

Armstrong Whitworth Albemarle

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L'Armstrong Whitworth **A.W.41 Albemarle** est un [avion militaire](#) britannique de la [Seconde](#) Guerre mondiale. Mis en chantier comme bombardier moyen par Bristol et développé par Armstrong Whitworth, ce bimoteur servit en fait d'avion de [transport](#) pour des missions spéciales.

Origine et développement

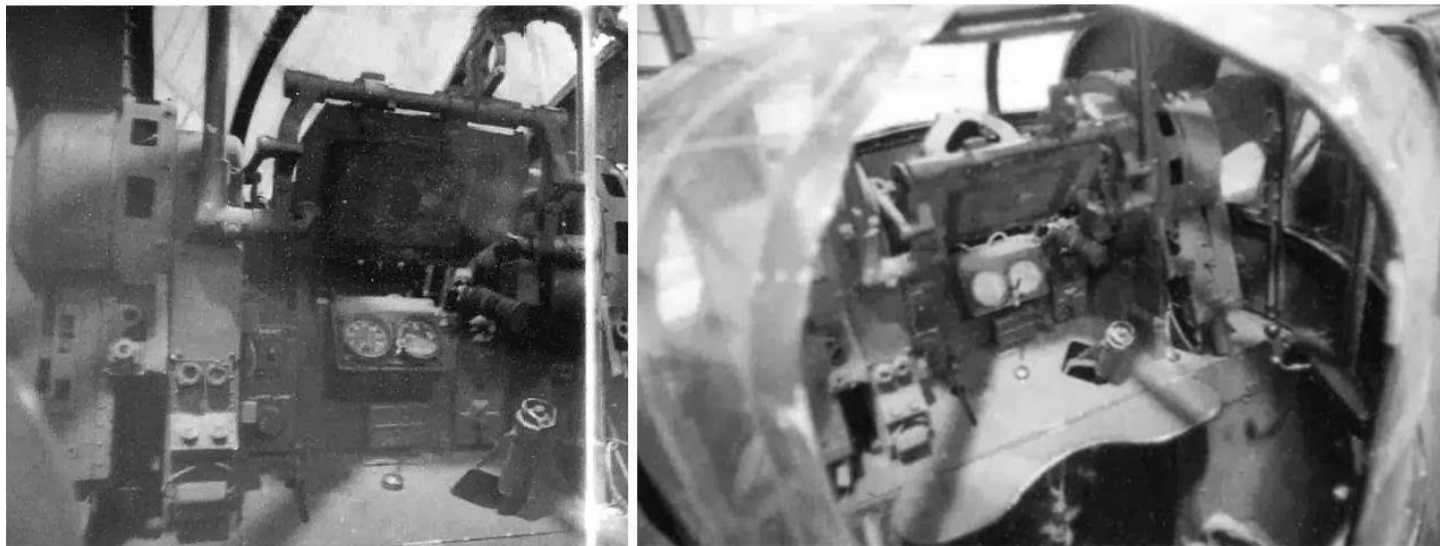
Bristol 155

Émise par l'Air Ministry en 1938, la spécification P.9/38 portait sur un bombardier moyen bimoteur construit essentiellement en tubes d'acier soudés supportant une structure en bois, procédé devant permettre d'économiser des [matériaux](#) stratégiques mais aussi de produire de nombreux sous-ensembles en faisant appel à des industriels sans expérience [aéronautique](#) spéciale. Bristol répondit en proposant un appareil embarquant 6 hommes d'équipage, dont un mitrailleur dorsal (tourelle quadruple) et un mitrailleur ventral (tourelle double). Il apparut rapidement qu'Armstrong Whitworth disposait d'une capacité industrielle inutilisée et le développement de l'appareil fut donc transféré au bureau d'études dirigé par John Lloyd.



