

# **De Havilland D.H.91 Albatross**

**A British airliner of 1938**

**Modelled for Flight Simulator X**

**And**

**Flight Simulator 2004 (A Century of Flight)**

**by**

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## ***De Havilland D.H.91 Albatross***

### **Introduction**

This very good-looking airliner was designed by the de Havilland team lead by Arthur E. Hagg in the late 1930's. The twin-engine D.H.88 Comet racer had won the MacRobertson air race England-Australia in 1934, and de Havilland wanted to use the experience they had gained to build a high-performance airliner.



The design was unusual, because the Albatross was built of wood throughout. The D.H.88 Comet had been built that way, and de Havilland used the same kind of construction a few years later for the famous D.H.98 Mosquito fighter-bomber and reconnaissance aircraft of the Second World War.

Although de Havilland had a passenger-carrying airliner in mind, the first two aircraft were built to an Air Ministry contract for a transatlantic mail carrier, and they differed from the final airliner version in several ways. The prototype made its first flight on the morning of 20 May 1937.

Imperial Airways, one of the forerunners of B.O.A.C. and the present-day British Airways, ordered the Albatross as a 22-passenger short-to-medium range aircraft, primarily for its European routes. The first order for 5 aircraft was placed in July 1937.

The Albatross entered service from November 1938 as the 'F' class. The Imperial Airways fleet was:

Registration	Name	Delivery	Fate
G-AFOI	<i>Frobisher</i>	8 November 1938	Destroyed by fire 1940
G-AFDJ	<i>Falcon</i>	22 November 1938	Broken up 1943
G-AFDK	<i>Fortuna</i>	10 January 1939	Accident 1943
G-AFDL	<i>Fingal</i>	3 April 1939	Accident 1940
G-AFDM	<i>Fiona</i>	15 June 1939	Broken up 1943

The two original mail carriers were later converted to airliner standard, and entered service with B.O.A.C. in June and July 1940 as G-AEUV *Faraday* and G-AEVS *Franklin*.

Imperial Airways (and, from April 1940, B.O.A.C.) used the 'F' class on the routes from London to Paris, Bruxelles, Zürich and a few other, European destinations, and the aircraft set a number of speed records. Paris was the main destination, with 8 services a day. This service continued until the fall of France in 1940, and after that the fleet was little used.

Because of the outbreak of war, construction of military aircraft took the priority after September 1939, and these seven aircraft were the only D.H.91's built.



(Above) The second of Imperial Airways' five D.H.91s, G-AFDJ *Falcon*, at Croydon during the short pre-war period in which the type was operating on European routes. (Below) An obviously posed photograph showing the interior of an Imperial Airways Albatross, looking forwards.



## Technical data:

### De Havilland D.H.91 Albatross Specification

**Power Plant:** Four de Havilland Gipsy Twelve 12-cylinder inverted-vee air-cooled, geared and supercharged piston engines, each rated at 525 hp at 2,600 rpm for take-off and 375 hp at 2,250 rpm at 7,500 ft (2 286 m). Two-blade de Havilland constant speed 10 ft 6 in (3.20 m) diameter propellers. Fuel capacity 440 Imp gal (1 997 l) in two fuselage tanks.

**Performance:** Max speed, 210 mph (338 km/h) at sea level and 234 mph (376 km/h) at 8,750 ft (2 664 m); cruising speeds, 195 mph (314 km/h) at 6,500 ft (1 980 m) on 73 per cent power, 210 mph (338 km/h) at 11,000 ft (3 355 m) on 76.5 per cent power and 200 mph (322 km/h) at 15,000 ft (4 570 m) on 66 per cent power; stalling speed, 70 mph (113 km/h); initial rate of climb, 1,018 ft/min (5.17 m/sec); time to 5,000 ft (1 525 m), 7 min; time to 10,000 ft (3 050 m), 15 min; time to 15,000 ft (4 575 m), 27.5 min; service ceiling, 17,900 ft (5 455 m); three-engine ceiling, 14,100 ft (4 300 m); two-engine ceiling, 5,100 ft (1 555 m);

take-off run, 975 ft (297 m); landing run, 942 ft (287 m); ranges, 1,040 mls (1 675 km) with 4,188 lb (1 899 kg) payload, 600 mls (965 km) with 5,388 lb (2 443 kg) payload.

**Weights:** Empty equipped, 21,230 lb (9 642 kg); crew and full fuel, 4,082 lb (1 851 kg); payload, 4,188 lb (1 899 kg); normal loaded, 29,500 lb (13 392 kg); max overload, 32,498 lb (14 742 kg).

**Dimensions:** Span, 105 ft 0 in (32.00 m); length, 71 ft 6 in (21.79 m); height, 22 ft 3 in (6.78 m); wing area, 1,078 sq ft (100.15 m<sup>2</sup>); aspect ratio, 9.1:1; dihedral, 5 deg constant; undercarriage track, 17 ft (5.18 m).

**Accommodation:** Flight crew of three — two pilots and wireless operator — and one steward. Standard day transport arrangement for 22 passengers — eight each in forward and amidships cabins and six in rear compartment. Toilet, wardrobe and galley forward and baggage compartment aft, with capacity of 158 cu ft (4.47 m<sup>3</sup>).



## New in this version

Much more detailed virtual cockpit and an improved panel, based on information from 'Propliner' and an old issue of 'Flight', see below.

Many other improvements, mostly small, to the model and the textures.

