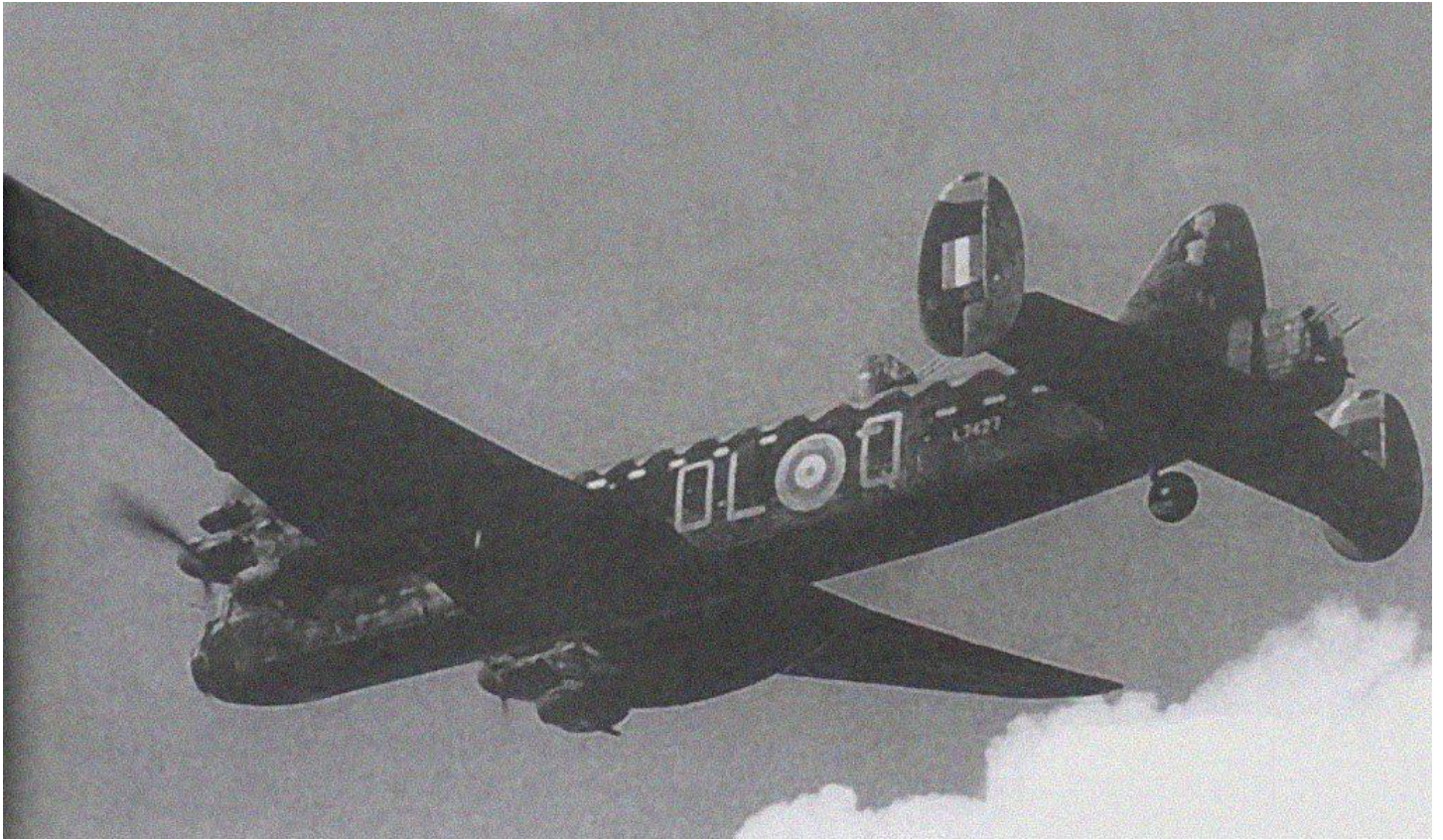


## Avro Manchester

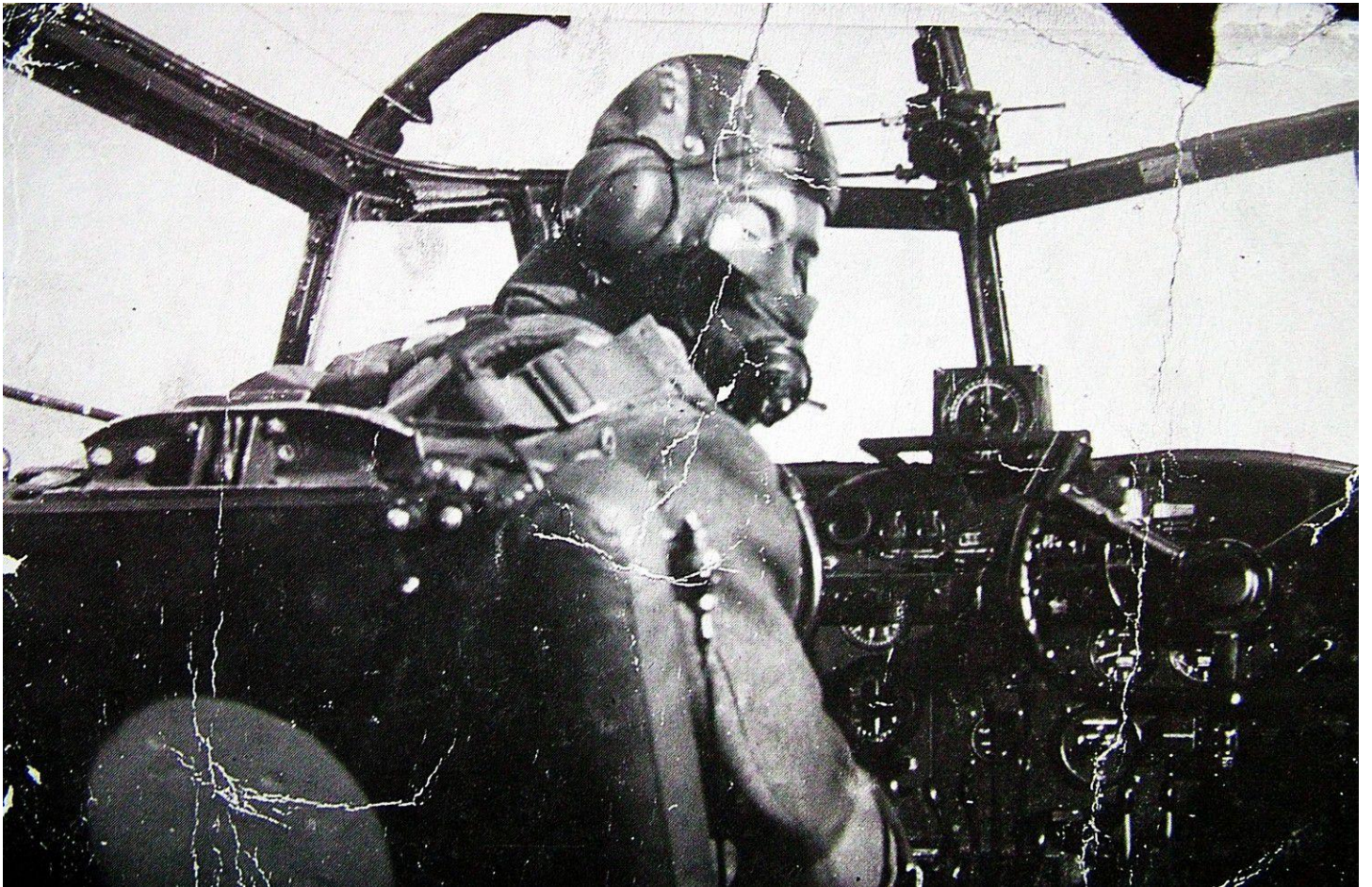


L'Avro Manchester fut conçu à la suite d'une demande en 1936 du Ministère de l'Air britannique. Produit à 200 exemplaires, il fut un échec surtout à cause du manque de puissance et de fiabilité des moteurs, mais la cellule eut le mérite de servir de base pour le projet qui devait devenir le célèbre Avro Lancaster. Le Manchester a été conçu en réponse à la spécification P.13/36 du Ministère de l'Air britannique, spécification qui a également été à l'origine du Handley Page Halifax. La spécification concernait un bombardier moyen bimoteur utilisable partout dans le monde, capable de réaliser des attaques en piqué léger (30 degrés), de transporter des charges de bombes importantes (8 000 livres), ou bien deux torpilles de 18 pouces. Il devait être propulsé par le puissant moteur Rolls Royce Vulture de 24 cylindres en X. Ce moteur était lui-même composé de deux blocs-moteur Peregrine à cylindres en V montés l'un par-dessus l'autre, celui du dessous étant inversé pour obtenir la forme en « X ». Développé en 1935, le moteur avait suscité bien des espoirs (il devait développer 1 760 chevaux), mais il n'a développé au final qu'entre 1 480 et 1 500 chevaux. Le premier prototype du Manchester (L7246) a décollé pour la première fois le 25 juillet 1939 de l'aérodrome de Manchester. Le second prototype a suivi le 26 mai 1940. Alors que le Manchester avait été conçu avec une double dérive, un troisième