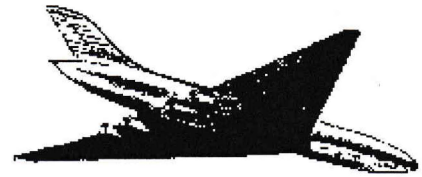


The Avro Atlantic

An Airliner that Never Was



One of the major accomplishments of the postwar British aircraft industry was the design, construction, and deployment of a strategic bomber force to deliver the country's nuclear deterrent. Entering service in 1955, the Vickers Valiant was followed by the Avro Vulcan in 1956 and the Handley-Page Victor in 1958. Transport versions of the Valiant - the V.1000 for the RAF and the V.C.7 for BOAC - would have greatly increased Britain's jet transport capability and might well have gained a considerable share of the rapidly expanding market for jet airliners, but they were cancelled in 1956.

Civilian versions of the other two V-bombers were also planned: they were the Avro 722 Atlantic and the Handley-Page H.P.97. In both cases the projected aircraft were to make use of wing and tail assemblies already developed for the bombers from which they were derived. All three of the proposed transports were intended to capture the market for transatlantic service. Avro released its proposal for the Atlantic in December 1952 and described its plans for the aircraft in the introduction to a mid-1953 brochure:

The Avro *Atlantic* is a projected design for a long range delta wing turbo-jet airliner. It has been designed because the superior performance and handling characteristics of the delta meet the essential requirements of airline operators. Its high cruising speed means greater utilisation; its long range eliminates the need for costly intermediate stops; its carrying ability ensures more profitable payloads, and its simplicity means easier maintenance and so greater safety.

Long non-stop flights at an economic ton/mile cost are the most important consideration. In achieving this the Avro *Atlantic* possesses payload/range characteristics which make it suitable also for a large number of shorter routes and, by rearrangement of layout, operators make take full advantage of seasonal fluctuations in traffic.

From the performance aspect the maximum practical cruising speed for all transport aircraft is limited, for some time to come, to a Mach number of 0.9 or thereabouts. In attaining this peak performance the Avro *Atlantic* cannot be bettered by comparable aircraft. At take-off and landing the handling characteristics of the delta are straightforward and a wide range of angles of incidence may be used without recourse to heavy and complicated high lift devices.

The successful development of the delta wing, pioneered in Great Britain by A.V. Roe & Co. Limited, has shown that extremely high performance need not be accompanied by an exorbitant rise in either first cost or operating costs. Its application to transport aircraft is therefore a logical development. For performance without economy it is without equal.

The idea of a delta-winged passenger aircraft was not entirely new to Avro. A sketch made by Technical Director (formerly Chief Designer) Roy Chadwick in 1946 or 1947 depicted a delta-winged passenger aircraft with 44 seats and what appear to be eight engines. According to some who worked with him, Chadwick had a long-standing interest in all-wing aircraft. Prior to his death in the crash of the Tudor 2 prototype in August 1947, he definitely took a strong interest in the delta-winged bomber design that became the Vulcan.

Plans and models of the Atlantic, up to 1955 at least, made use of the original Vulcan delta wing with a straight leading edge. This stands in sharp contrast with the Phase 2 wing's "kinked" leading edge that was introduced in 1955 as the result of transsonic buffeting when pulling "g" at altitude. Had the Atlantic actually been built, it would undoubtedly have used the Phase 2 wing, since the smoother flight and longer range it conferred were as useful for an airliner as they were for a bomber.

Technical Data

This information is drawn from a 1953 brochure for the Atlantic and from some later sources, most notably coverage in *Interavia* magazine. Note that all data are estimates and projections, since the aircraft was never actually built.

Data from 1953 Brochure

Dimensions

Span:	121 feet	36.88 m
Length:	144 feet	44.19 m
Fuselage diameter:	12.5 feet	3.81 m

Weights

Gross take-off weight:	Approx. 200,000 lb	90720 kg
Payload (dependent on route and stage distance):	20,000 to 45,000 lb	9072-20412 kg

Performance

Cruising Speed:	exceeds 600 mph	965 Km/h
Cruising Altitude:	exceeds 40,000 ft	12192 m
Minimum runway length classification:	ICAO Class C	
Minimum runway strength classification:	ICAO Class 4	

Air Conditioning

Pressure differential:	8.8 psi	0.62 kg/cm ²
Change of air (per minute per passenger):	2 lb	0.9 kg

Capacity of Compartments

Forward cabin:	1,550 cubic feet	43.8 m ³
Centre cabin:	1,000 cubic feet	28.3 m ³
Rear cabin:	3,340 cubic feet	94.6 m ³
Forward baggage and freight hold:	1,260 cubic feet	35.7 m ³
Rear baggage and freight hold:	670 cubic feet	18.9 m ³

Data from other sources, 1954-1955

Dimensions

Length:	145 feet
Span:	121 feet

Weights

Gross: 200,000 lb.
Empty: 155,000 lb.

Passengers

Luxury Version: 76
Tourist Version: 131

Performance

Engines: 4 Bristol Olympus, 10,000 lb. thrust ea.
Fuel Capacity: n/a
Maximum Speed: n/a
Cruising Speed: approx. 600 mph
Ceiling: 40,000 ft.
Estimated Range: 4,000 n.m.

