

# Geodetic Giant

The Vickers Windsor was the company's last wartime effort to get back on equal terms with the likes of Avro and Handley Page. Ultimately, though, it failed... as **Tony Buttler** explains



**ABOVE** Despite its apparent size, the Windsor manoeuvred incredibly well and had an impressive rate of roll KEY COLLECTION

One of the clear outcomes of World War Two was the domination of heavy bomber design and production by British aircraft manufacturers Avro and Handley Page. With the likes of the Lancaster, Lincoln and Halifax bearing their name, it is easy to overlook some of the other companies in the running, such as Vickers, Armstrong and Bristol.

At the start of hostilities in 1939, Vickers was at the forefront of bomber production with its twin-engined Wellington. However, rapid wartime development left this fine aircraft standing in the medium bomber category. With legendary designer Barnes Wallis behind its driving force, Vickers produced several blueprints for heavy bombers from within the

depths of its Weybridge facility in Surrey. However, only one would take to the air, the four-engined Windsor.

In 1941 the firm began devising a high-altitude bomber powered by Rolls-Royce Merlin engines, and in July 1942 the company gained Air Ministry approval to produce two prototypes – later given the serials DW506 and DW512. Covered by Specification B.3/42 stipulating a maximum speed of 350mph at 31,000ft, a ceiling of 38,500ft and a maximum bomb load of 8,000lb, the emerging design was designated the Type 447 Windsor the following year.

This five-seat machine would be the last Vickers aircraft to use Barnes' famous geodetic light-alloy arrangement, but the first four-

engined type to employ it. Having been favoured in several of the firm's previous exploits, including the Wellesley, Wellington and Warwick, it comprised a lattice arrangement of load-bearing members, which resulted in both a very strong and light airframe. This accrued strength allowed many severely battle-damaged Wellingtons to return home from operations safely.

## Wallis' other wonder

As an upshot of its success, Wallis used it to form the Windsor's fuselage, wing, tail and fin. However, compared with the smaller types, the structure envisaged for the new aircraft was far more complex and required heavy support





## Vickers Windsor specifications

<b>Powerplant</b>	Four 1,750hp (1,305kW) Rolls-Royce Merlin 85 liquid-cooled inline engines, production aircraft to be fitted with 1,850hp (1,380kW) Merlin 100s
<b>Span</b>	117ft 2in (35.71m)
<b>Length</b>	76ft 10in (23.41m)
<b>Gross wing area</b>	1,248sq ft (115.9m <sup>2</sup> )
<b>Maximum weight</b>	NK136 72,000lb (32,659kg), production aircraft 77,000lb (34,927kg)
<b>Performance</b>	
<b>Maximum speed</b>	300mph (483km/h) at sea level, 360mph (579km/h) at 21,000ft
<b>Sea Level rate of climb</b>	960ft/min (293m/min)
<b>Service ceiling</b>	27,250ft
<b>Armament</b>	Two fixed .303in machine guns, four remote-controlled, rearward-firing 20mm cannon, 8,000lb (3,629kg) bombs (later 12,000lb [5,443kg] of bombs)

**ABOVE** A rare image of Windsor prototype DW506 during its maiden flight on October 23, 1943, with Vickers' chief test pilot 'Mutt' Summers in the cockpit ALL TONY BUTTLER UNLESS STATED

components throughout. Other issues included the fabric used to cover the airframe. On earlier Vickers machines it was doped Irish linen, but this would not provide the suitable surface finish needed for the Windsor's predicted high speeds. Ever the innovator, Wallis developed a new composite material with high-tensile-grade steel wire running through it.

