



# *FlyPast* Spotlight

# Armstrong Whitworth Whitley

22 Pages in detail

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**Main picture**  
A 58 Squadron Whitley crew with their aircraft at Finningley in 1939.  
VIA ANDY THOMAS

Spotlight this month focuses on an often overlooked World War Two bomber – Britain's Armstrong Whitworth Whitley.



# The Armstrong Whitworth Whitley

We examine the history of the Whitley, one of three medium bomber types in RAF service when World War Two began

**Above**  
Whitley Mk.V  
T4149 took part  
in rocket assisted  
take-off trials at  
Farnborough. One of  
the rocket pods can  
be seen below the  
wing.

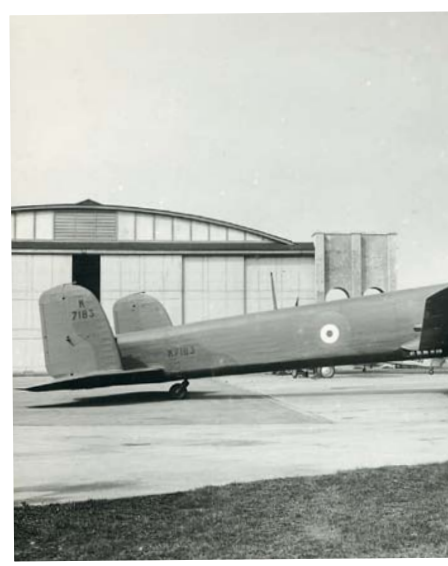
**W**ith the benefit of hindsight it is tempting to regard the Armstrong Whitworth Whitley as a crude forerunner of the more fit-for-purpose bomber designs that rapidly followed. In fact, though it failed to gain the 'fame' that later aircraft would, the Whitley fulfilled a significant role for the RAF, especially in the early war years. Although its place in history has often been overlooked, it was used extensively – and often effectively – in the hands of many courageous crews.

Armstrong Whitworth was a major British manufacturing company specialising in aircraft, shipbuilding and locomotives. Having merged with Vickers in 1927, its aircraft division was bought out by J D Siddeley and became a separate entity. Of the many machines it produced both before and afterwards, the Whitley was built in the greatest numbers.

### Early days

As the British Government entered its rearmament programme in the 1930s, the AW.38 Whitley was designed to meet an Air Ministry specification for a heavy bomber. Compared to the later Avro Lancaster, Short Stirling and Handley Page Halifax, the Whitley seemed far from 'heavy', but in the early part of World War Two it was capable of carrying the largest bombs available to the RAF.

Designed by John Lloyd, Whitley prototype K4586 first flew on March 17, 1936, from Baginton (now Coventry Airport) in Warwickshire, piloted by Alan Campbell-Orde. It was powered by two 795hp (593kW) Armstrong Siddeley Tiger IX radial engines. These were swapped for Tiger XI units in the second prototype. The same engines equipped the first production Whitleys but were rapidly upgraded in subsequent variants. The Whitley Mk.V, by far the most numerous version,





was powered by two Rolls-Royce Merlin X liquid-cooled V12s, each generating 1,145hp.

RAF orders for 80 machines had already been placed by the time it first flew – the Mk.I, technically advanced for the day, being the first aircraft with a stressed-skin fuselage to be produced for the air force. It was soon joined in military service by the supercharged Mk.II and III – the latter featuring a larger bomb bay and improved armament.

The Merlin engine was available for the Mk.IV and V versions, increasing range, speed and bomb-carrying capacity. Four RAF squadrons – 10, 51, 58 and 78 – were equipped with Whitleys at the outbreak of war. Some of the aircraft were committed to action on the very first night of hostilities, ten Mk.IIIIs from 51 and 58 Squadrons flying a propaganda leaflet dropping ‘op’ over Hamburg and Bremen.



### War Horse

Further leaflet drops followed, but the first ‘aggressive’ Bomber Command use of the type came on the night of December 12/13, 1939, when Mk.Vs attacked German seaplanes departing Borkum on the Frisian Islands. The focus on German coastal installations continued into the early part of 1940 with mixed results.

On March 19, a large group of Whitleys from 10, 51, 77 and 102 Squadrons were joined by Handley Page Hampdens in a raid on the seaplane base at Hörnum, on the island of Sylt. The action intensified over the spring and summer of 1940, aircraft attacking railway stations and German supply routes into the Netherlands. On June 10, Whitleys made the RAF’s first bombing sortie against Italy, although only 13 of the 36 that took off actually reached the targets due to a combination of poor weather and technical difficulties.

In August, the type registered another ‘first’ when aircraft from 51 and 78 Squadrons were involved in the inaugural raid of the war against the German capital, Berlin. Attacks on many other targets in Germany and Europe occupied Whitley crews for the next 12 months.

The more robust and capable Vickers Wellington gradually began to replace the Whitleys in 1941, the older machines being relegated to operational training units (OTU) and other roles. The Armstrong Whitworth last flew in ‘anger’ with Bomber Command on April 29, 1942, targeting the harbour at Ostend in Belgium. Although by now outdated, a few OTU aircraft were later assigned to take part in the ‘1,000 Bomber Raid’ on Cologne on May 30.

### Operation Colossus

In Britain’s first attempt to drop soldiers behind enemy lines, Whitleys were tasked with delivering paratroopers to Calitri in southern Italy, where they were to destroy an aqueduct which supplied water to several ports used by the enemy. Six aircraft from 78 Squadron were converted into troop carriers for the ‘op’ on February 10, 1941.

A combination of mechanical failures and navigational errors led to some of the men and equipment landing in the wrong area, but the remaining soldiers succeeded in disabling the aqueduct. It was, however, rapidly repaired and all the men were captured. Fortunato Picchi, an Italian translator, was executed, with all but one of the others becoming PoWs. Lt Anthony Deane-Drummond managed to escape and eventually made it back to England.

Elsewhere, Whitleys admirably carried out tasks with the RAF’s Coastal Command, the Mk.VII being fitted with the ASV II anti-surface radar. They were also used as troop transports. Aircraft from 78 Squadron dropped 37 SAS soldiers behind enemy lines in Italy during Operation Colossus (see panel) and others were engaged in ‘special duties’ operations (typically dropping agents over France) or were used as glider tugs.

Having first evaluated the aircraft in 1942, the Fleet Air Arm operated a number of modified former RAF machines from 1944 to 1946, mostly to train aircrew in fuel transfer and engine management procedures. This was the final use of the type, the RAF retiring its last examples in 1945. Though undoubtedly one of the less ‘celebrated’ bombers of World War Two, the Whitley was an effective and versatile workhorse. Its use laid the foundations for the successes that followed, largely – it must be remembered – due to the bravery of the men that flew them. ●

**Below left**  
Whitley K7183, an early example of the Mk.I, pictured in April 1937.

**Below**  
Armstrong Whitworth Whitley Mk.V N1349 of 10 OTU. This aircraft was the fifth production Whitley V.



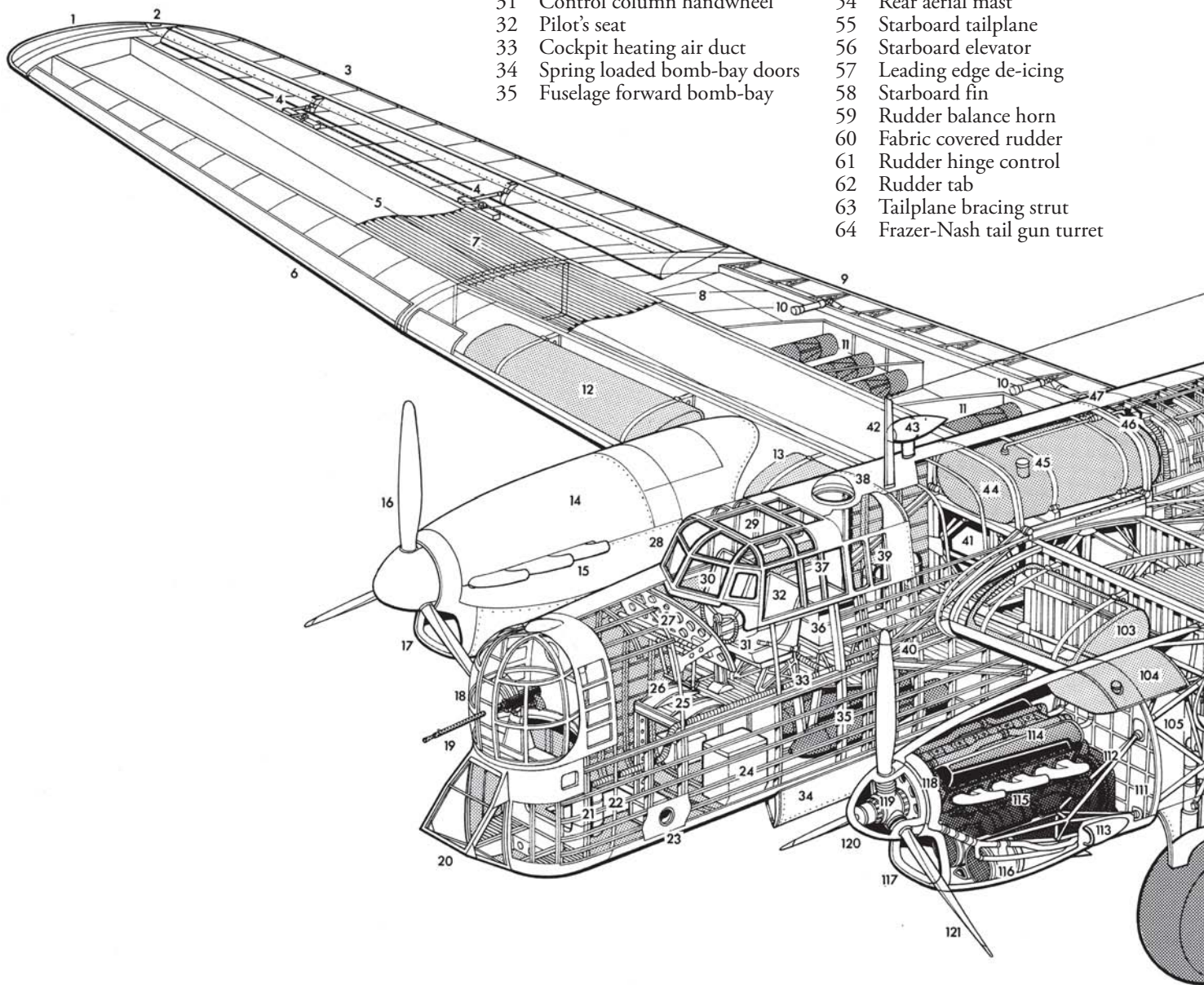
**1,000** -plus were produced during the war years