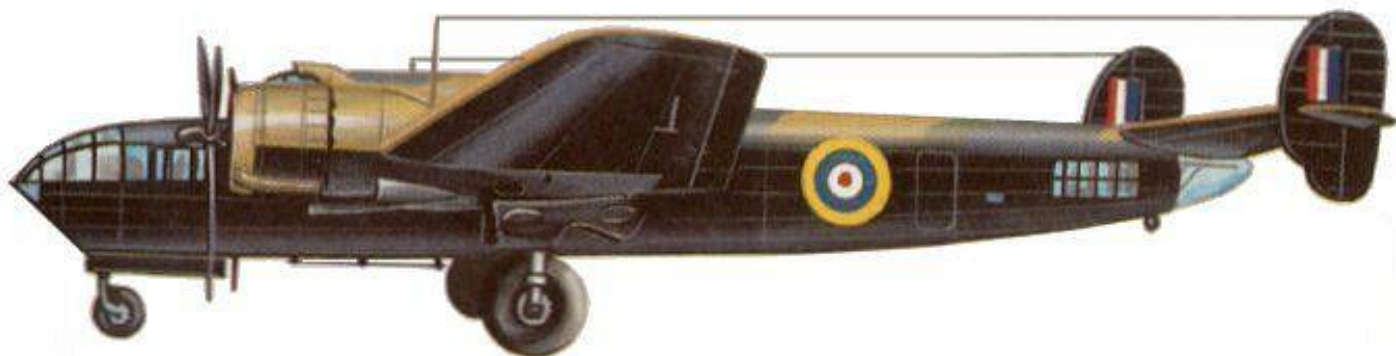
Armstrong Whitworth A.W.41

L'Air Ministry ayant modifié son [cahier des charges](#) pour faire du futur bimoteur un bombardier de reconnaissances et John Lloyd ayant modifié le [projet](#) Bristol pour en faire un quadriplace capable de transporter 680 kg de bombes sur 3 200 km à une [vitesse de croisière](#) de 402 km/h et 1 525 m d'altitude, une nouvelle spécification fut établie avec la désignation B.18/38. Au final le futur bombardier se présentait comme un [monoplan](#) à aile [médiane](#) cantilever de construction mixte. Avec un empennage bi-dérive et un [train](#) d'atterrissage [tricycle](#) escamotable à [commande hydraulique](#), l'Albemarle avait de faux airs de B-25 Mitchell, et fut le premier [avion](#) de construction britannique disposant d'un train tricycle (roulette avant) à entrer en service dans la [Royal Air Force](#).



Une première commande portant sur 200 appareils, soit 2 prototypes à produire par Armstrong Whitworth et 198 appareils de série devant être assemblés à Brockworth, près de Gloucester, par A.W. Hawksley Ltd, fut passée dès 1939. Deux marchés supplémentaires (dont 200 destinés à l'URSS) devaient porter la commande 880 bimoteurs, 278 étant par la suite annulés.

Le premier des deux prototypes construits par Armstrong Whitworth prit l'air le 20 mars 1940 à Hamble, avec une voilure affichant une envergure de 20,44 m et des moteurs Bristol Hercules XI de 1 590 ch. Il se révéla immédiatement trop lourd, essentiellement en raison de son mode de construction et le centre d'essais de Boscombe Down se montra très critique envers le bimoteur : Performances insuffisantes, particulièrement en [charge](#), efficacité médiocre des gouvernes sur un seul [moteur](#), manque d'efficacité du [frein](#) de [roue](#) avant, manque de confort pour l'équipage, avec en particulier une totale inefficacité du [chauffage](#) en arrière du [longeron](#) de voilure, difficultés à charger les bombes,



Le premier prototype fut détruit sur accident avant l'achèvement du second prototype, qui prit l'air le 20 avril 1941 avec une voilure portée à 23,47 m. Malgré les difficultés à mettre en place la production, impliquant quelques 1 000 sous-traitants sans expérience aéronautique, les premiers exemplaires de série sortirent d'usine en octobre 1941, avec une voilure de 23,47 m d'envergure, une tourelle dorsale quadruple Boulton-Paul et la possibilité de monter une tourelle ventrale double.



Source : <https://raf38group.org/armstrong-whitworth-albemarle/>

Au moment où les premiers appareils arrivèrent en unités, en décembre 1941, il avait été décidé de limiter l'usage de cet avion aux missions de transport de parachutistes (**Albemarle ST**) avec un aménagement pour 10 hommes armés, ou de remorquage de planeurs (**Albemarle GT**). Les essais dans ce sens avaient montré une nette tendance des moteurs à la surchauffe, problème qui ne fut jamais résolu malgré de nombreux essais d'amélioration de la ventilation des cylindres.



Versions

- **Albemarle I** : Bombardier moyen, 4 mitrailleuses Browning de 7,7 mm en tourelle dorsale, possibilité de tourelle double ventrale, réservoirs de carburant en voilure et fuselage central. 32 exemplaires seulement achevés selon ce standard, et ultérieurement convertis en appareils de [transport](#).
- **Albemarle ST. Mk I** : [Transport](#) de troupe, conservant les lance-bombes, mais avec suppression de la tourelle ventrale et des réservoirs de [fuselage](#). La tourelle dorsale était remplacée par 2 [Vickers](#) K en jumelage manuel Rose protégé par une verrière coulissante, une porte ce [chargement](#) cargo faisait son apparition à droite du fuselage et une trappe de largage de parachutistes était percée dans le plancher à l'arrière du fuselage. Un crochet de remorquage de planeurs Malcolm apparaissait à l'arrière du fuselage. On distingue trois modèles (Séries 1, 2, et 3), ne se différenciant que par des détails d'équipement.