A somewhat eyebrow-raising feature on the type was its landing gear, which featured four separate main legs – one in each engine nacelle. This made for a light but strong undercarriage, setting it apart from the much bigger and heavier units used on most bombers of the time. With the outer wheels 50ft apart, Windsor pilots had to be careful when taxiing,

Defensive armament comprised two fixed .303in machine guns in the nose, with as many Air Ministry specified remote-controlled rearward-firing 20mm cannon fitted inside the rear of the outer engines. By placing the armament

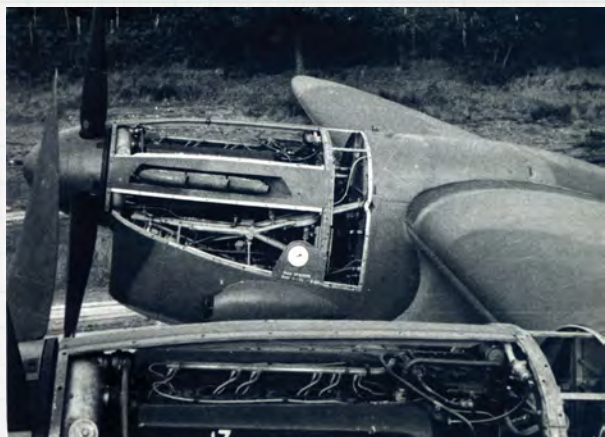
in the outboard nacelles, the tailplane was out of their direct line of fire. However, just one example carried them – the third prototype, serial NK136.

The wing was elliptical in shape and dispensed with the traditional

**BELOW** The first Windsor at Farnborough prior to its debut flight. It was re-assembled away from public view after delivery by road from Vickers' Foxwarren works. Note the four-piece main landing gear







ABOVE Close-up detail of DW506's right-hand outer Merlin 65 engine and chin-type radiator. Trouble with the starboard engines contributed to the loss of '506 in early 1944

spar for a single hollow geodetic tube, while each inner plane housed three sections of split flaps with the ailerons fitted to the outer. Plans called for production machines to carry 3,580 imp gal of fuel in mainplane-fitted tanks. To compensate for the fuel's net, Wallis designed the outer wings to droop when the aircraft was sitting on the ground, and 'flex' on take-off as they took the weight. The tips could rise in excess of 4ft when the aircraft was fully laden. Given this near unknown characteristic, most Windsor pilots required several flights to get accustomed to seeing the wing physically bend. Celebrated test pilot Eric 'Winkle' Brown, who included the aircraft in his record-breaking list of types



Due to its size, the Windsor suffered a chronic lack of ground clearance

flown, said it reminded him of a seagull in flight after witnessing it first-hand.

While the pilot sat in a stepped narrow cockpit under a detachable canopy, the navigator and wireless operator were seated behind, and the bomb-aimer was positioned in the nose. Said to have outstanding forward visibility, the single-person cockpit was considered controversial, with many believing a second pilot was required. It was pointed out that if the pilot were injured or killed, another crew member would have difficulty taking over due to the tight confines. Consequently, drawings were produced in August 1944 for a Windsor featuring a nose similar to the Lancaster's.

Two different engine variants were used during the development phase – prototype DW506 was fitted with Merlin 65s featuring chin-type radiators, while DW512 and NK136 had Merlin 85s housed in off-centre annular cowlings. The powerplants each drove a wooden four-bladed Rotol propeller. However, with the airframe's weight rapidly increasing, it was soon realised both '506 and '512 would no longer represent production machines. As a result, three more prototypes were ordered, serials NK136, NN670 and NN673; just the first of these would fly. Vickers decided it would use '506 and '512 to provide flight data but limited them to an all-up-weight of 55,000lb. Further modifications, including a much stiffer fuselage introduced to NK136, allowed this restriction to be lifted.

At the time, the Windsor was considered top secret. However, the US journal *American Aviation*, released news about the existence of this new aeroplane in its January 1, 1944 edition. Following suit, British magazine *Flight* reported on the development two months later.

RIGHT The wreckage of DW506 following its crash-landing at RAF Grove on March 2, 1944



BELOW Vickers Windsor DW506 running on the runway at Farnborough in 1943 showing the type's evident wing droop and fighter-style canopy







Construction had begun in 1942, and the first completed Windsor (DW506) rolled out of Vickers' mysterious Foxwarren works in Surrey during mid-1943, before being dismantled and transported to Farnborough, Hampshire. Re-assembled away from prying eyes, Vickers' chief test pilot, Capt Joseph 'Mutt' Summers, performed the first flight on October 23 – albeit with ballast in place of the armament.