Range and Payload

The 1953 brochure describes in some detail a typical westbound Atlantic crossing from London Airport to Idlewild, New York, a distance of 3,443 statute miles (5541 km). Cruising at 600 miles per hour into an 83 mph headwind at altitudes ranging from 40,000 to 45,000 feet, the Atlantic was intended to be able to hold for 30 minutes at 20,000 feet and divert an extra 215 statute miles to Washington, DC. This performance was equivalent to a still air range of 6,070 statute miles (9768 km).

On the North Atlantic route, direct operating costs were expected to vary between 7 and 10 pence per long ton/statute mile, depending on winds, and would be less than 1 penny per passenger statute mile. Eastbound crossings were expected to take between 5 and 5 1/2 hours eastbound and 6 1/2 to 7 hours westbound. On shorter routes of 1,500 to 4,000 statute miles, similarly low operating costs were expected with payloads ranging from 20 to 10 tons.

Seating Arrangements

Plans were made for at least three seating arrangements - the Basic, Luxury, and Tourist versions. Bulkheads and seats could be moved around or removed entirely, and the bar section between the middle and rear cabin could also be omitted in order to increase seating capacity. Whether the bar section could be removed and replaced in the same way as the bulkheads and seats were to be removable is unclear. Most versions included eleven berths in the aft section of the passenger compartment. Freight could also be carried in part of the front passenger cabin; a 1000 cubic foot compartment aft of the flight deck could be used to transport a complete jet engine, while the entire forward half of the front cabin could also be isolated from the passengers in order to carry freight.

Basic Version:

Seating for 94 passengers in three compartments: 24 in the forward cabin, 15 in the centre cabin, and 55 in the rear cabin. Removal of the bar between centre and rear cabin would have allowed seating for 109 passengers. 11 individual bunks, hinged from the cabin walls above the seats, provided alternative accommodation for passengers in the rear cabin. The rearward-facing seats were pitched at 42 inches, and were installed in rows of five: three on the starboard side of the aisle, and two on its port side.

[[Image of Basic Version](#) (26K, 1443x592)]

Luxury Version:

Larger seats meant that only four were installed per row, reducing the total passenger capacity to 76. The front cabin accommodated 20, the middle cabin 12, and the rear cabin 44 passengers. Seating capacity could be increased to 88 if the bar was removed, and as with the basic version, 11 bunks were provided in the rear cabin.

[[Image of Luxury Version](#) (24K, 1425x592)]

Tourist Version:

The smaller seats meant that this version had 6 of them per row, and held 29, 18, and 66 passengers in the front, centre, and rear cabins respectively. This total of 113 could be increased to 131 by removal of the bar. Eleven bunks could still be fitted in the rear compartment, but they were optional features on this version. There is also a passing reference to a "high density" version with seating for 139 passengers, but no further details are given.

[[Image of Tourist Version](#) (13K, 1434x384)]

Related Projects

As mentioned above, in addition to the V.1000 and the Atlantic, plans were made for similar civilian versions of the third V-bomber, the Handley Page Victor. Designated HP.96 and H.P.97, they would have employed the wing and tail assemblies of the H.P.80 Victor. With a projected load-carrying capacity of 50,000 lb. and provision for a maximum of 150 passengers, the HP.97 was intended to be able to fly London-New York nonstop. Its four engines, variously described as Armstrong-Siddeley Sapphires or Rolls-Royce Conways, were expected to give it an estimated cruising speed of 580 mph at 50,000 feet. A military transport and tanker version, the HP.111, was also planned. The earliest and latest references to this project that I've found so far are 1947 and 1955 respectively, but even less information seems available about this project than about the Atlantic.

Printed Sources

- A.V. Roe & Co. Ltd, "The Avro Atlantic," (London: C. Nicholls and Company Ltd., June 1953).
- "British Aircraft and Engines," *Interavia* IX:9 (September 1954), 601-605.
- Andrew Brookes, *V-Force: The History of Britain's Airborne Deterrent*, (London: Jane's, 1982).
- Margaret Dove, "Chadwick -- My Father," *Aeroplane Monthly*, 19:2 (February 1991), 102-105.
- William Green and Roy Cross, *The Jet Aircraft of the World*, (Garden City, NY: Hanover House, 1956), 124, 144, 152.
- Bill Gunston, Mark S. Pyle, and Edouard Chemel, *Chronicle of Aviation*, (London: Chronicle Communications, 1992), 539.
- Derek Wood, *Project Cancelled: A searching criticism of the abandonment of Britain's advanced aircraft projects*, (London: Macdonald and Jane's, 1975).
- [Vic Flintham](#) provided information about the Atlantic and the HP.96, 97, and 111 in response to a query in the rec.aviation.military newsgroup.
- Ian Kenney contacted me with a scan of the cover of the Aero Modeller Annual for 1953, featuring the Atlantic. I'm still trying to get permission to use the scan on this website.

Related Links

- Damien Burke's excellent website on postwar British military aircraft is a good source of information and references (both book and online) for all three of the V-bombers.

- - [Valiant](#)
 - [Vulcan](#)
 - [Victor](#)

This is still very much a work in progress. At this stage, it's more of a brief technical summary and description than any sort of detailed history. Additional information or comments would be greatly welcome, and can be addressed to jnoakes@connect.carleton.ca.

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