team.

Below; Sopley GCI seen from the air on 5th January 1941. Despite being described by Frank Griffiths as looking like the remnants of a farm sale, this GCI formed an important part of Britain's night defences during the 'Blitz', combined with AI Mk IV equipped RAF nightfighters. Sopley GCI became the most successful GCI with over 100 victories to its' credit; more than twice that of any other GCI .



The original Radars, sometimes referred to as Type 8s were adapted Army Gun Laying trackers. Sopley had a Type 8 Radar mobile unit with two manually rotated aerials. They were fitted with a 12 foot, 4 bay 4-stack aerial system. The aerials had a wooden frame, a lattice wire reflector and dipoles mounted in front of the reflector. Both aerials were rotated manually by airmen pedalling in the cabin mounted on the aerial trailer and behind the aerial array. The aerial's alignment onto a target was originally a manual process with airmen (known as "Binders") pedalling to operate a mechanical linkage to turn the aerial. The fighter controllers used a bell code and mechanical indicators on a device not dissimilar to a ship's telegraph in order to direct the airmen's efforts. This manual technique directed by the controller could allow the aerial's sweep to be reversed and also concentrated in a defined sector of the sky. This would permit a more frequent update of the track information than a 360 degree scan during the later stages of an intercept.

The transmitter and receiver were each mounted in big Crossley lorries that also towed the aerials and portable diesels. The receiver truck also had a mobile control cabin that was used when the Type 8 units were truly mobile, unlike Sopley. It would however have made a useful back up facility. One aerial was the transmit aerial powered by a transmitter installed in lorry and equipped with VT98 valves. The other was the receiver whose signal was fed into the Ops wagon. The receiver fed a range of displays (giving bearing, range and height and incorporating one Plan Position Indicator [PPI] scope). The height finding functionality was described as "hazy" in the beginning. The two aerials were synchronised by a Wheatstone Bridge circuit feeding two meters, one in each radar cabin. The two aerials had a master and slave relationship with the slave radar always zeroing on the setting from the master's dial, whose direction was in turn determined by the controller.

During GCI operations the ops room, a Brockhouse trailer, held a crew of three, a height finder operator, a fighter controller and a plotter. The plotting area appears to have been segregated from the PPI area by a curtain. Between the receiver aerial and the Ops van was a Dennis truck filled with radar display equipment to drive the PPIs in the Control Van. From the beginning Starlight seems to have been equipped with Identification Friend or Foe (IFF), although the phraseology used "let your cockerel crow" seems quaint and gentlemanly compared with the modern day "squawk".

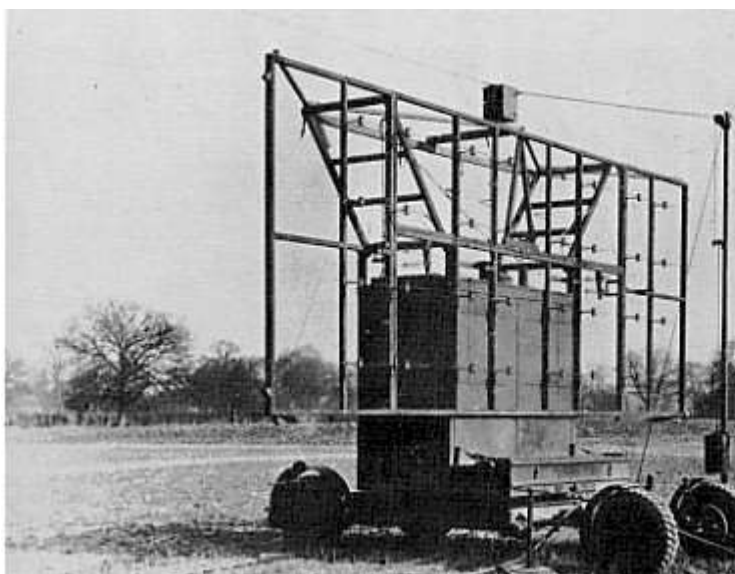
The unit used both AEC Matador and Dennis trucks and the various references to caravans, vans, wagons etc seems to refer to the ubiquitous Brockhouse 4 wheeled utility trailer.