- **Albemarle GT. Mk I** : [Remorqueur](#) de [planeur](#), 2 modèles (Séries 2 et 3).
- **Albemarle ST. Mk II** : Similaire au ST. Mk I mais modification d'équipements et avec tourelle dorsale, 99 exemplaires construits.
- **Albemarle GT. Mk II** : Version de remorquage de planeur du précédent, sans tourelle dorsale. 1 seul exemplaire achevé.
- **Albemarle ST. Mk IV** : Seule version non équipée d'un [moteur](#) Bristol Hercules XI, mais d'un Wright R-2600-A5B Double [Cyclone](#). Un prototype débuta ses essais le 12 décembre 1942, puis un appareil de série fut modifié, tous deux avec tourelle dorsale. Malgré la [puissance](#) supérieure du moteur ce modèle avait un [plafond](#) inférieur les bâti-moteurs, trop rigides, étaient sujets à rupture, ce qui entraîna l'abandon rapide de cette motorisation.
- **Albemarle ST.Mk V** : 50 appareils similaires aux ST. Mk II mais avec système de délestage du [carburant](#) modifié.
- **Albemarle ST.Mk VI** : Dernière version Special Transport, 133 exemplaires construits (Séries 1 seulement) avec tourelle dorsale.
- **Albemarle GT. Mk VI** : Version de remorquage de planeurs du précédent, 117 exemplaires construits (Séries 2 seulement).



Production

602 appareils furent construits au [total](#), soit 2 prototypes et 600 appareils de série. La production cessa en décembre 1944.

En service

- Royaume-Uni : Réputé sain et agréable à piloter après suppression de la tourelle dorsale et allongement de la voilure, l'Albemarle fit une carrière discrète, effectuant honnêtement un travail obscur et parfois essentiel sans que sa production n'entrave la réalisation de programmes plus importants. Les livraisons à la RAF débutèrent seulement en janvier 1943 au No 295 Sqn, à RAF Harwell. Outre cette unité l'Albemarle équipa les No 296, No 297 et No 570 Sqn pour le transport de troupes, le No 511 Sqn (transport cargo), le No 161 Sqn (Service Spécial) et, occasionnellement, les No 271, 279, 502 et 521 Sqn. Les No 296 et 297 Sqns du No 38 Wing furent les premiers à participer à une opération de guerre, l'invasion de la Sicile en juillet 1943. Le 6 juin 1944 six Albemarle du No 295 Sqn décollèrent de Harwell pour guider les transports chargés d'emmener la 6^e [Division](#) Aéroportée au-dessus de la Normandie. En septembre 1944 on retrouve deux unités d'Albemarle chargés de tracter les planeurs de la 1st Airborne Division sur Arnhem. Market Garden fut la dernière opération à laquelle participa le bimoteur.



- Union soviétique : En octobre 1942 l'Armée Rouge passa [commande](#) de 200 exemplaires. Un No 503 Ferry Training Unit fut donc constitué à RAF Errol, près de Dundee, en Écosse, pour assurer la formation des pilotes russes, mais durant les premiers cours un appareil fut perdu avec son équipage. Le premier Albemarle destiné à l'URSS [arriva](#) à Vnukovo le 3 mars 1943, suivi de 11 autres Albemarle ST.I prélevés sur les stocks de la RAF. Mais 2 avions furent également perdus durant le transfert depuis l'Écosse, dont un abattu par la chasse allemande. Ceci s'ajoutant aux limitations techniques de l'appareil comme [avion de transport](#), le gouvernement soviétique fit suspendre les livraisons en mai 1943, avant d'abandonner la commande au profit d'un appareil nettement plus utile, le C-47. Les 12 Albemarle livrés à l'URSS furent utilisés jusque fin 1945 (2 avions perdus sur accident) par la 10E Division Aérienne de la Garde jusqu'en 1944 puis des unités navales jusqu'à la fin de la guerre et le centre de formation de RAF Errol ferma en avril 1944, l'URSS ayant probablement tenté d'obtenir des [de Havilland Mosquito](#).

Constructeur Armstrong Whitworth

- Rôle Bombardier
- Premier vol 20 mars 1940
- Mise en service décembre 1941
- Date de retrait 1945
- Nombre construit 602
- Équipage 4