## Armstrong Whitworth Whitley

**Armstrong  
Whitworth  
Whitley V**

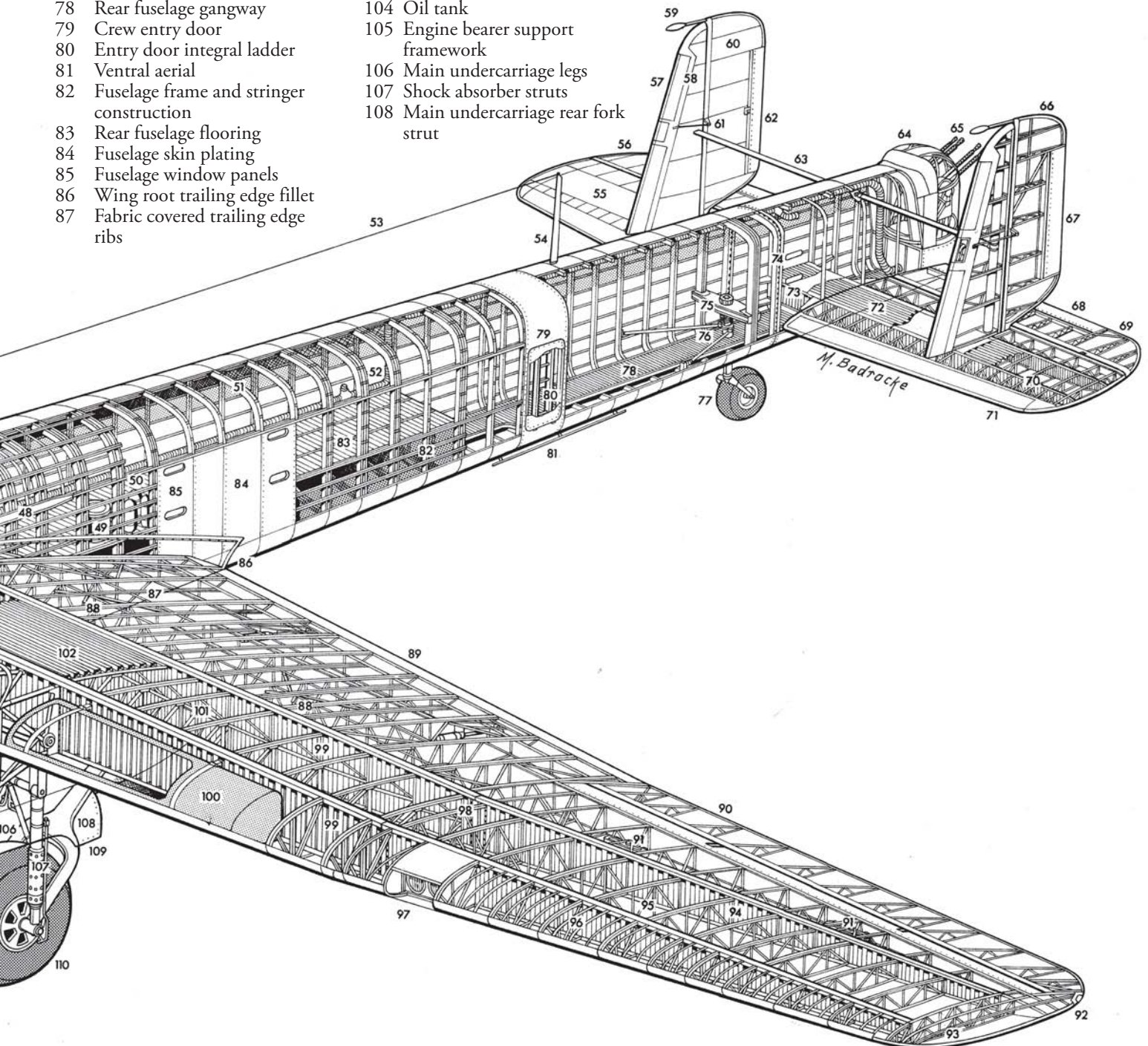
- 1 Starboard wing tip
- 2 Wing tip navigation light
- 3 Fabric covered aileron
- 4 Aileron hinge controls
- 5 Outboard wing panel, with dihedral
- 6 Leading edge de-icer
- 7 Corrugated inner wing skin
- 8 Fabric covered trailing edge
- 9 Starboard flap
- 10 Flap hydraulic jacks
- 11 Trailing edge bomb bays
- 12 Outboard leading edge fuel tank, capacity 182 Imp Gal (827 litres)

- 13 Inboard leading edge fuel tank, capacity 93 Imp Gal
- 14 Starboard engine cowlings
- 15 Exhaust stubs
- 16 de Havilland three-bladed propeller
- 17 Air intake
- 18 Frazer-Nash nose gun turret
- 19 Vickers 0.303 in (7.7 mm) gas-operated machine gun
- 20 Bomb aimer's window
- 21 Oxygen bottles
- 22 Ventral escape hatch
- 23 Oblique camera port
- 24 Auto pilot controller
- 25 Pilot's floorboards
- 26 Rudder pedals
- 27 Instrument panel
- 28 Windscreen panels
- 29 Cockpit roof escape hatch
- 30 Navigator/second pilot's seat
- 31 Control column handwheel
- 32 Pilot's seat
- 33 Cockpit heating air duct
- 34 Spring loaded bomb-bay doors
- 35 Fuselage forward bomb-bay
- 36 Radio transmitter/receiver
- 37 Radio operator's seat
- 38 Astro-dome observation hatch
- 39 Oxygen bottles
- 40 Wing attachment diagonal struts
- 41 Wing centre section framework
- 42 Front aerial mast
- 43 Direction-finding loop aerial
- 44 Fuselage fuel tank, capacity 155 Imp gal
- 45 Fuel tank filler cap
- 46 Cabin air intake
- 47 Centre fuselage production joint
- 48 Main longeron
- 49 Toilet
- 50 Oxygen bottles
- 51 Fuselage top decking frames
- 52 Cabin heater air ducting
- 53 Aerial cable
- 54 Rear aerial mast
- 55 Starboard tailplane
- 56 Starboard elevator
- 57 Leading edge de-icing
- 58 Starboard fin
- 59 Rudder balance horn
- 60 Fabric covered rudder
- 61 Rudder hinge control
- 62 Rudder tab
- 63 Tailplane bracing strut
- 64 Frazer-Nash tail gun turret





- 65 Four Browning 0.303in machine guns
- 66 Fabric covered rudder construction
- 67 Port rudder tab
- 68 Elevator trim tab
- 69 Fabric covered elevator construction
- 70 Port tailplane construction
- 71 Tailplane leading edge de-icer
- 72 Corrugated spar box construction
- 73 Tailplane spar centre section
- 74 Rear fuselage production joint
- 75 Tailwheel mounting
- 76 Self-centring spring cables
- 77 Castoring tailwheel
- 78 Rear fuselage gangway
- 79 Crew entry door
- 80 Entry door integral ladder
- 81 Ventral aerial
- 82 Fuselage frame and stringer construction
- 83 Rear fuselage flooring
- 84 Fuselage skin plating
- 85 Fuselage window panels
- 86 Wing root trailing edge fillet
- 87 Fabric covered trailing edge ribs
- 88 Trailing edge bomb-bays
- 89 Port split flap
- 90 Port aileron
- 91 Aileron hinge controls
- 92 Port navigation light
- 93 Wing tip construction
- 94 Rear spar
- 95 Spar box lattice ribs
- 96 Leading edge nose ribs
- 97 Landing and taxiing lamps
- 98 Outer wing panel joint
- 99 Corrugated spar webs
- 100 Outboard leading edge fuel tank
- 101 Box spar internal rib bracing
- 102 Corrugated box spar inner skin
- 103 Inboard leading edge fuel tank
- 104 Oil tank
- 105 Engine bearer support framework
- 106 Main undercarriage legs
- 107 Shock absorber struts
- 108 Main undercarriage rear fork strut
- 109 Mainwheel doors
- 110 Mainwheel
- 111 Fireproof bulkhead
- 112 Tubular steel engine bearers
- 113 Carburettor intake
- 114 Rolls-Royce Merlin X liquid-cooled 12-cylinder Vee engine
- 115 Exhaust stubs
- 116 Coolant radiators
- 117 Air intake
- 118 Coolant header tank
- 119 Propeller hub mechanism
- 120 Spinner
- 121 de Havilland three-bladed propeller







# Spotlight

Armstrong Whitworth  
**Whitley**

# teeth

Cutting their

**Air Cdre Graham Pitchfork** outlines three famous bomber pilots who started 'ops' on the Whitley





**SPOT FACT** It was the first RAF aircraft to have a semi-monocoque fuselage

## Men behind the Whitley

**B**lenheims, Hampdens and Wellingtons all provided valuable operational experience for some of Bomber Command's greatest airmen. There is another type to add to that list, though, the robust Whitley.

Jimmy Marks, Charles Pickard, Bill Staton and Dennis Witt, among others, started on Whitleys and went on to establish everlasting reputations as outstanding bomber commanders. Here, the focus is on the early careers of three of the most brilliant: Hamish Mahaddie, Leonard Cheshire and Willie Tait.

### 'Bumph Bombing'

Scottish former metal rigger and irrepressible ex-Halton apprentice, Hamish Mahaddie, trained as a pilot in Egypt before flying Westland Wapiti biplanes with 55 Squadron from Hinaidi in Iraq. He returned to the UK in 1937 just as the expansion of the RAF was gaining momentum in the face of gathering threats in Europe.

In 1939, he was well established on 77 Squadron at Driffield, flying Whitley Vs and the last of a few Mk.IIIIs left on the unit. On the outbreak of war in 1939, the Whitleys of 4 Group were given the task of dropping propaganda leaflets over German

cities, irreverently called 'Bumph Bombing'. For the next eight months attacks on the German mainland were not authorised.

With his crew of two other sergeants and two leading aircraftsman, Mahaddie flew his first operation within days of the opening of the war. He headed for Kiel and turned for the Ruhr, spreading leaflets over the towns and cities.

On the return journey a force of Belgian Air Force Fairey Fox biplanes surrounded his aircraft. The Whitley had strayed into neutral Belgium and he was invited to land, but he outran them to the coast. After the war, he discovered that the Belgian ace and future NATO commander, Michel Donnet, was piloting one of the chasing Foxes.