### **Sopley Mk II (Intermediate)**



The second radar station at Sopley (Mk 2) 1941-42.



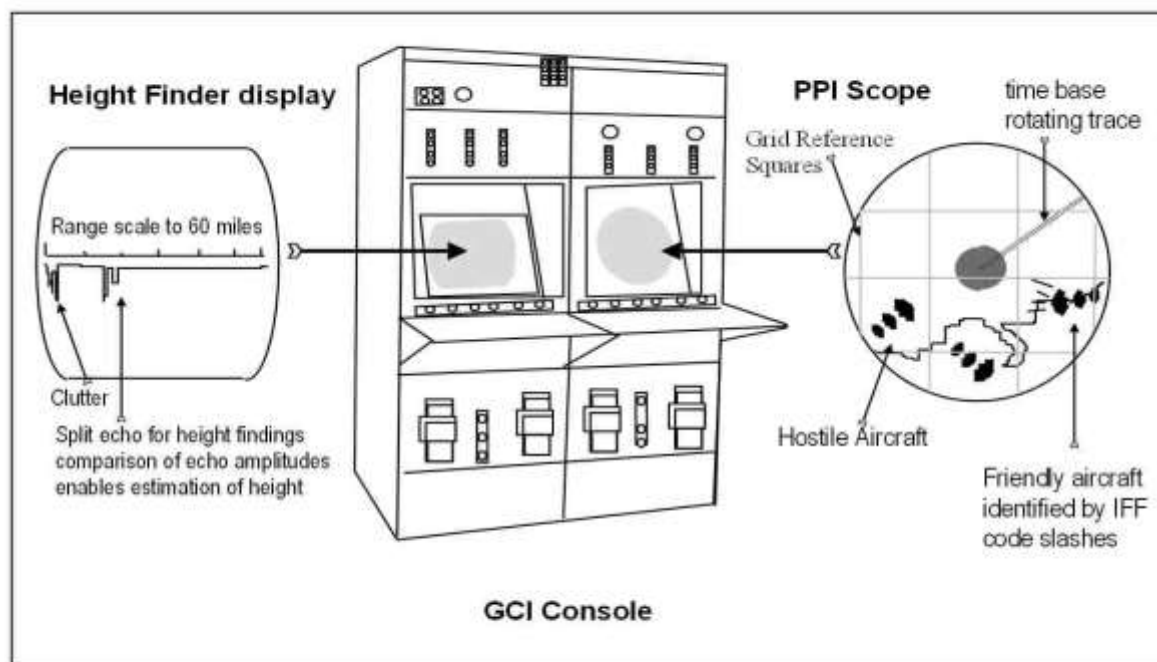


Type 8F

*This upgraded Mobile Radar was in use at Sopley Mk2 from late 1941. It was subsequently replaced with an electrically rotated radar almost certainly an AMES 8C intermediate transportable GCI - hopefully a photo is to follow shortly.*

*Mobile control cabin possibly for a Type 8 as it has the aerial bearing designation equipment between the console and the table. The cabin was mounted in a lorry or trailer.*

photos B C (Brian) Jones



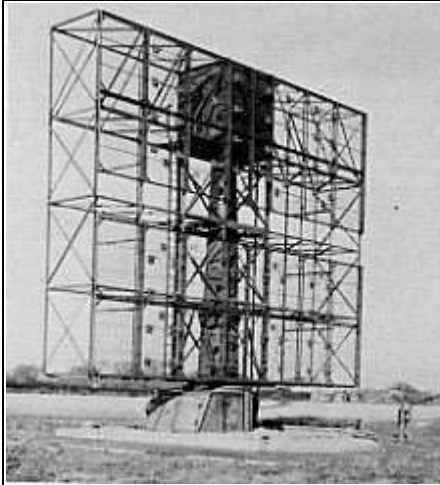
*diagram of GCI consoles and principle radar display features*