### Perfectly harmonised

In the air the Windsor was said to have extremely efficient controls and an excellent rate of roll. The rudder was light and effective at all speeds up to 240mph and harmonised perfectly with the powerful elevators. Even up to 260mph, the aircraft could turn sharply in a vertical bank without any undue effect. During landing the controls were commandingly light and handled easily with nothing in the way of unpleasant tendencies. With most of the initial test flying undertaken by 'Mutt' and Sqn Ldr Maurice Victor Longbottom, the aircraft reached a maximum speed of 317mph at 23,000ft.

On March 2, 1944, DW506 was written off following a crash-landing in the hands of Sqn Ldr Robert English from the Royal Aircraft Establishment's Performance Testing Squadron. During a sortie to assess the type's two-engine asymmetric flight performance, the starboard inner powerplant would not unfeather, while the outer motor on the same



Windsor NK136 outside Vickers' hangar at Wisley in 1945 after gaining its rear-firing twin 20mm Hispano cannon

side failed. Attempting to land at RAF Grove, Berkshire, '506 ran into a ditch and broke its back. Thankfully, no one was hurt, but the prototype's career was over after just 44 hours in the air.

Apart from different engines, DW512 was fundamentally the same as '506, although, it did carry more equipment and armour plating, which increased the weight – again ballast was used in place of the guns. Summers and Longbottom took the second aircraft on its debut flight from Wisley, Surrey on February 10, 1944. It should be noted that some sources give the date as February 15.

Performing most of the type's aerodynamic test flying, one of the issues that was highlighted during dive trials was the varying degrees of distortion and tearing in the already stiffened fabric on the wing's upper surfaces; a new form of glass cloth-backed covering was developed and applied to counter this. Another problem identified was vibration through the aircraft when the bomb doors were opened.

However, before this could be properly investigated, the airframe's career was abruptly cut short with the cancellation of Windsor production in November 1945. It was duly released for disposal in June 1946 and subsequently scrapped.

### One time only

The third Windsor, NK136, was the only airframe fitted with armament, and consequently Vickers allocated it the new designation Type 461. Fitted with



ABOVE Vicker's design engineer, Sammy Walsh, inspects NK136's rear-firing cannon. The only example to receive its defensive armament, the manufacturer gave the airframe the new designation Type 461

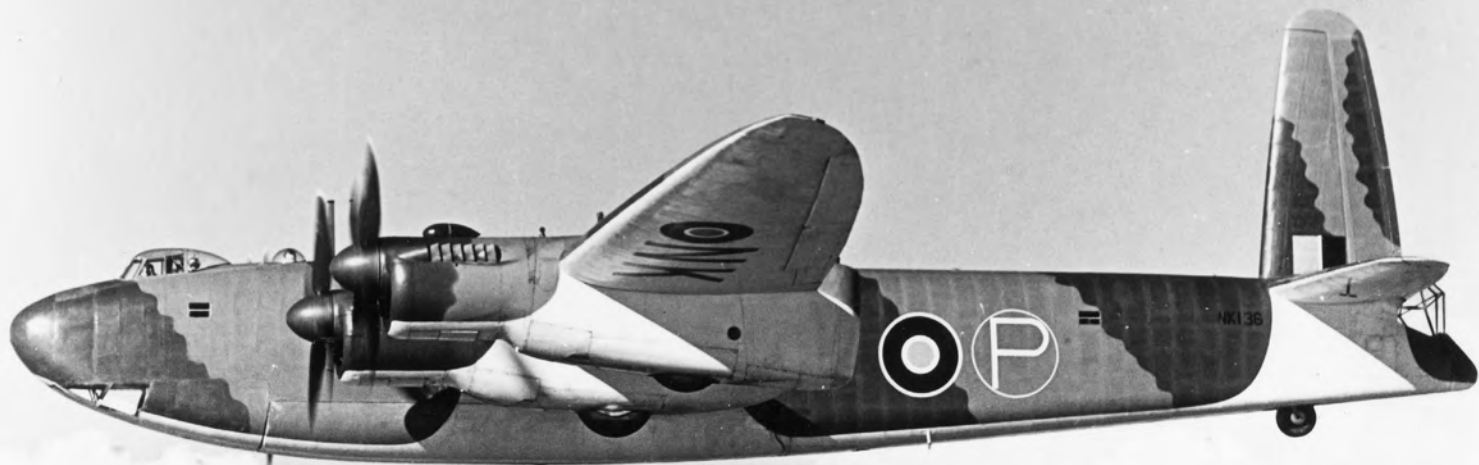


ABOVE A rare image of the Windsor's formidable barbetted-mounted cannon uncovered