Over the next few months of the so-called 'Phoney

**Below**

*A Whitley V bombing up in preparation for an evening flight. ALL VIA AUTHOR UNLESS NOTED*



**7** Whitley units were operational when World War Two began



**SPOT FACT** The Mk.III was the first to have hydraulically operated bomb bay doors



**Hamish Mahaddie**

After his debut on Whitleys, Hamish Mahaddie went on to complete a tour on Stirlings in the Pathfinder Force before joining the staff of 8 Group where he recruited candidates for the force. He served in the post-war RAF and retired as a group captain, having been awarded the DSO, DFC, AFC and Bar and the Czech Military Cross. Hamish acted as a consultant for several films, his most famous being *Battle of Britain*, which was released in 1969, when he gathered all of the aircraft needed. He died in 1997.



As daylight raids were rare, 'DY-P' of 102 Squadron is probably on a training flight from Driffield in 1940, or is positioning prior to a combat sortie.

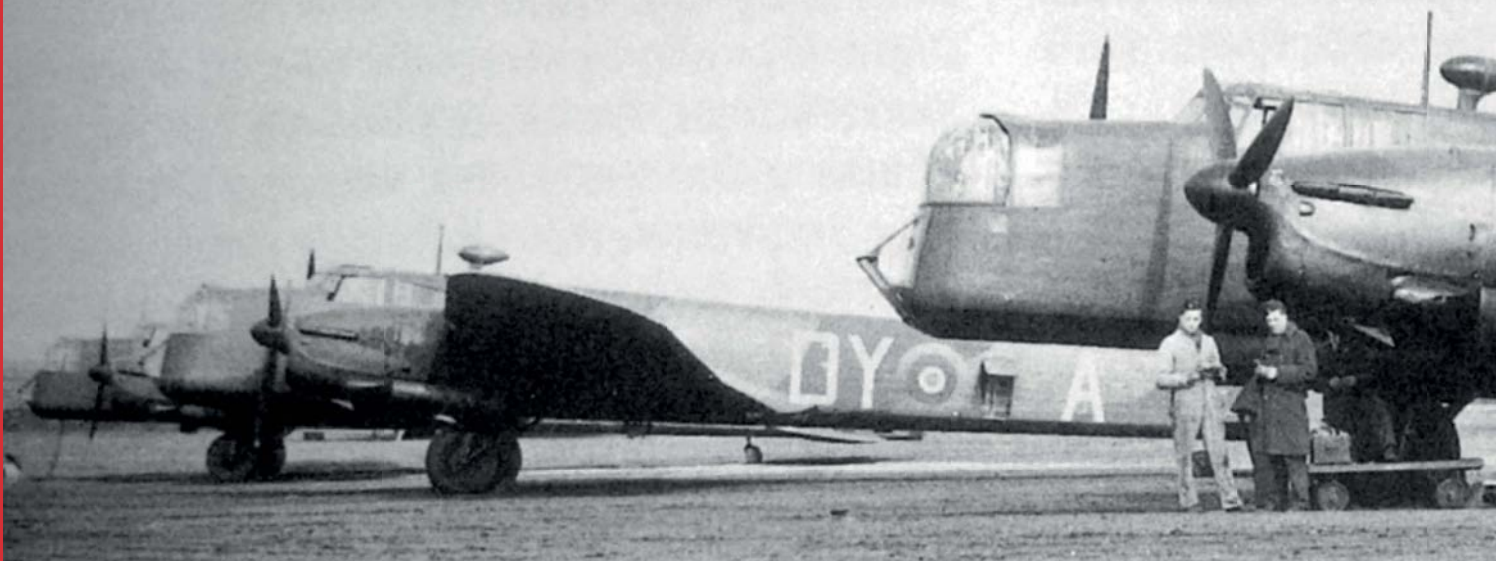
“Hörnum was claimed to be successful but Mahaddie always considered that this was a public relations venture rather than an accurate account. The raid was largely ineffective with minimal, if any, damage caused”

War' Mahaddie spent most of his operational time over Germany on leaflet raids. This ineffectual activity did provide him and his crew with experience, but it also highlighted the inadequacies of the aircraft's equipment and the difficulties of flying and navigating on long-range sorties over hostile terrain.

On March 19, 1940, he headed for Sylt to bomb the seaplane base at Hörnum. This was a reprisal for

a German attack two days earlier on British shipping in Scapa Flow. Some thirty Whitleys and twenty Hampdens were tasked and, at the time, it was the largest raid of the war.

Hörnum was claimed to be successful but Mahaddie always considered that this was a public relations venture rather than an accurate account. The raid was largely ineffective with minimal,







if any, damage caused. After five years as a sergeant, Mahaddie was commissioned on April 1.

## Blitzkrieg

The Germans invaded Denmark and Norway on April 9 and Bomber Command was ordered to do what it could to slow down the sea and airborne landings. Whitleys attacked Norway for the first time on the night of April 15/16.

Mahaddie attempted to hit targets in the Oslo Fjord with his 250lb bombs but the weather intervened. A few days later his bomb aimer had a fleeting sight of the airfield at Stavanger. It was a similar tale for the rest of the crews and the damage inflicted was negligible. The month of intensive operations had virtually no effect on the German advance.

Early on the morning of May 10, the German Blitzkrieg was launched against Belgium and the

Netherlands, and suddenly the pace of the war accelerated dramatically.

On the night of May 11/12, Mahaddie and his crew took part in Bomber Command's first attack on a German town, hitting the railway network near Mönchengladbach – the 'Phoney War' was over.

Restrictions limiting actions to the west of the River Rhine were lifted on the 15th, heralding the opening of Bomber Command's five-year strategic offensive against Germany.

As the military situation in the newly invaded France became increasingly critical, the Whitleys of 4 Group were also tasked to support the British Expeditionary Force. While the British Army retreated towards the Channel, 77 Squadron attacked road and rail communications at Abbeville, Bapaume and Givet in northern France, in an effort to slow down the pursuing Germans.

Individual aircraft unleashed 500

and 250lb bombs at night from heights between 7,000 and 10,000ft. Although target identification was difficult and the use of flares was common, crews regularly reported successful attacks. Mahaddie was not so sure this was the case.

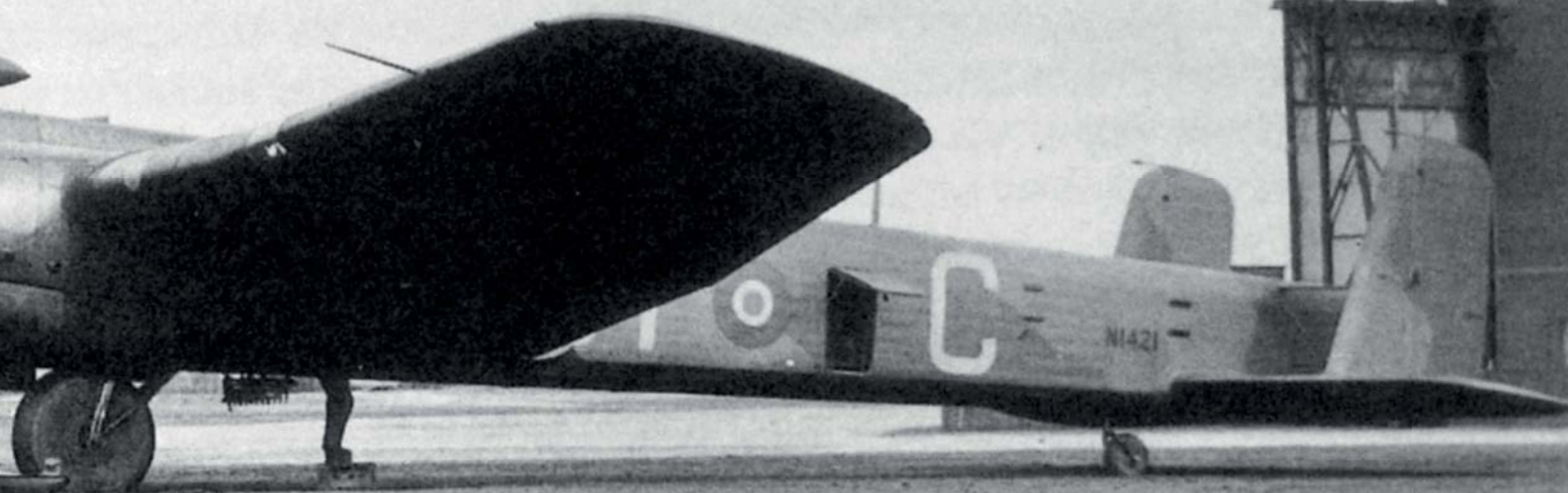
## Alpine debacle

With the fall of France, sorties against targets in Germany increased. Mahaddie and his crew flew intensively in a six-week period to locations including Gelsenkirchen, Hanover, Hamm and Rheydt. On the Gelsenkirchen raid on May 19, his aircraft (N1348) was badly damaged by flak but he landed safely.

Railways, river traffic, airfields and oil installations were the priority. The small bomber force was thinly spread and achievements were very limited; location of targets proved particularly difficult. Crews were ➔

**Above**  
A Whitley V of 51 Squadron in September 1940. Willie Tate was a flight commander with the unit at this time.

**Below**  
A Whitley of Hamish Mahaddie's 102 Squadron at Drifffield, circa April 1940.





**SPOT FACT** The Mk.V first flew in December 1938 with production continuing until June 1943



graduate was arriving to join the other Whitley unit based on the East Riding airfield. It was June 5 when 22-year-old Leonard Cheshire arrived to join 102 Squadron.

No.102 had at that stage suffered few losses and Cheshire was one of the first of the 'new boys'. He was also the first university graduate and, according to

briefed to bring back their bombs if the objective could not be sighted and Mahaddie freely confessed that he returned with his on numerous occasions.

After Italy declared war on June 10, Bomber Command sent a force of 36 Whitleys to factories in Turin. The aircraft positioned in Jersey and Guernsey before taking off for Italy.

Many, including Mahaddie, encountered bad weather en route and attempts to climb over the Alps were thwarted by the build up of ice on the aircraft. Mahaddie made two bids to conquer the Alps but, in the end, had to abandon his efforts, as did the great majority of the force.

This was to be his 30th and final operation, having flown 23 in the few weeks since May 10. A week later he left for Kinloss to join the instructional staff of 19 Operational Training Unit.

Bomber Command achieved little in the early months of the war and Mahaddie was critical of some of the planning and use of the ill-equipped aircraft. However, he gained much valuable experience for the future conduct of operations, many of which he would lead as a Pathfinder.

### Vital experience

Just as Hamish Mahaddie was coming to the end of his tour at Drifffield, an Oxford University

Hamish Mahaddie: "He was not one of us, we viewed him with some suspicion".