Initial hostile radar contacts were provided to Sopley by the Chain High and Chain Low early warning stations. Contact information included the range, bearing, speed and height of the contact. The GCIs accepted the transferred plot and took over. There were four staff in the ops room now, on the right in front of the PPI was the (Fighter) Controller whose display was overlaid with a grid reference (Sopley's grid reference was approximately U605177) and a coastal map. To the left using a timebase Cathode Ray Tube was the height finding position. Better height finding techniques had evolved but even now the equipment gave better comparative heights between aircraft than really accurate vertical heights above the ground. On the right was the plotter but now, behind the controller was a fourth crew member who called out the radar positions to the plotter. The plotter calculated aircraft speeds (both ground and air), and both the headings and tracks of targets using a map and a Dalton computer, essentially a navigation task.

Fighters were held at beacons on readiness, initially just one or two aircraft, the second was called onwards when the first fighter reported visual with it Target. Later units using Type 7 radars had multiple radar intercept and height reading cabins so could serve more fighters.

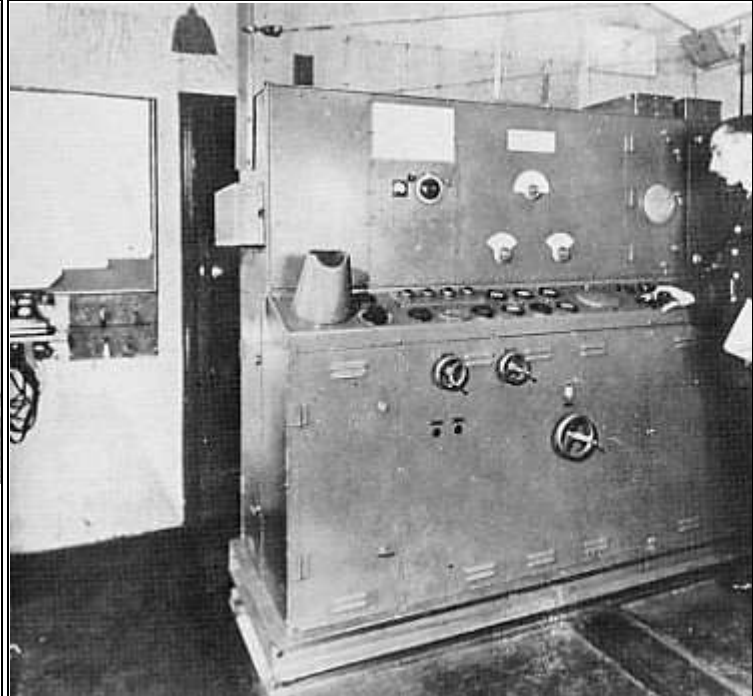
The Mk II Sopley was re-equipped with a AMES Mk 8C intermediate transportable GCI radar to augment its new recessed operations room half set into the ground. The efficiency of the transmitter and receivers had improved giving improved range. Whilst still described by visiting pilots as a collection of wooden huts, vehicles and a caravan draped in a tarpaulin, the site had acquired an air of permanence. The layout of the site had not changed much but it was now referred to as a "permanent" or "huttet" mobile site.

### **Sopley Mk III (Final) "the Happidrome"**



### Type 7 radar

*Installed at Sopley to replace the Type 8, the Type 7 aerial was also fully powered and had its equipment room in an underground room known as the well.*



In 1942 the station was significantly upgraded with a large permanent building designed for the purpose with intercept cabins and proper height finding facilities. The building housed a PBX (telephone exchange) and an "Apparatus " (telecommunications equipment) room. There were two plotting tables in a large plotting room (called the reporting room), that was designed along the lines of those seen in films about the Battle of Britain, with a vertical "Tote" board detailing the status of flights and raids and an elevated controller's cabin. One plotting table at Sopley showed the regional situation, the other the local picture. A Kassini military grid reference was marked on the map tables.