ABOVE Taken during an exhibition at Farnborough in 1945, this image of DW512 shows the type's single-pilot cockpit, which proved controversial during the development phase





ABOVE Windsor NK136 during an aerodynamic evaluation sortie, prior to the type being cancelled on November 12, 1945  
KEY COLLECTION

Merlin 85 engines, it first flew on July 18, 1944. Nevertheless, despite being the only airframe to closely represent a production machine, the flight was undertaken without any armament installed; this was finally fitted in January 1945.

Firing trials were carried out both on the ground at Pembrey, Wales and in the air over Lyme Bay in Southwest England. Arriving at Pembrey in late April 1945, the aircraft was secured with its tail pointing out to sea and all four cannons fired for the first time on the 27th. Three days later they were actioned again at angles ranging from 45° up and down. The following month, on May 29, Sqn Ldr Keating flew NK316 to Lyme Bay from Wisley for its initial airborne firing trials. With Windsor DW512 acting as a cameraship, this is understood to have been the only time both flew together.

By September 1944 the three Windsors had amassed 133 flights, many of which had been flown in excess of 20,000ft – with some attaining 31,000ft. As well as weapon trials, NK136 was used for further aerodynamic evaluation. But compared with the first two prototypes, the aircraft had lost 25mph from its top speed at higher altitudes. Contributing factors included the increase in weight and

the airframe's rough surface finish. In early April 1945, NK136 was shown to overseas visitors, and in October that year, Vickers test pilot Douglas Webster 'Tommy' Lucke displayed DW512 at Farnborough's German Aircraft Exhibition.

A month later '136 was grounded. Almost a year passed before the aircraft flew again on September 17, 1946 for what would be its final flight. Landing at RAF Manby in Lincolnshire, the aircraft joined the Empire Air Armament School as a ground instructional asset coded 6222M – but its new role was short-lived, as it was scrapped two years later.

### Not all is lost

The production Windsor was to be known as the Vickers Type 483, 300 of which were ordered across seven batches in April 1943, with construction being undertaken at Weybridge. Following the war in Europe, the first true airframe was expected for delivery in 1946, with up to 30 squadrons planned to re-equip. Intended for use in the Pacific, the end of hostilities against Japan brought everything to a shuddering halt. Even as early as November 1944 the production order had been cut to just 100 examples. Subsequently the number plummeted to 40 – all of

which were to be Windsor Mk.IIs fitted with Rolls-Royce Clyde turboprop engines. Finally, on November 12, 1945 the Windsor was officially cancelled. Nevertheless, trials with the existing airframes were to be continued.

Classed as pre-production airframes, the fourth and fifth prototypes were never completed as a result. The first long-distance Windsor was to be NN670, powered by Merlin 85s. Boasting a range of 4,000 miles, the aircraft was almost ready to fly when it was abandoned in March 1946. Although intended to start its flying career fitted with Merlin 100s, the fifth Windsor (NN673) was to have instead featured Clyde powerplants and serve as the Mk.II prototype. At cancellation, NN673 was around half complete, and both it and '670 were scrapped with no major pieces remaining.

For a heavy bomber the Windsor was a rather striking aeroplane that was a pleasure to fly, exhibiting little in the way of vices. However, the complex geodetic framework made it problematic to build. With nearly three-quarters of a century passing since the project was terminated, it is difficult to judge how useful the Windsor might have been during the first years of peace.

One thing is known for sure; while the manufacturer failed to find favour with the type, it would recover lost ground massively in 1951 with the first flight of its Valiant jet bomber. Vickers would be back on top... for a time at least. **FP**

---

**“In 1941 the firm began devising a high-altitude bomber powered by Rolls-Royce Merlin engines”**

---