Motorisation

Moteur Bristol Hercules XI
Nombre 2
Type radial
Puissance unitaire 1 590 ch

Dimensions

Envergure 23,47 m
Longueur 10,26 m
Hauteur 4,75 m
Surface alaie 74,6 m²

Masses

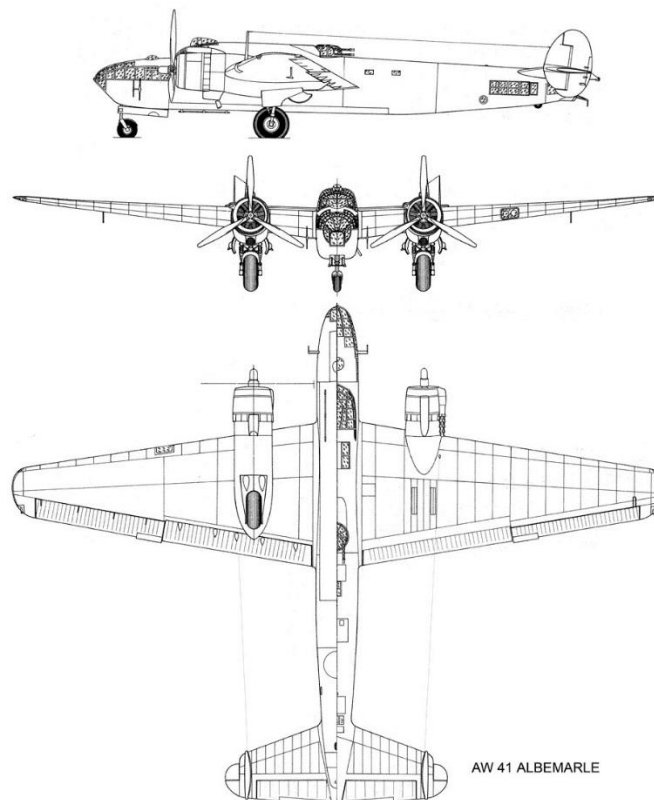
À vide 10 260 kg
Avec armement 16 570 kg

Performances

Vitesse maximale 426 km/h
Vitesse de décrochage 113 km/h
Plafond 5 490 m
Vitesse ascensionnelle 4,9 m/min
Rayon d'action 2 160 km

Armement

Interne 2 tonnes de bombes
Externe 4 Browning de 7,7 mm en tourelle dorsale, 2 Browning de 7,7 mm ventrales



The **Armstrong Whitworth A.W.41 Albemarle** was a twin-engine [transport aircraft](#) developed by the British aircraft manufacturer [Armstrong Whitworth](#) and primarily produced by A.W. Hawksley Ltd, a subsidiary of the [Gloster Aircraft Company](#). It was one of many aircraft which entered service with the [Royal Air Force](#) (RAF) during the [Second World War](#).

The Albemarle had been originally designed as a [medium bomber](#) to fulfil [Specification B.9/38](#) for an aircraft that could be built of wood and metal without using any light alloys; however, military planners decided to deemphasise the bomber role in favour of [aerial reconnaissance](#) and transport missions, leading to the aircraft being extensively redesigned mid-development. Performing its [maiden flight](#) on 20 March 1940, its entry to service was delayed by the redesign effort, thus the first RAF squadron to operate the Albemarle, [No. 295](#) at [RAF Harwell](#), did not receive the type in quantity until January 1943. As superior bombers, such as the [Vickers Wellington](#), were already in use in quantity, all plans for using the Albemarle as a bomber were abandoned.

Instead, the Albemarle was used by RAF squadrons primarily for general and special transport duties, [paratroop](#) transport and [glider](#) towing, in addition to other secondary duties. Albemarle [squadrons](#) participated in [Normandy landings](#) and the assault on [Arnhem](#) during [Operation Market Garden](#). While the Albemarle remained in service throughout the conflict, the final examples in RAF service were withdrawn less than a year after the war's end. During October 1942, the [Soviet Air Force](#) also opted to order 200 aircraft; of these, only a handful of Albemarles were delivered to the Soviets prior to the Soviet government deciding to suspend deliveries in May 1943, and later cancelling the order in favour of procuring the American [Douglas C-47 Skytrain](#) instead.

Development

The origins of the Albemarle can be traced back to the mid-1930s and the issuing of [Specification B.9/38](#) by the British [Air Ministry](#). This sought a twin-engine [medium bomber](#) of wood and metal construction, without the use of any light [alloys](#), in order that the aircraft could be readily built by less experienced manufacturers from outside the aircraft industry. Furthermore, the envisioned aircraft had to be engineered in a manner that would allow it to be divided into relatively compact subsections, all of which had to fit on to a standard [Queen Mary trailer](#) to facilitate the adoption of a dispersed manufacturing strategy. At the time, the Air Ministry was particularly concerned that, in the event of a major conflict arising, there would be restrictions on the supply of critical materials that could undermine mass production efforts.