An article in the July 2005 issue of Flypast magazine describes the workings of the much larger operations and plotting room at RAF Uxbridge. This was used as the 11 Group command post in the Battle of Britain and would have possessed greater functionality than was required at Sopley. None the less the information gives some clues as to how operations were conducted.

From the elevated cabin a Supervisor would oversee the entire situation whilst (possibly) an Allocator would allocate fighters and intercepts to individual fighter controllers, who would then control the radar interceptions. The controllers and their assistants were situated in the elevated cabin behind the controller, and in the reporting room. There would be direct phone lines to the wider air defence organisation, manned by an assistant.

On the plotting table metal arrows showing the position and direction of contacts. WAAFs used metal poles with magnetic tips to manipulate the arrows which were colour coded in co-ordination with an RAF sector clock with 5 min colour sectors to show the recency of the plot information. Plots more than ten minutes old were discarded, so only two colours of arrows would have been visible at any one time. If the station was busy, a WAAF supervisor maintained the wall mounted tote board and added additional data to the arrows such as a contact number and a classification of the contact as Hostile or Friendly. The tote board would have listed the local RAF night fighter stations, including Hurn and Middle Wallop, their night fighter squadrons with whom Sopley worked, the aircraft available and their status.



*RAF Sector Clock*



The Reporting Room (as seen from the overlooking Chief Controller's console) the foreground are supervisors. The large and small plotting tables show different situations respectively.



The Chief Controller's console in foreground displays PPI (Plan Position Indicator) responses.



Reporting Room of final GCI station, AMES Type 7, generally known as the Hap.

*Photos from [radar pages](http://radar-pages.com) website. Pat Sparks confirms they are of Sopley Mk III GCI Hapdrome, as she can identify several of her former colleagues in the pictures*

The airmen and WAAFs at the Hapdrome numbered a total of 144, working 40 to a watch. In the beginning in late 1940 there were only eight airmen and 4



WAAFs with 6 to a watch, in the "Intermediate" phase the staff had risen to 40 in all. The three watch duty rotation was ...

Day 1 08:00 – 13:00 and 23:00 until 08:00 on Day 2

Day 2 a second duty of 17:00 to 23:00.

Day 3 13:00 – 17:00

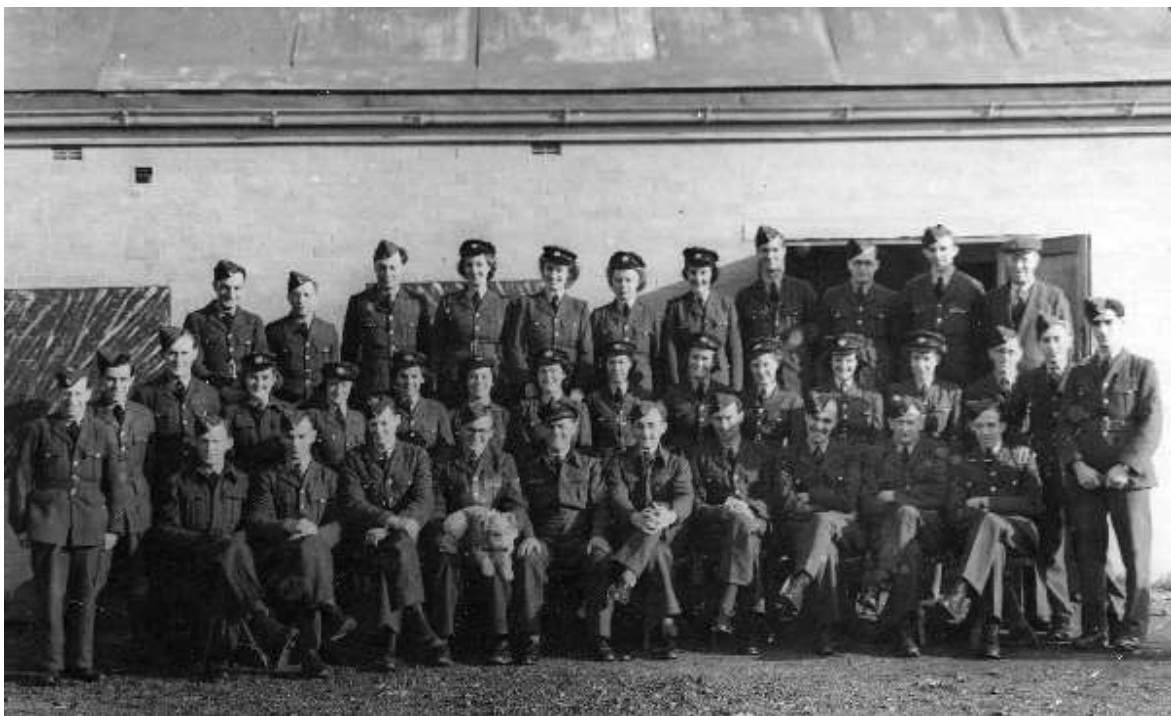
...the hardest watch keeping pattern to operate. Just one night off in three, a 36 hour pass every nine or twelve days.

