**Airbus A330**

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*"A330" and "A333" redirect here. For the Czechoslovak biplane A.330, see* [*Aero A.30*](https://en.wikipedia.org/wiki/Aero_A.30)*. For the A330 and A333 roads, see* [*A roads in Zone 3 of the Great Britain numbering scheme*](https://en.wikipedia.org/wiki/A_roads_in_Zone_3_of_the_Great_Britain_numbering_scheme)*.*

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| **A330** |
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| [Lufthansa](https://en.wikipedia.org/wiki/Lufthansa) A330-300 in landing configuration on approach to [Frankfurt Airport](https://en.wikipedia.org/wiki/Frankfurt_Airport) in 2010 |
| **Role** | [Wide-body](https://en.wikipedia.org/wiki/Wide-body_aircraft) [jet airliner](https://en.wikipedia.org/wiki/Jet_airliner) |
| **National origin** | Multi-national |
| **Manufacturer** | [Airbus](https://en.wikipedia.org/wiki/Airbus) |
| **First flight** | 2 November 1992 |
| **Introduction** | 17 January 1994 with [Air Inter](https://en.wikipedia.org/wiki/Air_Inter) |
| **Status** | In service |
| **Primary users** | [Air China](https://en.wikipedia.org/wiki/Air_China)[Cathay Pacific](https://en.wikipedia.org/wiki/Cathay_Pacific)[Delta Airlines](https://en.wikipedia.org/wiki/Delta_Airlines)[China Eastern Airlines](https://en.wikipedia.org/wiki/China_Eastern_Airlines) |
| **Produced** | 1992–present |
| **Number built** | 1000 as of 19 July 2013 |
| **Unit cost** | A330-200: [US$](https://en.wikipedia.org/wiki/United_States_dollar)200.8 million, €195 million (2011) A330-300: US$222.5 million, €215 million (2011) A330-200F: US$203.6 million, €199 million (2011)  |
| **Developed from** | [Airbus A300](https://en.wikipedia.org/wiki/Airbus_A300) |
| **Variants** | [Airbus A330 MRTT](https://en.wikipedia.org/wiki/Airbus_A330_MRTT)[EADS/Northrop Grumman KC-45](https://en.wikipedia.org/wiki/EADS/Northrop_Grumman_KC-45) |

The **Airbus A330** is a [wide-body](https://en.wikipedia.org/wiki/Wide-body_aircraft) twin-engine [jet airliner](https://en.wikipedia.org/wiki/Jet_airliner) made by [Airbus](https://en.wikipedia.org/wiki/Airbus), a division of [EADS](https://en.wikipedia.org/wiki/EADS). Versions of the A330 have a [range](https://en.wikipedia.org/wiki/Range_%28aircraft%29) of 7,400 to 13,430 kilometers (4,000 to 7,250 nmi) and can accommodate up to 335 passengers in a [two-class layout](https://en.wikipedia.org/wiki/Travel_class) or carry 70 tons (150,000 lb.) of cargo.

The origin of the A330 dates to the 1970s as one of several conceived derivatives of Airbus's first airliner, the [A300](https://en.wikipedia.org/wiki/Airbus_A300). The A330 was developed in parallel with the [A340](https://en.wikipedia.org/wiki/Airbus_A340), which shared many common [airframe](https://en.wikipedia.org/wiki/Airframe) components but differed in number of engines. Both airliners incorporated [fly-by-wire](https://en.wikipedia.org/wiki/Fly-by-wire) flight control technology, first introduced on an Airbus aircraft with the [A320](https://en.wikipedia.org/wiki/Airbus_A320_family), as well as the A320's six-display [glass cockpit](https://en.wikipedia.org/wiki/Glass_cockpit). In June 1987, after receiving orders from various customers, Airbus launched the A330 and A340. The A330 was Airbus's first airliner that offered a choice of three engines: General Electric CF6, Pratt & Whitney PW4000, and Rolls-Royce Trent 700.