Several aircraft manufacturing firms, including [Armstrong Whitworth](#), [Bristol](#) and [de Havilland](#), were approached to produce designs to meet the specification. Bristol proposed two designs – a [conventional undercarriage](#) and an 80 ft (24 m) wingspan capable of 300 mph and a [tricycle undercarriage](#) design with 70 ft (21 m) span with a maximum speed of 320 mph (510 km/h). Both designs, known as the Type 155, used two [Bristol Hercules](#) engines. The rival Armstrong Whitworth AW.41 design used a tricycle undercarriage and was built up of sub-sections to ease manufacture by firms without aircraft construction experience. The AW.41 was designed with [Rolls-Royce Merlin](#) engines in mind, but also with provisions for the use of Bristol Hercules as an alternative powerplant.

In June 1938, mock-ups of both the AW.41 and Bristol 155 were examined, while revised specifications B.17/38 and B.18/38 were drawn up for the respective designs; de Havilland opted against submitting a design. The specification stipulated 250 mph (400 km/h) at 15,000 ft (4,600 m) economical cruise while carrying 4,000 lb (1,800 kg) of bombs. Bristol was already busy with other aircraft production and development and stopped work on the 155. Changes in policy made the Air Staff reconsider the Albemarle as principally a reconnaissance aircraft capable of carrying out bombing. Among other effects, this meant more fuel to give a 4,000 mi (6,400 km) range. An upper dorsal turret and a (retractable) ventral turret for downward firing were added.

Into production

In October 1938, 200 aircraft were ordered "off the drawing board" (i.e. without producing a prototype). The aircraft had a positive reputation and there were initially high hopes for its performance, however it never quite lived up to expectations. Furthermore, according to aviation author Oliver Tapper, the brief was a relatively difficult one for any company to fulfil. Initially, physical work centred around the construction of a pair of lead aircraft, which were to be test flown prior to the commencement of full-rate manufacture of the type. The first Albemarle, [serial number P1360](#), was assembled at Hamble Aerodrome by Air Service Training; the aircraft performed its [maiden flight](#) on 20 March 1940.

This first flight had actually been unintended, the test pilot having picked up too much speed during a ground taxi run, and had only taken off with the barest margin after traversing the entire runway. Months later, *P1360* was damaged after a forced landing during the test flight programme, but was promptly repaired. Early flights of the type by test pilots typically described it as being relatively average and being free of flaws. A number of modifications were made to the design during this late stage of development, including the extensive redesign of the aircraft's structure by Lloyd at Coventry. Further measures were made to improve the Albemarle's take-off performance, such as the adoption of a wider span 77 ft (23 m) wing, and the thickening of the [rudder's trailing edge](#) to correct a tendency to over-balance. Occurrences of the engines overheating were never fully resolved, the main change in this area being the raising of the maximum permissible operational temperature from 280C to 300C.

The Albemarle's production run was principally undertaken by A.W. Hawksley Ltd of [Gloucester](#), a subsidiary of the [Gloster Aircraft Company](#), which was specifically formed to construct the Albemarle. Originally, Gloster was to have undertaken this work itself at its [Brockwood](#) facility. Both Gloster and Armstrong Whitworth were member companies of the [Hawker Siddeley](#) group, one of the largest aircraft manufacturing interests in Britain. Individual parts and sub-assemblies for the Albemarle were produced by in excess of 1,000 [subcontractors](#). Amongst the companies that were subcontracted were [MG Motor](#), to produce the forward fuselage, [Rover](#), which constructed the wing centre section, and [Harris Lebus](#), which built the tailplane units. Production of the Albemarle was terminated during December 1944, by which point 602 aircraft had been completed.

Design

The Armstrong Whitworth Albemarle was a mid-wing [cantilever monoplane](#) with twin fins and [rudders](#). The fuselage was built in three primary sections; the structure being composed of unstressed [plywood](#) over a steel tube frame, including four circular steel [longerons](#); most elements were bolted together via [gusset plates](#). The structure was intentionally divided in order that it might readily permit individual sections to be removed and replaced in the event of battle damage being sustained. The centre section of the wing was a single piece that ran through the fuselage, being built around a steel tube girder; it formed the attachment points for the central and nose fuselage sections, as well as the engines, main undercarriage legs, and extension wings. Aside from a portion of the [leading edge](#) that used light alloys, the majority of the wing was covered in [plywood](#). The extension wings were almost entirely made of wood, save for the bracing of the two spars by steel tubing; the Frise-type [ailerons](#) and tailplane were also composed of wood. The structure of the forward section used [stainless steel](#) tubing as to reduce interference with [magnetic compasses](#).