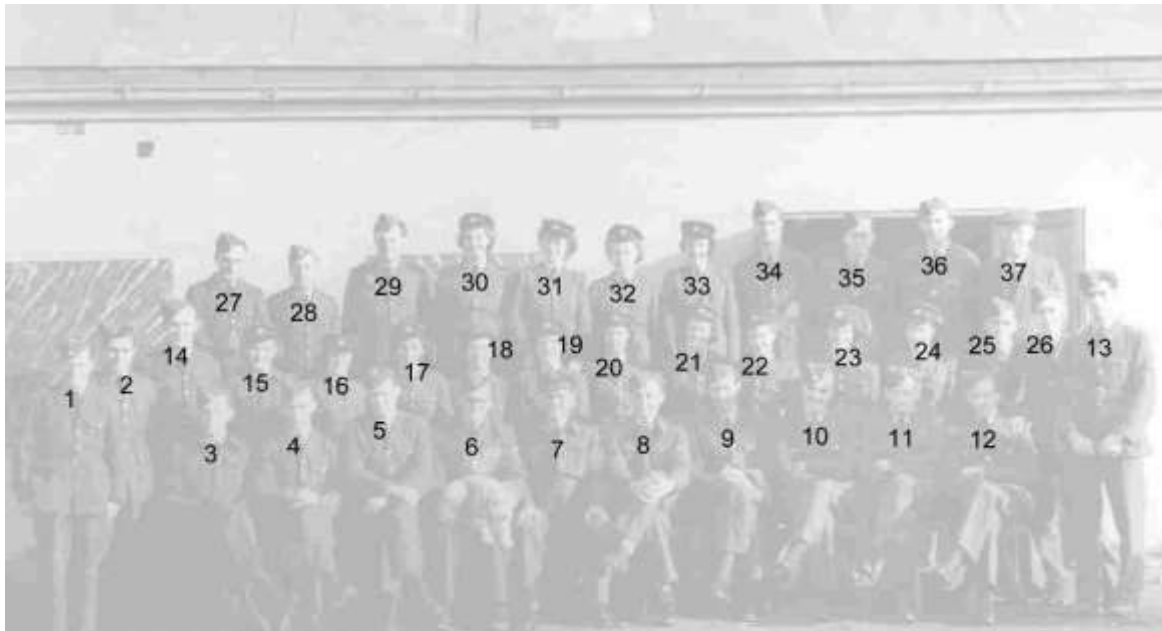
At least one Happidrome survived after the war, as an Air Traffic Control Radar Unit at [Western Gailes](#) on the Ayrshire coast in Scotland