dérive (centrale) a été ajoutée sur le premier appareil de série. Un total de 20 appareils ont été construits avec cette configuration. Le Mk IA leur a succédé, revenant au système à empennage double, mais les dérives étant considérablement agrandies et pourvues de compensateurs. Cette configuration a plus tard été reprise sur le Lancaster. Le Manchester MkIII, immatriculé BT308, qui a volé pour la première fois le 9 janvier 1941, était à peu de choses près le premier Lancaster car propulsé par 4 moteurs Merlin et doté d'une envergure plus importante, bien que reprenant dans un premier temps le triple empennage. Le BT308 a reçu le nom de Lancaster dès la fin de son premier vol. Le second prototype du Lancaster (DG595), a été directement équipé de l'empennage du Manchester MkIA. La production du Manchester a été poursuivie jusqu'en novembre 1941, mais certains avions ont été transformés en Lancaster directement sur les chaînes d'assemblage. Les Manchesters ont effectué 1 269 sorties opérationnelles (le dernière contre Brême le 25 juin 1942), larguant 1 826 tonnes de bombes, et perdant 63 appareils en opérations. La cause principale de ces pertes a été le manque de fiabilité des moteurs : ils avaient tendance à prendre feu sans signes avant-coureurs.

## **Avro Manchester :**

- 2 moteurs Rolls Royce Vulture I
- 2 X 1500 Ch
- 402 Km/h
- 8 Mitrailleuses 7.7 mm 4695 Kg de bombes
- 22680 Kg en charge
- 5852 m de plafond pratique
- 1930 Km en distance franchissable
- 7 Equipiers