The Whitley always flew with two pilots, and novices were assigned to experienced captains before being given crews of their own. Cheshire joined up with New Zealand Pilot Officer Hugh 'Lofty' Long DFC. It was a partnership that Cheshire valued immensely and one from which he gained very important experience. He was soon able to dispel the 'suspicions' of his new colleagues.

Cheshire flew his first 'op' on June 9 as Long's second pilot; they were tasked with bombing the advancing German Army at Abbeville. Then it was only a matter of a few days before the crew started making regular visits to Germany to attack communications and oil installations.

With Long as his captain, Cheshire flew eight sorties. It was a period when he learned a great deal about the Whitley, as well as operational flying and personal relations with his air and ground crew under the inspirational and professional leadership of Long.

Unusually, his captain gave him time at the controls over enemy territory and Cheshire appreciated the value of this experience which other second pilots were denied. Years later, Cheshire commented: "I must have been the only pilot in the squadron who was ever given such a start as this". When Long was lost a year later, Cheshire was deeply affected.

**Above**  
Whitley Vs Z6743 'EY-V' and Z6625 'EY-L' of 78 Squadron in 1941 - the unit supplied aircraft for Operation Colossus, of which Willie Tait commanded the air element. VIA ANDY THOMAS

**Below**  
Whitley V Z6487 'MH-G' of 51 Squadron taking off from Dishforth. This aircraft was lost in combat during a raid on Hanover on July 19, 1941. VIA ANDY THOMAS



**Leonard Cheshire**

From his baptism on Whitleys, and over the next four years, Leonard Cheshire's leadership qualities would be displayed many more times. This resulted in the award of two more DSOs, the DFC and, finally, the supreme award of the Victoria Cross - a testament to him as one of the RAF's greatest operational pilots. He was a witness to the explosion of the Nagasaki atomic bomb and this was pivotal in the next phase of his life. He established a hostel for the disabled and this led to today's Leonard Cheshire Disability charity. Cheshire died in 1992.





## Crew of his own

Early in August Cheshire was given his own crew and aircraft *N-for-Nuts*. Inspired by the way Long had run his crew, Cheshire set out to follow his example and establish a close rapport with his

colleagues, irrespective of rank. On August 10, Cologne was their first target and others in Germany soon followed.

On the night of August 13/14, the Whitleys of 102 Squadron

were positioned at Harwell [then in Berkshire, now in

Oxfordshire] to refuel, prior to making the long trip to Italy. It was Bomber Command's first attack on the industrial cities in the north of the country since the ill-fated attempt in June.

In better weather, Cheshire crossed the Alps at 16,500ft to hit the Caproni works in Milan. When landing back at Harwell after almost ten hours in the air, he described the sortie as "a very successful trip".

The following day fortunes were reversed. The crews were relaxing in their messes at Dishforth when the air raid warning sounded at lunchtime – a force of Junkers Ju 88s were dropping bombs. Within minutes, 15 people had been killed, ten Whitleys were destroyed and all four hangars were badly damaged. The destruction on the airfield was so severe that 102 Squadron had to head for a

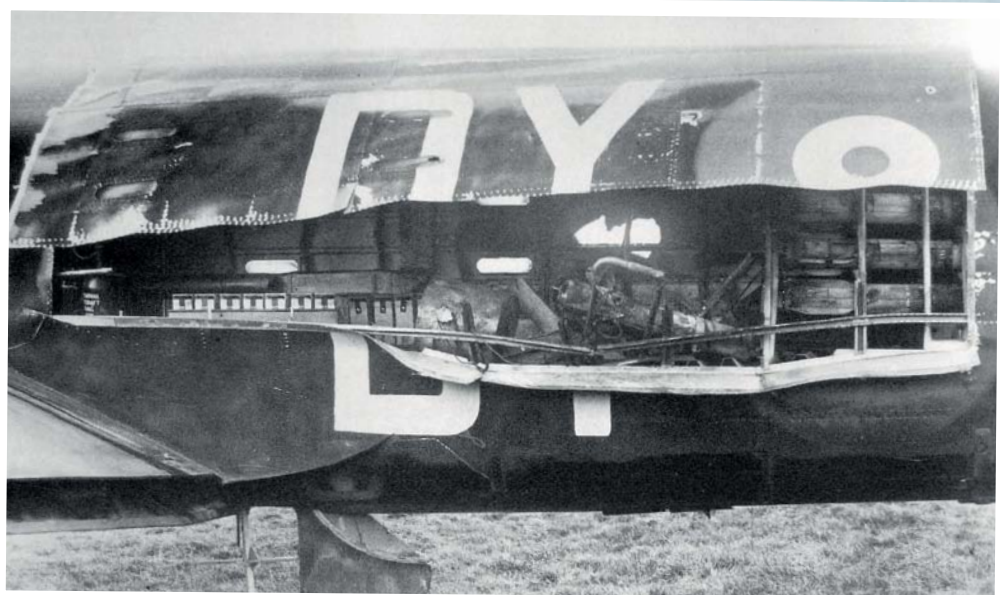
new home at Leeming.

For the next few weeks the squadron's Whitleys came under the control of Coastal Command, with detachments to Aldergrove in Northern Ireland. Cheshire flew his first patrol on September 8, providing an escort for a convoy of 21 ships.

Over the following two weeks, he and his crew flew another eight long patrols – on one occasion he was airborne for more than 12 hours and almost out of fuel when he landed. He found the interlude over the Atlantic "tedious".

## Nightmare sortie

The squadron returned to Bomber Command and moved to its new home at Linton-on-Ouse - Cheshire then flew in the attacks on the railway yards at Pretzsch on October 18. On November 12/13,



**Above**  
The smashed open fuselage of Cheshire's Whitley V P5005, shortly after the November 12/13 'op'.

the synthetic oil plant at Wesseling near Cologne was the target.

By this stage, Cheshire had moulded his crew into an excellent and happy team inspired by their captain. On this night a new wireless operator, 18-year-old Sgt Henry Davidson, joined them for his first 'op'.

Cheshire arrived over the area to find some cloud. A fault on the intercom took

Davidson was badly burned and blinded but he insisted on returning to his wireless where the rear gunner, 'Riv' Rivaz, guided his hands over the dials and keys until they discovered that the set was no longer

working.

Cheshire headed for home, a flight described by Rivaz as a "nightmare", while Desmond



Coutts, the second pilot, looked after Davidson. Taffy Roberts navigated as best as he could, given that he had no maps as they had been blown away.

Eventually, and after all at Linton had given up hope for them, they arrived back at base. Cheshire put the Whitley down immediately and Davidson was rushed to hospital. Nobody could believe how the bomber had managed to return in such a state.

Three weeks later it was announced that Cheshire had been awarded an immediate DSO and Davidson a DFM. It was almost unprecedented for a pilot officer to receive the DSO and his deeds were widely publicised. The citation concluded: "He displayed great courage, determination and leadership throughout". Cheshire completed his tour in January 1941.

some time to resolve and it was difficult to pinpoint the exact target, so he elected to bomb the secondary, the marshalling yards at Cologne. Flying at 8,000ft, he was intending to drop a flare when the Whitley was engaged by intense flak.

A shell smashed through the nose and front turret and Cheshire was momentarily blinded. He lost control as a second shell exploded near the port wing root. Davidson was standing by the flare chute and a splinter ignited a flare. The aircraft was filled with thick smoke and a fire broke out.

Regaining control, Cheshire was informed of the severe damage to the aircraft. There was a gaping hole in the port side of the fuselage in addition to the damaged nose, but he pressed on and dropped the bombs.



**SPOT FACT** The Mk.VI was a proposed Pratt & Whitney powered version; none were built



**Willie Tait**

Beyond the Whitley, Tait was to write his name into the history books of the RAF. A fearless leader, he went on to be awarded three more DSOs and a second DFC. He replaced Leonard Cheshire as CO of 617 Squadron and led the force of Lancasters that sank the *Tirpitz* in a Norwegian fjord. After completing 101 bombing operations, he was recommended for the Victoria Cross for sustained gallantry over a long period. In the event, he was awarded an unprecedented third bar to his DSO. He died on August 31, 2007, aged 90.

### Cranwell cadet

James Brian Tait, known to crews as 'Willie', was awarded a cadetship at the RAF College Cranwell and graduated as a pilot in 1936. He joined 10 Squadron flying the Heyford, before converting to the Whitley I. Due to a leg injury he did not participate on the early operations of the war. Once recovered in April 1940, he joined 51 Squadron at Dishforth as a flight commander.

His first 'op' was to attack the



airfield at Oslo. In June he flew 15 sorties, mostly into Germany, but he was one of a handful of crews that managed to cross the Alps in a thunderstorm and bomb Turin on June 11.

On August 25, he took part in the first raid on Berlin, mounted as a reprisal for the German attack on London. The Whitley was the only type which had the range to carry a bomb load to such distant targets.

Before the end of the year, Tait 'visited' Berlin on three more

occasions at a time when navigation and bombing aids were rudimentary. He was awarded the DFC and in December was promoted to command the squadron.

### Airborne commandos

In June 1940, the Prime Minister, Winston Churchill, had instructed that an experimental British parachute force be formed. This was established at Ringway, now Manchester Airport, using old Whitley Is. Known as 'X' Force of





the 11th Battalion of the Special Air Service, these pioneers of British Airborne forces were ready for action by the end of 1940.

For their initial operation they went to Italy, as this appeared to be the most promising area in which to achieve complete surprise and create the most confusion. It was felt that the Italians would be more susceptible to alarm and panic than their more stoic allies, the Germans. A large aqueduct spanning the River Tragino in the southern Italian province of Campagna was chosen.

In January 1941, preparations for Operation Colossus commenced. Bomber Command provided eight Whitleys, four each from 51 and 78 Squadrons. Tait, the CO of 51 Squadron, was appointed to command the force. The eight specially selected crews left for a three-week period of intensive training at Ringway.

Modifications had to be made to the Whitleys to enable each to carry, and drop, six parachutists. The bomb racks had to be adapted to carry air-droppable containers of explosives and stores. Crew training

included flying and navigating precisely at low level.

All was ready by early February and, on the 3rd, the eight Whitleys departed for Mildenhall to join up with 'X' Troop. Four days later they took off for Malta, crossing over France during the night and landing at Luqa after an 11-hour flight.

Following a briefing and a short test flight at dusk, and with Tait leading, the eight aircraft took off for the pioneering sortie. Six were tasked to drop the party of 35 parachutists and two were to bomb Foggia, some 30 miles from the target, as a diversionary tactic.

They flew to the assigned area at 9,000ft before descending to low level. Tait led the first four into the valley and the dropping zone at 500ft. With flaps lowered, they slowed to 100 knots before the troops dropped through the exit hole in the centre of the fuselage. All landed close to the objective.