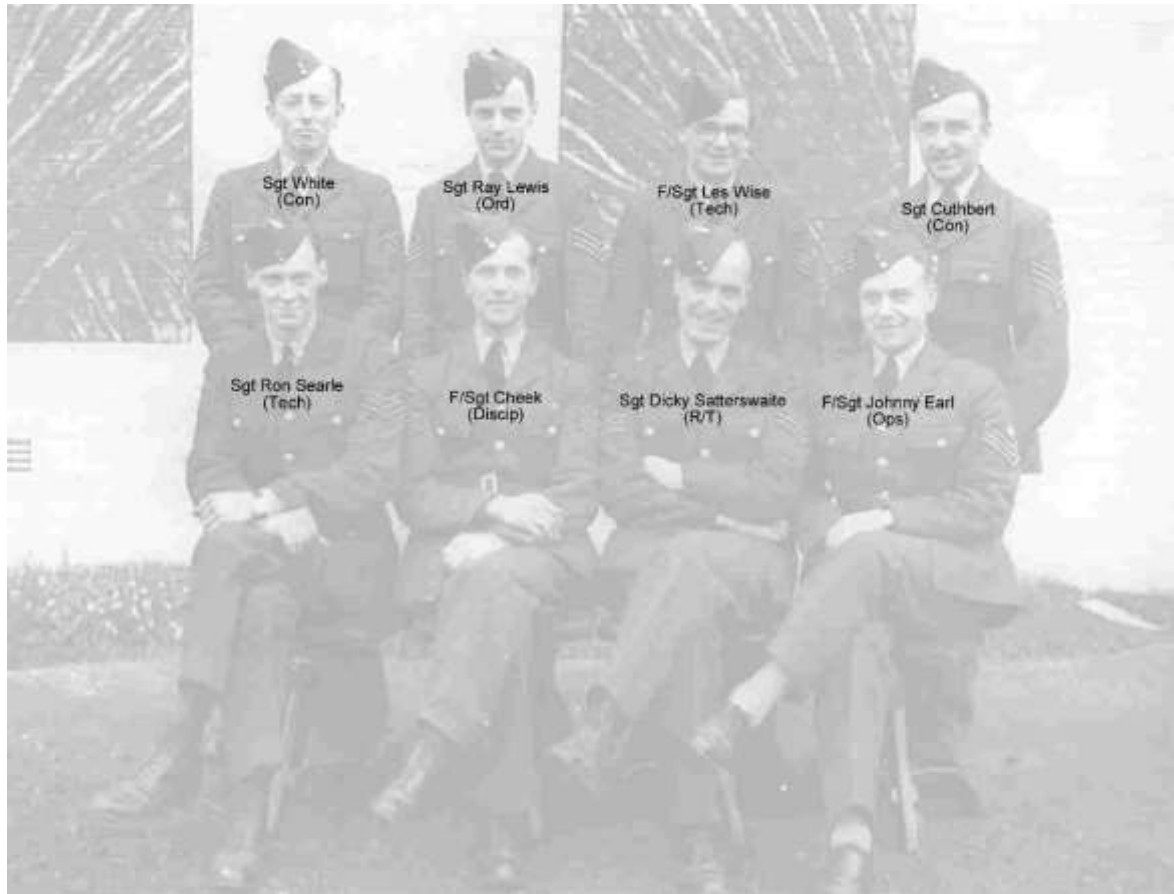
Photo and signatures of some of the Sopley GCI staff, perhaps one of the watches at the Happidrome?





1. "Shorty" Taylor	8. F/O Cole	15. ? WAAF R/T	22. ? WAAF R/T	29. "Dusty" Rhodes	36. "Jimmy" Studd
2. Ron Biggs	9. Sgt "Bud" Wright	16. ? WAAF R/T	23. ? WAAF R/T	30. ? WAAF	37. ? Civilian
3. Cpl Leonard	10. Sgt "Dicky" Satterswaite	17. ? WAAF R/T	24. ? WAAF R/T	31. ? WAAF	
4. Cpl Richardson	11. Cpl "Taffy" Hopkins	18. ? WAAF R/T	25. ? Airman	32. ? WAAF	
5. Sgt Ron Searle	12. Cpl Bill Dwyer	19. ? WAAF R/T	26. "Wally" Grubb	33. ? WAAF	
6. F/Sgt Les Wise	13. "Dicky" Budd	20. ? WAAF R/T	27. Cpl Love	34. "Brew" Brewerton	
7. F/Lt "Afer" Harris	14. Jack Leonard	21. ? WAAF R/T	28. Cpl Bill Danson	35. "Freddy" Priest	





*photos courtesy of Mike Searle*

Mike's late father Ron Searle (Sergeant GCI radar operator/mechanic) was stationed at both RAF Southbourne and RAF Sopley during 1944/45.