The Albemarle featured a [Lockheed](#)-designed [hydraulically](#)-operated, retractable [tricycle undercarriage](#), the main wheels retracting back into the engine nacelles, and the nose wheel retracting backwards into the front fuselage, while the tail wheel was fixed in position, albeit semi-concealed by a "bumper" configuration. It was one of the particularly notable design features of the Albemarle, according to Tapper, it was the first British-built aircraft with a retractable nose-wheel to be built in quantity for the [Royal Air Force](#). Power was provided by a pair of [Bristol Hercules XI](#) air-cooled [radial engines](#), each capable of 1,590 hp and driving a three-blade [de Havilland Hydromatic](#) propeller unit. Fuel was typically stored in four tanks, two in the center fuselage and two within the wings centre section; in circumstances where extended range would be required, a maximum of additional auxiliary tanks could be installed within the aircraft's [bomb bay](#). This sizable bomb bay was equipped with [hydraulically](#)-operated doors and spanned from just aft of the cockpit to roughly half way between the wings and the tail.

The two pilots sat side by side in the forward portion of the cockpit, while the radio operator was seated behind the pilots. The navigator's position was within in the aircraft's nose, and thus was forward of the cockpit. The bomb aimer's sighting panel was incorporated into the crew hatch in the underside of the nose. In the rear fuselage, several glazed panels were present so that a "fire controller" could help coordinate the aircraft's defensive turrets against attackers. The dorsal turret was a [Boulton-Paul](#) design, which was electrically-operated and originally armed with four Browning machine guns. A fairing forward of the turret automatically retracted as the turret rotated to fire forwards. The original bomber configuration of the Albemarle required a crew of six including two gunners; one in the four-gun dorsal turret and one in a manually operated twin-gun ventral turret but only the first 32 aircraft, the *Mk I Series I*, were produced in such a configuration.

As a bomber, the Albemarle was commonly considered to be inferior to several other aircraft already in RAF service, such as the [Vickers Wellington](#); according to aviation author Ray Williams, the type was only used ever used as a bomber on two occasions. Accordingly, later built aircraft were configured as transports, called either "General Transport" (GT) or "Special Transport" (ST). Amongst the modifications made was the elimination of the ventral turret, while the dorsal unit was downgraded to a manually-operated twin gun arrangement; the internal space was heavily altered by the elimination of bomb-aiming apparatus and the rear fuselage tank. Additions also included a quick-release hook, installed at the rearmost part of the fuselage for the towing of [gliders](#). When used as a paratroop transport, a maximum of ten fully armed troops could be carried; these paratroopers were provided with a dropping hatch in the rear fuselage along with a single large loading door in the starboard side of the fuselage.

Operational history

Ambitions to use Albemarle in the bomber role were dropped almost immediately upon the type reaching service; this was due to it not representing an improvement over current medium bombers (such as the [Vickers Wellington](#)) and possessing inferior performance to the new generation four-engined heavy bombers that were also about to enter service with the RAF. However, the aircraft was considered to be suitable for general reconnaissance and transport duties, and thus was re-orientated towards such missions.

The [Soviet Air Force](#) placed a contract for delivery of 200 Albemarles in October 1942. An RAF unit – [No. 305 FTU](#), at [RAF Errol](#) near [Dundee](#) – was set up to train Soviet ferry crews. During training, one aircraft was lost with no survivors. The first RAF squadron to operate the Albemarle was [No. 295](#) at [RAF Harwell](#) in January 1943. Other squadrons to be equipped with the Albemarle included [No. 296](#), [No. 297](#) and [No. 570](#). The first operational flight was on 9 February 1943, in which a 296 Squadron Albemarle dropped leaflets over [Lisieux](#) in Normandy

A Soviet-crewed Albemarle flew from Scotland to [Vnukovo](#) airfield, near Moscow, on 3 March 1943, and was followed soon afterwards by eleven more aircraft. Two Albemarles were lost over the [North Sea](#), one to German fighters and the other to unknown causes. Tests of the surviving Albemarles revealed their weaknesses as transports (notably the cramped interior) and numerous technical flaws; in May 1943, the Soviet government suspended deliveries and eventually cancelled them in favour of abundant American [Douglas C-47 Skytrains](#). The Soviet camp at Errol Field continued until April 1944: apparently the Soviet government had hoped to secure [de Havilland Mosquitos](#) Tapper speculated that a major reason for the Soviet's interest in the Albemarle had been its Bristol Hercules engines, which were [reverse engineered](#) and subsequently copied by Soviet industries.



Armstrong Whitworth Albemarle of No. 296 or 297 Squadron RAF, taking off from [Brize Norton, Oxfordshire](#), with an Airspeed Horsa Mark I in tow.