Tait dropped the first stick and then orbited the area until all the troops were on the ground. With full power selected, the Whitleys climbed out of the valley and

attacked local targets with 250lb bombs to act as another diversion.

A fifth aircraft carried out a successful drop but the sixth was late and dropped its troops in the adjacent valley.

The Whitleys arrived back at Luqa after a seven-hour flight. 'X' Troop was able to damage the aqueduct before heading for the coast to rendezvous with a Royal Navy submarine. Unfortunately, one of the two bombers suffered an engine failure and ditched, unwittingly compromising the pick-up point. The submarine sailed away and all the members of 'X' Troop were captured together with the Whitley crew. So ended the first British airborne commando raid.

Tait and his crew returned to the UK. Operation Colossus was his last operation with 51 Squadron and he was awarded the DSO. The Whitley provided him with ideal experience for outstanding service. As the panel reveals, with six gallantry decorations to his name, Willie Tait remains one of the most distinguished airmen in the history of the RAF. ●

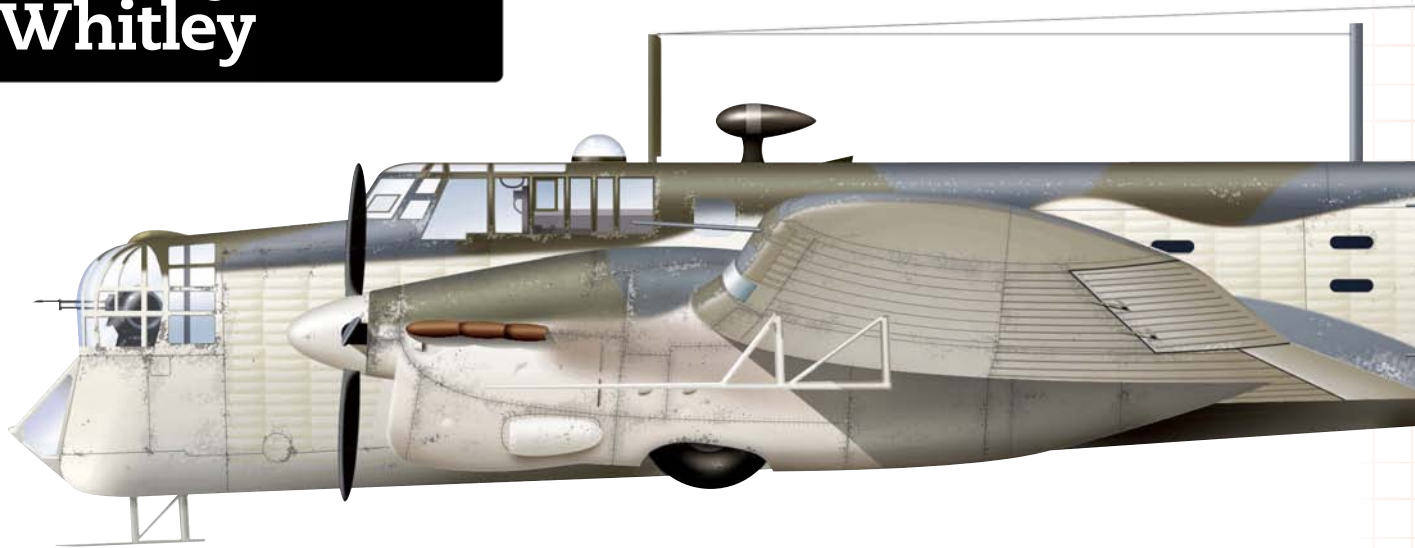
**Left**  
*Five of the converted bombers during a practice para drop.*

**Below**  
*No.51 Squadron preparing for another sortie from Dishforth.*



**2,000** lb was the weight of the heaviest single bomb carried by Whitleys





# Watching the water

**Right**  
Armstrong Whitworth  
Whitley VII Z6633  
'WL-G' of 612  
Squadron, based at  
Wick, Scotland, 1942.

PETE WEST

**I**n the early days of World War Two, the Whitley played a prominent role in operations with the RAF's Bomber Command. As technology advanced, the need for heavier, faster and better armed aircraft soon relegated the Armstrong Whitworth type to other roles.

While some became trainers or troop transports and others were earmarked for use as glider tugs, a handful of Mk.Vs were employed

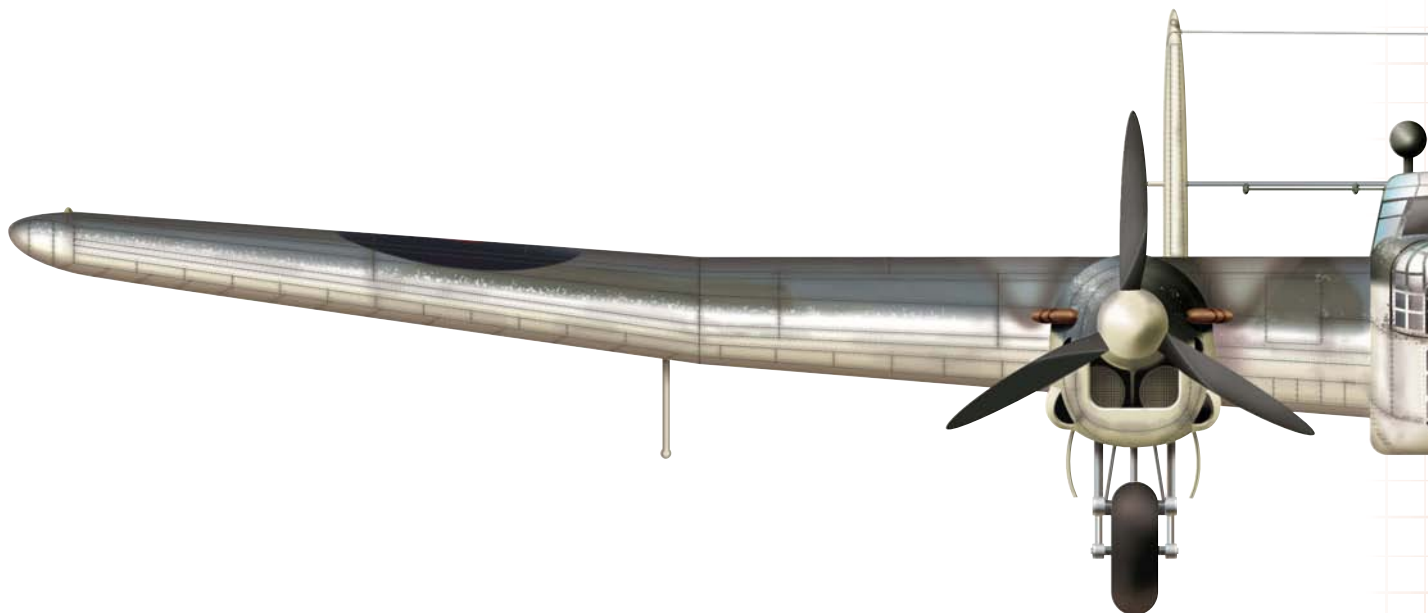
by the RAF's Coastal Command from November 1940. Several of the subsequent Mk.VIIs remained in service until June 1943 and were among the last Whitleys to undertake frontline duties.

Rather than simply being a modified version of existing types, the VII was designed specifically for Coastal Command (although some Vs were also reconfigured to VII status). It had additional fuel tanks fitted in the bomb bay and fuselage, extending

Phased out of Bomber Command service, the ageing Whitley enjoyed a revival with Coastal Command

its range to around 2,300 miles, a significant improvement on the V's 1,650-mile radius. The aircraft was also equipped with air-to-surface vessel radar for anti-shipping patrols, with four distinctive 'stickleback' dorsal radar masts.

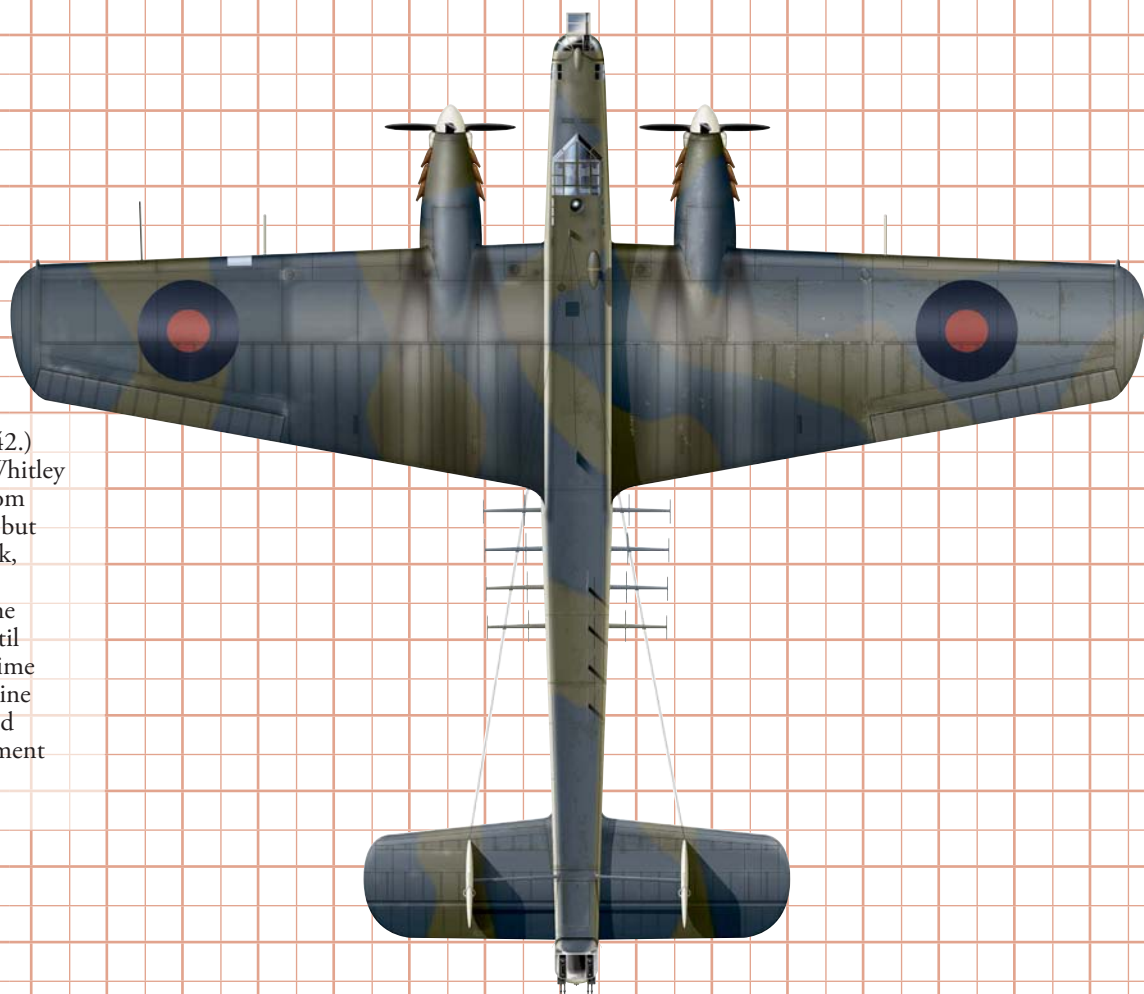
Whitley VII Z6633 was assigned to 612 Squadron at the end of 1941, remaining with the unit until mid-1943 when the fleet swapped over to Vickers Wellingtons. (The latter type had been in service with 612 in small