Source : <http://les-avions-de-legende.e-monsite.com/pages/les-bombardiers/les-bombardiers-anglais/avro-manchester.html>

Version anglaise Wikipédia

The **Avro 679 Manchester** was a British twin-engine [heavy bomber](#) developed and manufactured by the [Avro](#) aircraft company in the United Kingdom. While not being built in great numbers, it was the forerunner of the famed and vastly more successful four-engined [Avro Lancaster](#), which was one of the most capable [strategic bombers](#) of the [Second World War](#). Avro designed the Manchester in conformance with the requirements laid out by the British [Air Ministry Specification P.13/36](#), which sought a capable [medium bomber](#) with which to equip the [Royal Air Force](#) (RAF) and to replace its inventory of twin-engine bombers, such as the [Armstrong Whitworth Whitley](#), [Handley Page Hampden](#) and [Vickers Wellington](#). Performing its [maiden flight](#) on 25 July 1939, the Manchester entered squadron service in November 1940, just over twelve months after the outbreak of the war. Operated by both RAF and the [Royal Canadian Air Force](#) (RCAF), the Manchester came to be regarded as an operational failure, primarily as a result of its [Rolls-Royce Vulture](#) engines, which were underdeveloped and hence underpowered and unreliable, and production was terminated in 1941. However, the Manchester was redesigned into a four-engined heavy bomber, powered by the [Rolls-Royce Merlin](#) engine instead, which became known as the Lancaster.