Mike's father 'lived out' with his parents at Station House, Ringwood , where his father (Mike's grandfather) was the stationmaster, when Ringwood was part of the old Southern Railway. He used to 'commute' to Sopley by bike, and on occasion would visit RAF Southbourne (by RAF transport from Sopley). Mike would like to contact anyone who may have known his father. [Contact](#) this web site and I'll pass on details to Mike.

## **Other radar and navigation sites in the same general area as RAF Sopley**

### **Isle of Wight**

*Bembridge*                      Type 41 10 cm coast watch radar

*Ventnor*                        Chain Home, 50 cm Fighter Direction Radar, Type 24 height finder, Types 52 and 53 10 cm coast watch radars

*St Boniface Down*    Chain Home Low

*St Lawrence*                Chain Home



*Blackgang*                    Type 8 GCI and Mobile GCI type 21 convoy with types 13 and 14 radars

*Needles*                    Type 41 10 cm coast watch radar

### **Hampshire (then now Dorset)**

*Southbourne (by Hengistbury Head)*    Chain Home

### **Dorset**

*Tilly Whim*                Oboe

*Worth Matravers*        Chain Home Low, SCR615 radar (AMES Type 66) Gee and Loran

*Bulbarrow Hill*         Gee

*Ringstead*                Chain Home

*The Verne*                Types 41, 54 and 57 10 cm coast watch radars

*Westcliffe (Portland)* Chain Home Low

### **MEMORIES**

#### **John Kirkham remembers...**

*" I recall going into the operations room of the Air Defence Network at Sopley where the movements of enemy planes were plotted on a big plan of the South of England. Every time the telephone rang with the latest information of German Planes heading for the South coast or flying over Southern England. the cluster of wooden fighters on the model would move as the aircraft were tracked. I remember too visiting some of the houses which had been requisitioned and where air force personnel were billeted, Avon Tyrrell, Sopley Park and Sopley vicarage to mention a few."*

In his book "A Glimpse of Sopley" the late Sam Morris included a reminiscence by Brindley Boon, one of the first RAF personnel to arrive at the original radar station.

*"Sopley was the first ground controlled interception unit. Operations were carried out from a trailer in the middle of a requisitioned field. We soon became the eighth wonder of the world. Everyone who was anyone came down to be entertained by*

*the fascinating new toy. Winston Churchill and Clement Atlee and other cabinet ministers; war lords; foreign diplomats; military brasshats - the lot. The crowning glory was a visit by King George VI. I was the fighter plotter that night. My job was to track the courses and calculate the airspeeds of friendly and hostile planes on a huge perspex grid reference map and to pass such information on to the controller to be included in instructions transmitted to the pilot. The king was given a seat on my right, a curtain separating us.*

*We had been well briefed. Should the VIP speak to us we were to remember that he was there primarily as an RAF officer and we were to address him as "Sir", never "Your Majesty" ! Imagine my state of panic when, right in the middle of a chase across southern skies, the curtain was drawn aside and a deep guttural voice asked "and what are you doing ?". I sprang to my feet and sent my chinograph crayon hurtling to the floor, and replied in my best open-air voice "plotting your Majesty", as if I were about to plant a bomb under the throne. "Oh are you" commented the king as he stooped down into the darkness to retrieve the crayon which he calmly restored to a ledge in the plotting table."*

Despite the King's intervention the record shows that that night, while the King watched, the British night fighter ace John Cunningham, flying a Beaufighter from RAF Middle Wallop, successfully intercepted an enemy aircraft which crashed near Ringwood about six miles north of Sopley. Popular legend has it that the King was able to step outside after the successful interception in time to see the flames of the enemy aircraft as it fell to earth.