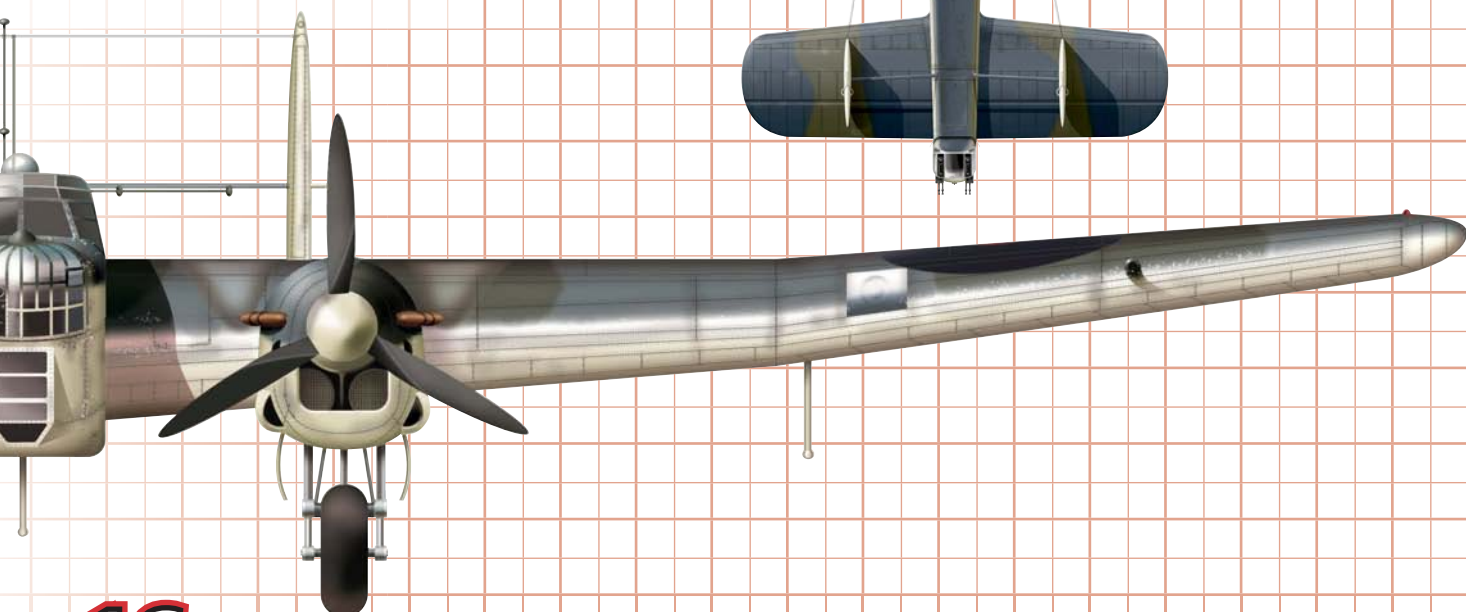
**SPOT FACT** A Whitley was shot down by three Arado 196 floatplanes on July 12, 1942

## Whitley in profile



numbers since November 1942.)

During its time with 612, Whitley Z6633 mainly flew patrols from Wick in Caithness, Scotland, but was also detached to Reykjavik, Iceland, from December 15, 1941, to August 18, 1942. The unit operated Wellingtons until the end of the war, at which time it re-equipped with Supermarine Spitfires and later de Havilland Vampire FB.5s until disbandment on March 10, 1957.



**16** Whitleys were earmarked for anti-submarine patrols in August 1942



# Journey's

# End



Hubert Walters had several close shaves in Whitleys, but the last 'dicey' moment may have saved his life. **Sean Feast** explains

**A**ny pilot who survived a tour in a Whitley in the winter of 1940/1941 had an exciting tale or two to tell of distant targets, searchlights and flak. The danger started long before they got over enemy territory. Training both at an Operational Training Unit (OTU) and on a squadron could also test a pilot's mettle, straining the nerves of instructor and instructed alike.

An airman who had more than his fair share of excitement flying Whitleys was Hubert Walters who

joined the RAF Volunteer Reserve immediately after the Munich crisis in 1938. Hubert Joseph Walters initially learned to fly on Tiger Moths, before progressing to Harts, Hinds and Audaxes at Marshall's airfield (now Cambridge Airport).

With the outbreak of war, Hubert's training accelerated, on Magisters from Redhill before moving on to twins at Lossiemouth, the home of 15 Service Flying Training School. It was at 10 OTU at Abingdon (then in Berkshire) that he was introduced to the Whitley, making

**Left**

*Hubert Walters proudly displaying his Volunteer Reserve badge. ALL VIA AUTHOR UNLESS NOTED*

**Below**

*Crews of 58 Squadron's 'B' Flight in October 1940.*





SQDN / CREW		CAPTAIN	OFF TOT	TIME	REMARKS
<b>NIGHT 11/12-2-41</b>					
58	K K6V	FULLERTON	1831	—	ON S/G 0049 QSY D/F Nothing further heard - Baled out. Cranwell-Gain Bedford Sq
	U	CROOKS	1840	LAND	TA 2140. S/G D/F 1. QGX? QGY. BFX DREM. LANDED OK FIX 2237
	R	WALTERS	1836	2125	TA 2145 DF2 0145, AFTER FIX BLACKPOOL. BFX DREM. BALED OUT WISHAW. CREW SAFE
	N	OWEN	1833	2203	LAND TA. 2203. S/G D/F 2. TRQ. BFX DREM. LANDED OK FIX 2032
	Q	HILDYARD	1838	2000	LAND TA. 2000. LOREING 2010 Recv. 45 TRQ OK; HOMED BY N° 2 D/F. BFX DREM. LANDED OK
	O	HUGHES	1850	LAND	TA. D/F 2. P'GDMS. BFX DREM. GIVEN BASE UNFIT Q&B 300 - LANDED KINLOSS OMS
	F	KERRY	1844	LAND	TA. D/F 2. BFX DREM. QDRS FROM N° 2 D/F LANDED OK. FIX 2243
	H	MACKLEY	1901	2123	LAND T.C. S/G D/F TRQ. BFX DREM. NOT DONE. BFX FINNINGLEY - NO - LANDED LINTON (CS300 (2 22 attempts - Good))
	A	ELLIOT	1852	LAND	LANDED NORTH COATES FIFTIES.
	S	DANIELS	1855	2137	LAND TA. 2135 S/G D/F BFX DREM. LANDED OK FIX 2330
51	F M9V		2128		TC 2128 NOT WORKED BY US. BALED OUT POCKLINGTON. FIX 2230
	D				ON S/G QGX? 0302. QSY 3045. INT? NOT HEARD AGAIN. BALED OUT BENTLEY COLLEGE
	J		2125		TA 2125. ON D/F 1. QGX S/S. QGX ATTEMPTED. NO GOOD BALED OUT WETHERBY. FIX 2350
	R				LANDED LEUCIARS N° 1 D/F BFX DREM. OK
	O		2132		TC. 2132 S/G N° 1 D/F. QGX PETROL. 4 ATTEMPTS 22 N° 1 D/F BFX FINNINGLEY. BALED OUT LEEDS
	K		2125		TA 2125. N° 1 D/F BFX DREM. LANDED OK
	Q		2144		TC. 2144 BFX - GROUP. LANDED OK DREM
	N				" " " " DREM
	H		2127		TC 2127 " " " " " "
	E		2114	LAND	DIRECT TA 2114 D/F 1 BFX DREM LANDED OK
78	G 8PT		2150		TA 2150 BFX. LANDED OK DREM
	F				" " " " " "
	U		2110	LAND	TC 2110 " " " " " "
	Q		2110		TA 2110 Landed Leuchars 0140
	B		2120		TC 2120 N° 1 D/F. QGX? QGY. BFX DREM. 0231. MISSING. UNDECIPHERABLE. LINTON - DREM TRACK 337 T. SYKO TO BASE
					CRASH LANDED KILMARNOCK - ALL CREW SAFE. COURSE 341° M. DISTANCE 154 MILES. TIME 56 MINS. HAVE TONK LANDED AND LAND



his first trip as a second pilot on August 12, 1940, in a Mk.III. Only six weeks later he was off on his first operational sortie, again as second pilot, in a more powerful Mk.V of 58 Squadron from Linton-on-Ouse in Yorkshire.

**Lost nerve**

As a novice, it was normal procedure to complete a number of sorties in the co-pilot's seat before gaining

“...raids were filled with incidents. For example, on his third operation – his first to Berlin – one of Hubert’s crew lost his nerve and became uncontrollable, obliging them to abandon the mission”

command of an aircraft. Hubert – then one of small number of sergeant pilots – did well to be skippered by Plt Off Ernest ‘Brownie’ Brown for his first ‘op’, to Zeebrugge in bright moonlight, which passed without incident. He stayed with Brown for his first half-dozen sorties before acting as second pilot to Sgt Colin Hughes until he was at last trusted with his own crew.

These raids were filled with incidents. For example, on his third operation – his first to Berlin – one of Hubert’s crew lost his nerve and became uncontrollable, obliging them to abandon the mission. On landing back, their aircraft was surrounded by RAF Police and the airman taken away, never to be seen or heard of by them again. The observer, John Mitchell (later Air Cdre John Mitchell LVO DFC AFC and Churchill’s

navigator), noted in his logbook afterwards one single word to describe his fellow airman – “Mad”.

A long haul to Stettin, Germany (a round trip of some 9 hours, 40 minutes), at the beginning of October had to be abandoned because of bad weather, and indeed the climate was as dangerous as the enemy in those early days of the bomber war. Make no mistake, though – the German night-fighters were a very effective force: an intruder accounted for ‘Brownie’ Brown and all but two of his crew on the night of October 21.