## Development

The Manchester has its origins in a design produced by Avro in order to fulfil the British [Air Ministry's Specification P.13/36](#). This was the same specification to which [Handley Page](#) had also produced their initial design for what would become the [Halifax](#) bomber.<sup>[1]</sup> Issued in May 1936, Specification P.13/36 called for a twin-engine monoplane "[medium bomber](#)" for "worldwide use", which was to be capable of carrying out shallow (30°) [dive bombing](#) attacks and carry heavy bombloads (8,000 lb/3,630 kg) or two 18 in (457 mm) [torpedoes](#).<sup>[2][3]</sup> Additionally, provisions to conduct catapult assisted takeoffs, which would permit the carriage of the maximum payload, was also a stated requirement, although this provision was removed in July 1938.<sup>[4]</sup> The envisioned cruising speed of the bomber was to be a minimum of 275 mph at 15,000 feet.<sup>[5]</sup> The Air Ministry had expectations for an aircraft of similar weight to the [B.1/35](#) specification, but smaller and faster. Avro had already started work on a corresponding design prior to having received a formal invitation to tender. The company was in competition with [Boulton Paul](#), [Bristol](#), [Fairey](#), [Handley Page](#) and [Shorts](#). Vickers also had its Warwick, which had [Napier Sabre](#) engines, but eventually chose against tendering it. In early 1937, both the Avro design and the rival Handley Page HP.56 were accepted and prototypes of both ordered; but in mid-1937, the Air Ministry exercised their rights to order the types "off the drawing board". This skipping of the usual process was necessary due to the initiation of a wider expansion of the RAF in expectation of large scale war in Europe. From 1939, it was expected that the P.13/36 would begin replacing the RAF's existing medium bombers, such as the [Armstrong Whitworth Whitley](#), [Handley Page Hampden](#) and [Vickers Wellington](#). The Avro design used the [Rolls-Royce Vulture](#) 24-cylinder [X-block engine](#), which was two [Rolls-Royce Peregrine Vee cylinder blocks](#) mounted one on top of the other, the bottom one inverted to give the "X" shape.<sup>[6]</sup> When developed in 1935, the Vulture engine had promise — it was rated at 1,760 hp (1,310 kW) but it proved woefully unreliable and had to be derated to 1,480–1,500 hp (1,100–1,120 kW). Avro's prototype Manchester L7246, was assembled by their experimental department at Manchester's [Ringway Airport](#) and first flew from there on 25 July 1939, with the second aircraft following on 26 May 1940.<sup>[2][7]</sup> The Vulture engine was chosen by Avro and not stipulated by the Air Ministry as is sometimes claimed;<sup>[a]</sup> other engine layouts considered included the use of two [Bristol Hercules](#) or [Bristol Centaurus radial engines](#).<sup>[6]</sup> The Handley Page HP.56, always intended as the backup to the Avro, was redesigned to take four engines on the orders of the Air Ministry in 1937, when the Vulture was already showing problems.<sup>[11][b]</sup> While the Manchester was designed with a [twin tail](#), the first production aircraft, designated the **Mk I**, had a central fin added and twenty aircraft like this were built. They were succeeded by the **Mk IA** which reverted to the twin-fin system but used enlarged, taller fin and [rudders](#) mounted on a new [tailplane](#), with span increased from 22 ft (6.71 m) to 33 ft (10.06 m). This configuration was carried over to the Lancaster, except for the first prototype, which also used a central fin and was a converted, unfinished Manchester.<sup>[12]</sup> Avro constructed 177 Manchesters while [Metropolitan-Vickers](#) completed 32 aircraft. Plans for [Armstrong Whitworth](#) and [Fairey Aviation](#) at Ringway (now [Manchester Airport](#)) to build the Manchester were abandoned. Fairey's order for 150 Manchesters was replaced by orders for the Halifax.