## References

'Unlucky Seven – the story of de Havilland's beautiful Albatross', Air Enthusiast vol 4 no 5, 1973.

'The Albatross in Detail', Flight, 17 November 1938. ([www.flightglobal.com](http://www.flightglobal.com))

Gerry Sweet: 'Albatross Soaring', Propliner no. 109, Winter 2006.

R.E.G. Davies: British Airways – the Imperial years, Paladwr Press 2005

R. Bluffield: Imperial Airways, Ian Allan 2009

J. Stroud: The Imperial Airways Fleet, Tempus Publishing 2005

Other material was found on the internet, for example [www.imperial-airways.com](http://www.imperial-airways.com) , and on a CD available from [www.archivebritain.com](http://www.archivebritain.com) :

"Imperial Airways (Royal Aeronautical Society Archive Series Vol.3)"



## Using the panel

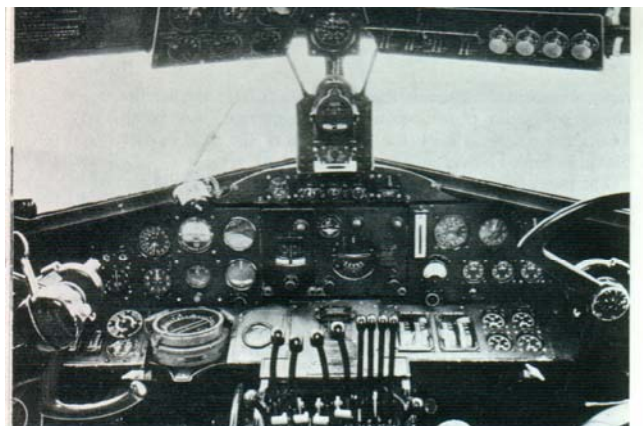
### The main panel



The Albatross had the instrumentation you would expect in an airliner of the late 1930's. The Sperry Autopilot dominated the middle of the panel. Only the captain had a full set of flight instruments, the first officers panel contained mostly engine gauges. I have designed the panel from the picture shown to the right, taken from the Air Enthusiast article mentioned above, a similar picture from 'Propliner' and a description in a 1938 issue of Flight.. I have not been able to identify all gauges with 100% certainty, but I hope the general look and feel is close enough to the original.

For navigation and landing, the Albatross had ADF and a 'beamed approach' landing system similar to the ILS system developed post-war. I have included suitable gauges for these systems, borrowed from the KeDi gauge set by Hauke Keitel et.al. These instruments were made by Telefunken, Germany.

The autopilot is based on the default Flight Simulator Douglas DC-3, and you can find detailed instructions in the FS Learning Centre.



*The Albatross flight deck, with dual flying controls. On the centre pedestal, the four throttle controls are to the left and the constant-speed propeller controls to the right. The elevator trim wheel is adjacent to the throttles.*

The autopilot defaults to 'heading hold', so the best way to engage it by using the keyboard: Press CTRL+SHIFT+H followed by CTRL+H.

Other useful keyboard shortcuts:

Altitude hold:	Press Ctrl+Z
Disengage Alt hold:	Press Z+Z (that's Z two times)

## Popup panels

SHIFT+2 : GPS. GPS did not exist in the 1930's, but the GPS map is a nice substitute for the Flight Simulator map view.

SHIFT+3: Radio panel – inherited from the DC-3, I don't know much about the real radio panel of the D.H.91. Tune ADF and NAV radios, switch between ADF and NAV modes for the dual-needle radio compass (see below).

SHIFT+4: Overhead panel. Magneto switches and starter buttons for the engines, fire extinguishing buttons for the engines (these four switches are dummies).

SHIFT+5: Throttle Quadrant.

SHIFT+6: Dual-needle radio compass. Tune the receivers on the radio panel (SHIFT+3).

## ***Flying instructions***

This information is available during your flight, just press Shift+F10 (in FSX) or F10 (in FS2004) to call up the electronic kneeboard, and select the reference tab.

### **Before takeoff**

Elevator trim ½ - 1 division up.

Flaps to take-off (TO) position (30 degrees, press F7 twice).

### **Takeoff and initial climb**

Full throttle and rpm (6.2 lbs boost, 2600 RPM). The tail lifts by itself at 70 mph (60 kts). Takeoff at 95 mph (85 kts).

Retract landing gear. Retract flaps at 120 mph (110 kts).

When safely airborne reduce to 4 lbs Boost, 2350 RPM. Initial climb 800-1200 fpm (depending on weight), let the aircraft accelerate to 150 mph (130 kts)

### **En route climb**

3 lbs Boost, 2350 RPM. Speed 150-160 mph (130-140 kts) IAS, expect a climb rate of 700-800 fpm to 5000 ft, a little less at higher altitudes.

Climb above 11000 ft: Increase throttle from time to time to hold 3 lbs boost.

### **Cruise**

Normal cruising speed up to 11000 ft is 180 mph (160 kts) IAS. Normal cruising altitude on passenger flights: 8000-11000 ft, on mail services: 15000 ft. Engines at 0-1 lbs boost, 2200 RPM

### **Landing**

Before final approach: 1 stage of flaps (15 degrees).

Entering glideslope: Extend landing gear, flaps to TO position (30 degrees).

500 ft above the runway: Full flaps.

Do not expect a three-point landing - a 'wheeler' was the rule with the DH91.