**Long slog**

Hubert took the controls in his own right for the first time on November 14, with Plt Off Hildyard in the second pilot’s seat, for an attack on Lorient in western France. On

**Above**  
The Linton-on-Ouse ops board for February 11/12, 1941.

**Left**  
Sgt Walters at Linton-on-Ouse in 1940.



**SPOT FACT** The Mk.V was by far the most numerous variant



**Above**  
An all-sergeant team from 58 Squadron during a briefing.

**Right**  
Walters (second from the right) and his crew in the autumn of 1940.

### RAF Whitley Squadrons

**Bomber Command:** No.7 (March 1938 to May 1939); 10 (March 1937 to December 1941); 51 (February 1938 to November 1942); 58 (October 1937 to December 1942\*); 77 (November 1938 to October 1942); 78 (July 1937 to March 1942); 97 (February 1939 to April 1940); 102 (October 1938 to February 1942); 166 (June 1939 to April 1940).

**Coastal Command:** No.53 (February 1943 to May 1943); 58 (see above); 502 (October 1940 to February 1943); 612 (November 1940 to June 1943).

**Transport Command:** No.295 (August 1942 to November 1943); 296 (June 1942 to March 1943); 297 (February 1942 to February 1944); 298 (August 1942 to October 1942).

**Special Duties:** No.138 (August 1941 to October 1942) and 161 (February 1942 to December 1942).

\* Total time operating type, including Bomber Command and Coastal Command use.

their return, Hubert was furious to see Coventry ablaze from a heavy German raid, and set out to look for any German aircraft that might still be in the area. The Whitley had never been designed with night-fighting in mind and a contest against a German Heinkel or Dornier could have been interesting!

Further raids followed to Antwerp (Belgium) and Duisburg before

Hubert's crew were briefed for an operation to Turin on November 26. Owing to the great distance involved, the 58 Squadron aircraft taking part flew down to Wyton, near Huntingdon, to refuel before attempting the long slog over the Alps. With a full load of bombs and petrol, it was asking a great deal of the Whitleys to make it there and back without incident.

Sure enough, there was trouble en route. Hubert's aircraft was part of the way through the mountain range when the engines began playing up, losing boost. Without this he was unable to climb, and as such was again obliged to return to base. On the way home, he made sure his bombs were not wasted, scoring a direct hit on a German ammunition dump in the docks around Calais, and earning a



“With fuel running dangerously low (they had been in the air now for more than 10 hours) and unable to find Drem, Hubert took the unenviable decision to abandon Mk.V T4322”



well-deserved pat on the back for his efforts from the CO on his return.

At the end of 1940 and early in 1941, many of the targets centred on the German navy; attacking ships and harbour installations in Wilhelmshaven, Bremen and Brest. It was while returning from a raid on Bremen on February 11 that Hubert had his first real brush with death. By now he had a regular, all-sergeant, crew: second pilot Thomas Thurling, observer Boreham, wireless operator Arthur Sayner and air gunner Halliday [Sadly, the first names of Sgts Boreham and Halliday have been lost in the mists of time – ED]. The weather during the day was bad, and Hubert expressed his concerns to the CO but was told not to worry.

Taking off in poor visibility and heading for Germany, they dodged the usual searchlights and flak over the target to complete a successful run and head for home. They arrived back over Linton-on-Ouse to find the airfield covered in a thick blanket of cloud and were ordered to make for Drem, in Scotland, where the weather was thought to have been clearer. It was evident from the wireless traffic that others were experiencing similar difficulties.

With fuel running dangerously low (they had been in the air for more than 10 hours) and unable to find Drem, Hubert took the unenviable decision to abandon Mk.V T4322. Waiting until his crew had safely



departed, he trimmed for straight and level flight and at a height of around 10,000ft dived through the forward escape hatch. For a few brief moments he feared his parachute would not open, but then with a reassuring crack the canopy blossomed above his head and he began to descend into the darkness, which was momentarily lit up by the crash of his own aircraft close by.

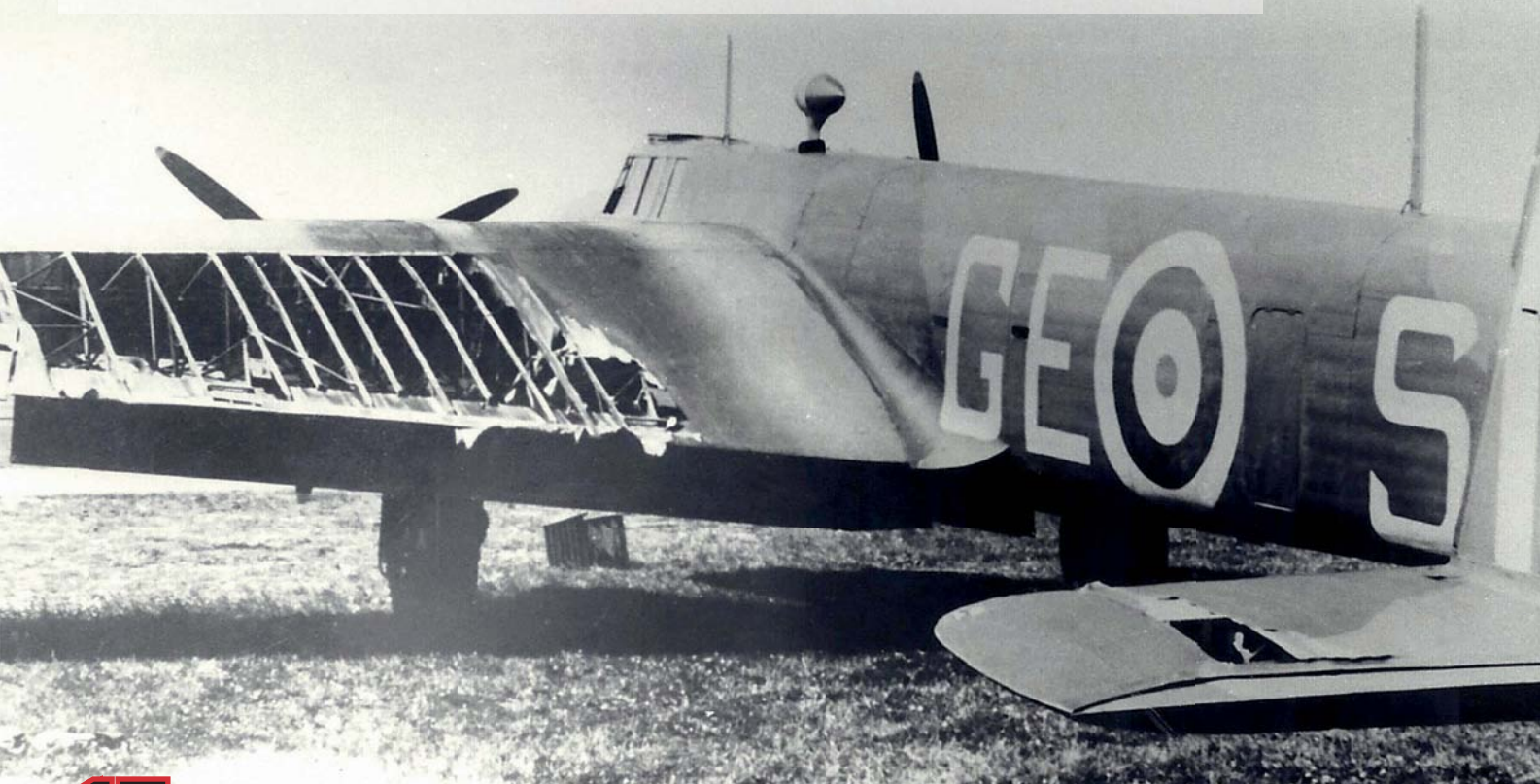
Landing in a field, Hubert gathered his parachute and his senses and

knocked on the door of a farmer's house to be greeted by a man in long johns and a lady in a long nightdress. After their initial shock, they invited him in and offered him a cup of tea.

On his return to Linton, Hubert learned that his was not the only aircraft missing that night. Indeed, it had been a disaster for Bomber Command, and 4 Group especially. Eighteen aeroplanes were lost that night and not a single one to enemy action.

**Above**  
Hubert Walters (in the centre) at war's end.

**Below**  
Whitley V 'GE-S' shortly after landing with considerable battle damage to its port wing. This aircraft, believed to be serial number Z6947, was the personal Whitley of 58 Squadron's CO, Wg Cdr Sutton. 58 SQUADRON RECORDS





**SPOT FACT** It was named after a suburb of Coventry, home to an Armstrong Whitworth plant



**Above**  
A damaged Whitley from 58 Squadron.

**Right**  
Although the reason why this Whitley's Merlin Xs are being ground run is unclear, the lack of crew visible on board suggest it was for post-maintenance tests. VIA AUTHOR



### Balloon encounter

As a fully paid-up member of the Caterpillar Club (a jewelled gold caterpillar was sent to all of those who survived a parachute bale out by the Irving Air Chute company), Hubert was soon back in action for a raid on Düsseldorf, which he completed successfully despite having to fly the entire operation with a frozen airspeed indicator.

Considered tour-expired, Hubert was posted back to 10 OTU in March 1941 and soon after commissioned. As a pilot officer he attended the Central Flying School to undertake an instructor's course and returned to Abingdon in October.

Although this was designated a period of rest, it did not prevent him from taking part in further 'ops' when he could. One of these was the second Thousand Bomber raid, to Essen, on the night of June 1/2, 1942. This was a 'showpiece' devised by 'Butch' Harris to show what his Bomber Command crews were capable of, even if it meant trawling through the OTUs and Coastal

Command to make up the numbers.

Instructing proved a dangerous occupation. One night, on a cross-country navigation exercise, Hubert's pupil managed to take a Whitley into an area populated by barrage balloons and almost crashed into one. Although Hubert just managed to grab the controls in time, it was not quick enough to avoid the balloon's trailing cable attaching itself to the wing. At this point Hubert's heart would have stopped, for at the end of the cable was a small explosive device which fortunately failed to explode.

This made for a tense flight home and a terrifying landing, the pair thinking that at any moment the charge could fuse and blow their aircraft apart. Happily it did not, although they had the horror of watching the device bouncing along behind them as they sped along the runway.

### Down the High Street

On the night of September 2/3, 1942, Hubert's war all but came to an end. Instructing out of







## Armstrong Whitworth Whitley V

**Construction:** 1,814 were built, including two prototypes. By far the most numerous variant was the Mk.V with 1,466 made.

**First Flight:** The prototype Whitley first flew on March 17, 1936, from Baginton, Warwickshire, in the hands of AW chief test pilot Alan Campbell-Orde.