## Design

The forward section of a Manchester Mark I at Waddington, Lincolnshire, showing the nose with the bomb-aimer's window, the forward gun-turret and the cockpit, September 1941 The Avro Manchester was designed with great consideration for ease of manufacture and repair.<sup>[13]</sup> The fuselage of the aircraft comprised longitudinal stringers or [longerons](#) throughout, over which an external skin of aluminium alloy was flush-riveted for a smooth external surface.<sup>[13]</sup> The wings were of a two-spar construction, the internal ribs being made of aluminium alloys; fuel was contained with several self-sealing fuel tanks within the wings.<sup>[14]</sup> The tail shared a similar construction to the wing, featuring a twin fin-and-rudder configuration that provided good vision for the dorsal gunner.<sup>[15]</sup> The cockpit housed the pilot and fighting controller's position underneath the canopy, and these two crew members were provided with all-round vision. The navigator was seated aft of the fighting controller and the position included an [astrodome](#) for use of a [sextant](#).<sup>[15]</sup> The bomb aimer's station was housed inside the aircraft's nose, beneath the forward turret and bomb aiming was conducted using optical sights housed in this compartment.<sup>[16]</sup> For crew comfort on lengthy missions, a rest area was situated just to the rear of the main cabin.<sup>[17]</sup> The aircraft's undercarriage was entirely retractable via hydraulic systems, or in an emergency, a backup air system.<sup>[13]</sup> The doors to the [bomb bay](#) were also operated by these systems, an additional safety measure was installed to ensure that the bombs could not be dropped if the doors were shut.<sup>[16]</sup> The bombs were housed on bomb racks inside the internal bomb bay, and other armaments such as torpedoes could also be fitted.<sup>[16]</sup> All fuel tankage was located in the wings in order to keep the fuselage free to accommodate more armaments in the bomb bay which covered nearly two-thirds of the underside of the fuselage.<sup>[6]</sup> Vulnerable parts of the aircraft were armoured; the pilot had additional armour and bulletproof glass and an armoured bulkhead was to the rear of the navigator's position.<sup>[15]</sup> The Manchester featured three hydraulically-operated turrets, located in the nose, rear and mid-upper fuselage;<sup>[12]</sup> the addition of a [ventral](#) turret directly behind the bomb bay had been considered and tested on the second prototype, but did not feature on production aircraft.<sup>[c]</sup><sup>[6]</sup> Access to all crew stations was provided by a walkway and crew positions had nearby escape hatches.<sup>[18]</sup> The Manchester was powered by a pair of Vulture engines; in service these proved to be extremely unreliable. Aviation author Jon Lake stated of the Vulture: "The engine made the Manchester mainly notable for its unreliability, poor performance, and general inadequacy to the task at hand" and attributed the aircraft's poor service record to the engine troubles.<sup>[12]</sup> I was one of the six original pilots to have flown with the first Manchester squadron. That was a disaster. The aircraft itself, the airframe, had many shortcomings in equipment in the beginning, but as we found out Avro were excellent in doing modifications and re-equipping the aeroplane. The engines never were and never did become reliable. They did not give enough power for the aeroplane, so we ended up with two extremely unreliable 1,750 hp engines having to haul a 50,000-pound aircraft. We should really have had 2,500 hp engines. You felt that if you'd lost one, that was it, you weren't coming home. It didn't matter if you feathered the propeller or not. There was only one way you went and that was down. I have seen an aircraft doing a run up on the ground and have two pistons come right out through the side of the engine. The original bearings were made without any silver as an economy measure, so they weren't hard enough. The bearings would collapse the connecting rod and the piston would fling out through the side of the engine and bang! Your engine just destroyed itself.<sup>[19]</sup>