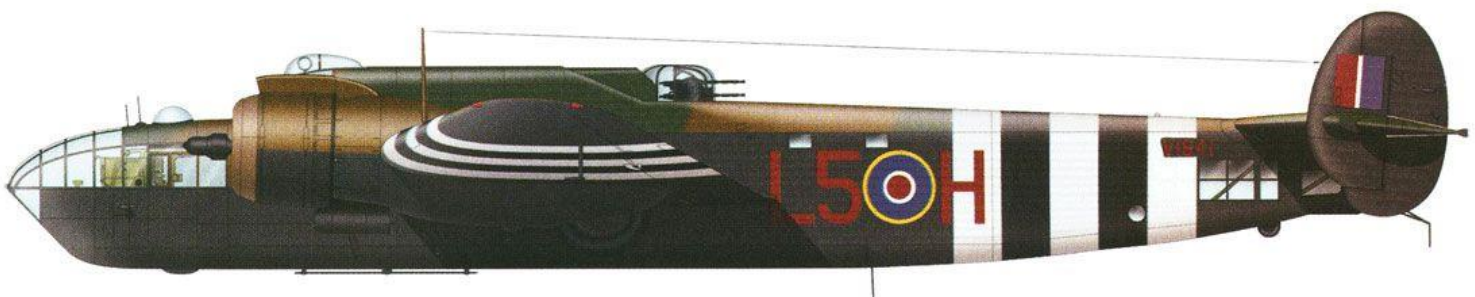
From mid-1943, RAF Albemarles took part in many British airborne operations, beginning with the [invasion of Sicily](#). The pinnacle of the aircraft's career was a series of operations for [D-Day](#), on the night of 5/6 June 1944. 295 and 296 Squadrons sent aircraft to Normandy with the pathfinder force, and 295 Squadron claimed to be the first squadron to drop Allied airborne troops over Normandy. On 6 June 1944, four Albemarle squadrons and the operational training unit sent aircraft during [Operation Tonga](#); 296 Squadron used 19 aircraft to tow [Airspeed Horsas](#); 295 Squadron towed 21 Horsas, although it lost six in transit; 570 Squadron sent 22 aircraft with ten towing gliders; and 42 OTU used four aircraft. For [Operation Mallard](#) on 7 June 1944, the squadrons towed 220 Horsas and 30 Hamilcars to Normandy. On 17 September 1944, during [Operation Market Garden](#) at Arnhem, 54 Horsas and two [Waco Hadrian](#) gliders were towed to the Netherlands by 28 Albemarles of 296 and 297 squadrons; 45 aircraft were sent the following day towing gliders. Of the 602 aircraft delivered, 17 were lost on operations and 81 lost in accidents. The final RAF unit to operate the Albemarle was the Heavy Glider Conversion Unit, which replaced its examples with [Handley Page Halifaxes](#) during February 1946, at which point the type was formally retired from all operational units.

Variants

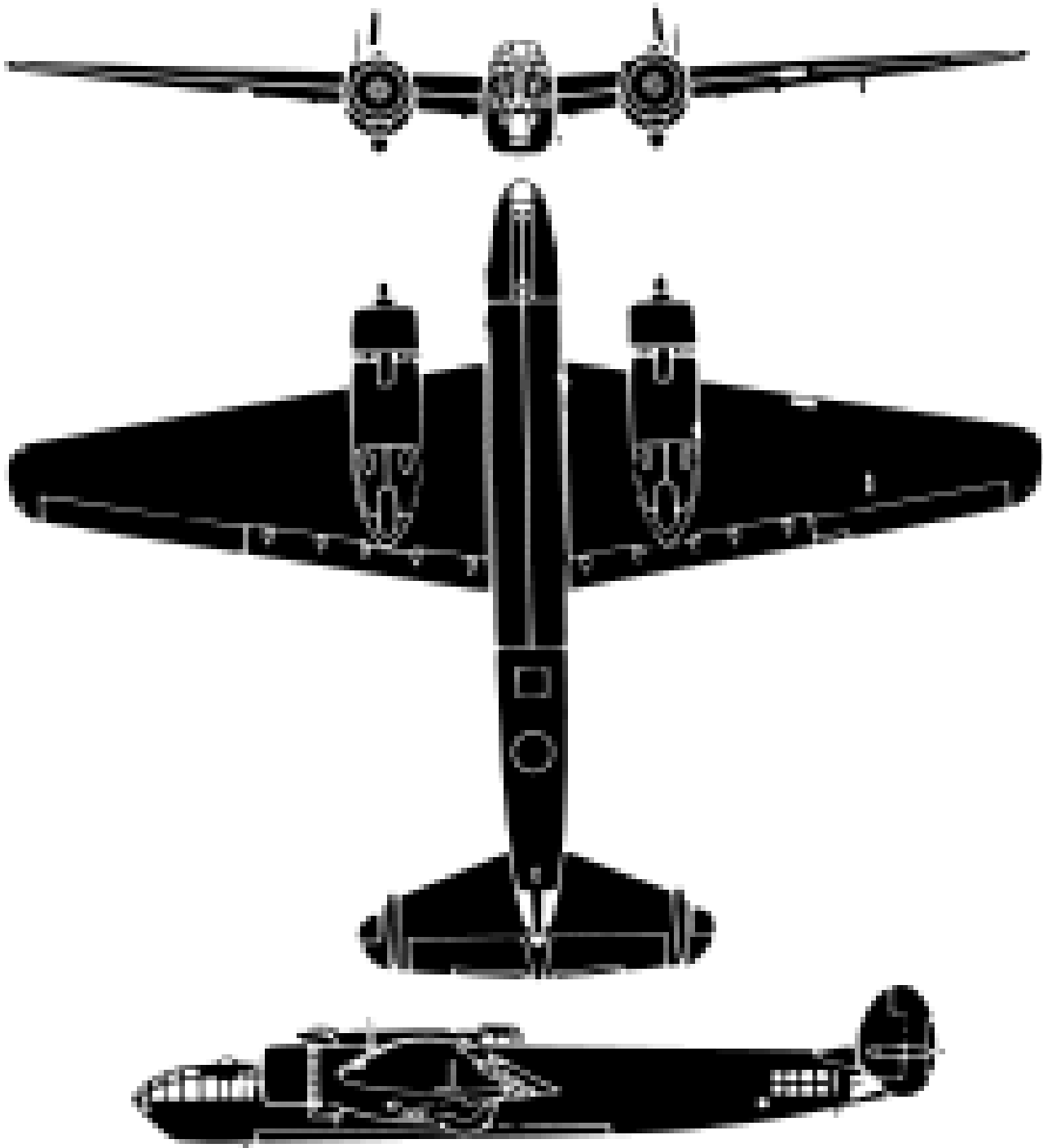
Over the course of its production life, a number of variants of the Albemarle were built:

- **ST Mk I** – 99 aircraft
- **GT Mk I** – 69
- **ST Mk II** – 99
- **Mk III** – One prototype only.
- **Mk IV** – One prototype only.
- **ST Mk V** – 49
- **ST Mk VI** – 133
- **GT Mk VI** – 117

Most Marks were divided into "Series" to distinguish differences in equipment. The **ST Mk I Series 1** (eight aircraft) had the four gun turret replaced with hand-operated twin-guns under a sliding hood. As a special transport, a loading door was fitted on the starboard side and the rear fuel tank was removed. The 14 **ST Mk I Series 2** aircraft were equipped with gear for towing gliders. The Mk II could carry ten [paratroops](#) and the Mk V was the same but for a fuel jettison system. All production Albemarles were powered by a pair of 1,590 hp (1,190 kW) [Bristol Hercules XI radial engines](#). The **Mk III** and **Mk IV** Albemarles were development projects for testing different powerplants; the former used the [Rolls-Royce Merlin](#) III and the latter used the 1,600 hp (1,200 kW) [Wright Double Cyclone](#).



Specifications (ST Mk I)



Orthographic projection of the Albemarle.

General characteristics

- **Crew:**
 - Four (two pilots, navigator and radio operator) in Transport configuration
 - Six (two pilots, navigator/bomb-aimer, radio operator and two gunners) in Bomber configuration
- **Capacity:** ten troops
- **Length:** 59 ft 11 in (18.26 m)
- **Wingspan:** 77 ft 0 in (23.47 m)
- **Height:** 15 ft 7 in (4.75 m)
- **Wing area:** 803.5 sq ft (74.65 m²)
- **Empty weight:** 25,347 lb (11,497 kg)
- **Max takeoff weight:** 36,500 lb (16,556 kg)

- **Fuel capacity:** 769 imp gal (924 US gal; 3,500 L) normal, 1,399 imp gal (1,680 US gal; 6,360 L) with auxiliary tanks
- **Powerplant:** 2 × [Bristol Hercules](#) XI 14-cylinder air-cooled [radial engines](#), 1,590 hp (1,190 kW) each
- **Propellers:** 3-bladed de Havilland Hydromatic

Performance

- **Maximum speed:** 265 mph (426 km/h, 230 kn) at 10,500 ft (3,200 m)
- **Cruise speed:** 170 mph (270 km/h, 150 kn)
- **Stall speed:** 70 mph (110 km/h, 61 kn) (flaps and undercarriage down)^[30]
- **Range:** 1,300 mi (2,100 km, 1,100 nmi)
- **Service ceiling:** 18,000 ft (5,500 m)
- **Rate of climb:** 980 ft/min (5.0 m/s)

Armament

- **Guns:**
 - Four × [.303 in](#) (7.7 mm) [Browning machine guns](#) in dorsal turret.
 - Two × [.303 in](#) (7.7 mm) machine guns in ventral turret (first prototype only)
- **Bombs:** Internal bomb bay for 4,500 lb (2,000 kg) of bombs

source : https://en.wikipedia.org/wiki/Armstrong_Whitworth_Albatross