**Powerplant:** Two 1,145hp (858kW) Rolls-Royce Merlin X V12s driving three-bladed propellers.

**Dimension:** Span 84ft 0in (25.6m). Length 70ft 6in. Height 15ft 0in. Wing area 1,137sq ft (106m<sup>2</sup>).

**Weight:** Empty 19,350lb (8,777kg). Loaded 28,200lb.

**Performance:** Max speed 228mph (367km/h) at 17,750ft (5,410m). Initial climb rate 800ft per minute. Service ceiling 17,600ft. Loaded range 470 miles (756km). Max range 1,650 miles.

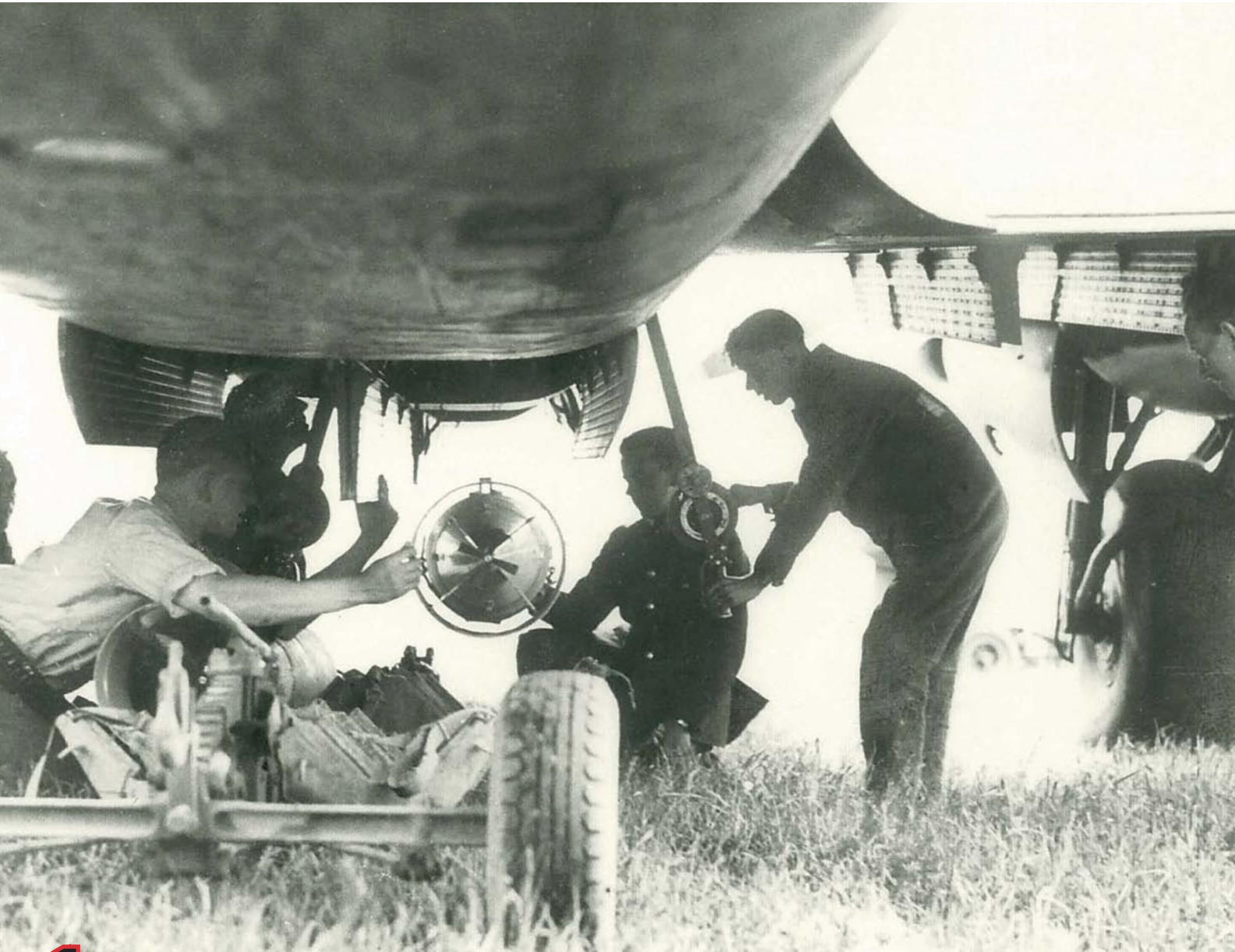
**Armament:** Five 0.303in Vickers and Browning machine guns in nose and tail turrets. Maximum bomb load 7,000lb (3,175kg).

**Crew:** Five.

Note: performance and weights varied according to role and configuration.

### Below

*A 58 Squadron Whitley V being loaded with bombs prior to a combat sortie. 58 SQUADRON RECORDS*







**Above**  
Whitley V N1436  
'JL-A' of 10 OTU  
undergoing repairs  
to its undercarriage.  
B LOWE VIA ANDY  
THOMAS

Stanton Harcourt, a satellite of Abingdon, he volunteered as an extra instructor for a night cross-country in Mk.V N1391 with a sergeant pilot named Peter Gammon and a number of trainee crew. Hubert had flown with the youngster on a number of occasions and was not unduly concerned. He was perched on Gammon's right with an extension of the controls to use as required.

Some way into the flight at around 3,000ft, one of the engines caught fire, with flames pouring out of the exhaust. Hubert immediately assumed command and asked for a mayday call to be put out and for the appropriate distress cartridge signal to be fired.

Despite the fire, Hubert felt confident he could land on one engine, if only he could receive an answer to his calls for help. He was in the vicinity of York and, having served with 4 Group, was familiar with a good many airfields in the area.

As the minutes ticked by, and still with no reply, Hubert opted instead to head back towards Abingdon, and attempted to restart the damaged Merlin X. It was a mistake, for it once again began belching flames and smoke. Steadily losing height, it was now urgent that they found somewhere to land.

Concerned for the safety of the crew, he ordered them to bale out,

which they all managed safely – with the exception of his pupil pilot. Gammon could only exit via the roof hatch or by bundling past his instructor, neither of which presented an attractive proposition. He opted instead to stay.

Down to below 1,000ft, Hubert desperately scanned through the gloom for a safe place to land. As he did so he caught sight of what he thought was a flare path. These friendly lights proved to be along Nuneaton High Street! A number of local inhabitants heard and saw the stricken bomber struggling overhead.

Putting N1391 into a glide and turning on his landing lights, Hubert picked out a cornfield that seemed to offer his best chance of survival, and with the wheels retracted and the top escape hatch open, he offered up a silent prayer. This must have been answered, for the Whitley made a perfect crash landing, skidding along the ground until coming to a halt as one of the wings struck a tree.

Hubert was momentarily stunned, but regained consciousness to find his gloves and flying clothes on fire. He had the presence of mind to look for his pupil, but there was no sign of him, so he set about saving himself. Scrambling out, he beat at the flames on his clothes and shouted for help.

Assistance soon arrived in the shape of Vera Woodward, an 18-year-old

farm girl. An ambulance was called and Hubert was taken to Nuneaton hospital where he was patched up, prior to being transferred to the burns ward of the RAF Hospital at Cosford.

Soon after his arrival he was reunited with Peter Gammon, who had serious burns to his hands and his face. Unlike Hubert, he had not been wearing gloves or a flying helmet.

Treated under the care of the great Sir Archibald McIndoe, Hubert underwent a long period of recovery at East Grinstead, and was obliged on his release to undergo another full Air Ministry medical. His flying category was reduced to A2 non-operational status: light aircraft in daylight only, and below 5,000ft.

Hubert was philosophical about his accident. It saved him from a likely posting to a Halifax squadron and a return to 'ops'. Ironically, the burns saved his life. In three years, Hubert had flown 101 different Whitleys. He finished the war as a squadron leader and chief ground instructor. He died in July 2000.

*The author would like to acknowledge the help of David Walters, Hubert's son, in researching his father's life. He would also like to thank Air Cdre John Mitchell, 58 Squadron observer, for referencing his book Churchill's Navigator. ●*

**Below**  
Whitley V T4134  
after making a  
crash-landing  
close to Lübeck on  
Germany's Baltic  
coast on September  
11, 1940. All the crew  
survived and were  
taken prisoner. VIA  
ANDY THOMAS





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## JANUARY ISSUE FEATURES:

### MOSQUITO NIGHT FIGHTER ACE

Flying Officer Norman Crookes MBE, DFC & Two Bars, DFC (US) was the navigator in a Mosquito night fighter when, in the early hours of 30 July 1944, his pilot claimed four "kills" in just twenty minutes

### NO WAY HOME

At first it looks like a picture of a pile of unrecognisable wreckage. However, the clues to its identity – a 610 Squadron Spitfire shot down during a Circus operation in 1941 – can be found on the back of the photograph itself.

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### Armstrong Whitworth Whitley

# Rocket Man

A look at a Whitley bomber adapted for rocket-assisted take-off

*Above Whitley V T4149 getting airborne with the assistance of wing-mounted rocket pods.*

**A**fter the type had been withdrawn from frontline duties, the Armstrong Whitworth Whitley was used in a variety of secondary roles. Perhaps the most unusual of these was the one undertaken by T4149, a Mk.V version, which played a part in the development of rocket-assisted take-off (RATO).

One of a batch of 150 aircraft delivered between August and December 1940 by the manufacturer

to Baginton, T4149 never served with a squadron and was instead assigned to the Royal Aircraft Establishment at Farnborough. Here, in July 1943, it was fitted with two rocket pods for RATO trials. The containers – one held under each wing – were designed to accommodate 24 three-inch rockets, but were suitable to provide take-off assistance to bombers weighing between 30,000 (13,608kg) and 80,000lbs, and to the General Aircraft Hamilcar, a military glider.

The rockets were fired in sequence rather than all at once to provide boost over a long enough period to 'launch' a large aircraft. As well as testing on the Whitley and Hamilcar, they were also tried on the Horsa glider. Both of the gliders would receive a 'boost' from the rockets having already been towed into the air behind a tug. The Whitley would use the power to assist in take-off. With the ending of these trials, T4149 was struck off charge on February 29, 1944.



### Spotlight Next Month

#### Fairey Battle

Next month *Spotlight* focuses on the ill-fated Fairey Battle. Sleek and futuristic-looking on the design table, the single-engined light bomber turned out to be an especially vulnerable war machine. Slow and poorly armoured, it was shot down in large numbers during the Battle of France. We look back at its use in combat, the bravery of its crews, and its other uses following withdrawal from frontline service. Our March issue is on sale in the UK on **January 31** – or see **page 30** for our latest money-saving subscription offers.



*A view of T4149 clearly showing its underwing rocket canisters.*



*Whitley T4149 never saw frontline action and was based for much of its 'career' at RAE Farnborough.*