## Operational history



Avro Manchester Mk IA

On 5 August 1940, the first production Avro Manchester, L7276, was delivered to [RAF Boscombe Down](#) in advance of service acceptance trials.<sup>[4]</sup> In November 1940, the Manchester officially entered service with the newly reformed [No. 207 Squadron](#) of [RAF Bomber Command](#). The type passed all acceptance tests by 21 December 1940, and 207 Squadron had at least 80 Manchesters on strength by the end of 1940.<sup>[20]</sup> The Manchester's first operational mission was conducted on 24–25 February 1941 in a raid on the [French](#) port of [Brest](#).<sup>[21][22]</sup> On 13 March 1941, L7319 became the first Manchester to be shot down by enemy fire.<sup>[23]</sup> On 13 April 1941, all Manchesters were temporarily grounded due to a higher than expected number of engine [bearing](#) failures; on 16 June 1941, a second grounding of the type was ordered due to more engine troubles.<sup>[24]</sup> The unserviceability of the Vulture engine forced squadrons to make use of obsolete bombers such as the Hampden in its place. Upon the restart of operations in August 1941, additional failings were encountered; excessive tail flutter, hydraulic failures and faulty [propeller feathering controls](#).<sup>[25]</sup> Production of the Manchester was halted in November 1941, by which point a total of 202 aircraft had been constructed. A total of eight bomber squadrons were equipped with the type, it also served in two further squadrons and also saw use by [RAF Coastal Command](#).<sup>[22]</sup>



Interior view of a Manchester MK I

While modifications were made by Avro to address some of the technical issues experienced, unit strength suffered and Bomber Command was frequently unable to raise significant numbers of aircraft to participate in large bombing missions; on 7 November 1941, all of the RAF's serviceable bombers had been dispatched to bomb [Berlin](#), out of a force of over 400 bombers, only 15 were Manchesters.<sup>[26]</sup> On 3 March 1942, out of a force of nearly 200 bombers sent against a [Renault](#) factory near [Paris](#), 25 were Manchesters;<sup>[27]</sup> while during the [first 1,000 bomber raid](#) on [Cologne](#) on 30 May 1942, 35 Manchesters were amongst the 1,047 bombers sent to attack the city.<sup>[28]</sup> Flying Officer [Leslie Manser](#) was posthumously awarded the [Victoria Cross](#) for his actions while piloting Manchester L7301 of [50 Squadron](#) during the Cologne bombing mission.<sup>[29]</sup>

The **Mk III** Manchester ([serial number](#) *BT308*) which first flew on 9 January 1941, was essentially the first Lancaster, featuring a longer wing fitted with four Rolls-Royce Merlins in new unitized, [power-egg](#) nacelles – originally developed by Rolls-Royce for the Merlin-powered [Beaufighter II](#) – although initially retaining the three fins and twin outboard rudders (the central fin had no movable control surface) of the Manchester I. *BT308* received the "Lancaster" name immediately after its first flight. The second prototype Lancaster *DG595* featured the twin, enlarged fins and rudders of the Manchester IA. Manchester production continued until November of that year but some aircraft that were still in production were instead completed as Lancasters. The 193 operational Manchesters flew 1,269 sorties with Bomber Command, dropping 1,826 tons (1,657 tonnes) of bombs and lost 78 aircraft in action, flying its last operation against [Bremen](#) on 25 June 1942.<sup>[30][31]</sup> A further 45 were non-operational losses of which 30 involved engine failure. The Manchester was withdrawn from operations in mid-1942 in favour of more capable aircraft. Its final role in RAF service was as instructional trainers for converting crews to the RAF's new Lancaster bombers; the Manchester and Lancaster shared nearly identical crew positions and fuselages.<sup>[31]</sup> The type persisted in use for training purposes into 1943 before being completely retired.<sup>[12]</sup>



Source : [https://en.wikipedia.org/wiki/Avro\\_Manchester](https://en.wikipedia.org/wiki/Avro_Manchester)