The A330-300, the first variant, took its maiden flight in November 1992 and entered passenger service with [Air Inter](https://en.wikipedia.org/wiki/Air_Inter) in January 1994. Responding to dwindling sales, Airbus followed up with the slightly shorter A330-200 variant in 1998, which has proven more popular. Subsequently developed A330 variants include a dedicated [freighter](https://en.wikipedia.org/wiki/Cargo_aircraft), the A330-200F, and a military [tanker](https://en.wikipedia.org/wiki/Aerial_refueling), the [A330 MRTT](https://en.wikipedia.org/wiki/Airbus_A330_MRTT). The A330 MRTT formed the basis of the proposed [KC-45](https://en.wikipedia.org/wiki/EADS/Northrop_Grumman_KC-45), entered into the U.S. Air Force's [KC-X](https://en.wikipedia.org/wiki/KC-X) competition in conjunction with [Northrop Grumman](https://en.wikipedia.org/wiki/Northrop_Grumman), where after an initial win, on appeal lost to Boeing's tanker.

Since its launch, the A330 has allowed Airbus to expand market share in wide-body airliners. Airlines have selected the A330 as a replacement for less economical [trijets](https://en.wikipedia.org/wiki/Trijet) and versus rival twinjets. [Boeing](https://en.wikipedia.org/wiki/Boeing) has offered variants of the [767](https://en.wikipedia.org/wiki/Boeing_767) and [777](https://en.wikipedia.org/wiki/Boeing_777) as competitors, along with the [787](https://en.wikipedia.org/wiki/Boeing_787_Dreamliner), which entered service in late 2011. Airbus's [A350](https://en.wikipedia.org/wiki/Airbus_A350) will also share this wide-body airliner market. As of December 2012[[update]](https://en.wikipedia.org/w/index.php?title=Airbus_A330&action=edit), the A330's order book stood at 1,244, of which 938 had been delivered. The largest operator is [Air China](https://en.wikipedia.org/wiki/Air_China), which has 41 A330s in its fleet. Airbus delivered the 1000th A330 to Cathay Pacific in July 2013. The A330 is expected to continue selling until at least 2020.

**Development**

**Background**

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| Airbus jetliners, 1972–1994 |
| **Model** | **A300** | **A310** | **A320** | **A330** | **A340** |
| **Priorcode(s)** | – | B10 | SA2 | B9(TA9) | B11(TA11) |
| **Debut** | 1972 | 1983 | 1988 | 1994 | 1993 |
| **Body** | Wide | Wide | Narrow | Wide | Wide |
| **Engines** | 2 | 2 | 2 | 2 | 4 |
| **Range** | Short/medium | Medium/long | Short/medium | Medium/long | Long |

Airbus's first airliner, the A300, was envisioned as part of a diverse family of commercial aircraft. In pursuit of this goal, studies began in the early 1970s into derivatives of the A300. Before introducing the A300, Airbus identified nine possible variations named A300B1 through B9. A tenth variant, the A300B10, was conceived in 1973 and developed into the longer range [Airbus A310](https://en.wikipedia.org/wiki/Airbus_A310). Airbus then focused its efforts on single-aisle (SA) studies, conceiving of a family of airliners later known as the [Airbus A320 family](https://en.wikipedia.org/wiki/Airbus_A320_family), the first commercial aircraft with digital [fly-by-wire](https://en.wikipedia.org/wiki/Fly-by-wire) controls. During the SA studies Airbus turned its focus back to the wide-body aircraft market, simultaneously working on both projects.

In the mid-1970s Airbus began development of the A300B9, a larger derivative of the A300, which would eventually become the A330. The B9 was essentially a lengthened A300 with the same wing, coupled with the most powerful [turbofan engines](https://en.wikipedia.org/wiki/Turbofan_engine) available. It was targeted at the growing demand for high-capacity, medium-range, transcontinental trunk routes. Offering the same range and payload as the [McDonnell Douglas DC-10](https://en.wikipedia.org/wiki/McDonnell_Douglas_DC-10) but with 25 per cent more fuel efficiency, the B9 was seen as a viable replacement for the DC-10 and the [Lockheed L-1011 TriStar](https://en.wikipedia.org/wiki/Lockheed_L-1011_TriStar) trijets. It was also considered as a medium-ranged successor to the A300.

At the same time, a 200-seat four-engine version, the B11 (which would eventually become the A340) was also under development. That aircraft was originally planned to take the place of narrow-body [Boeing 707s](https://en.wikipedia.org/wiki/Boeing_707) and [Douglas DC-8s](https://en.wikipedia.org/wiki/Douglas_DC-8) then in commercial use, but would later evolve to target the long-range, wide-body trijet replacement market. To differentiate from the SA series, the B9 and B11 were re-designated as the TA9 and TA11, with TA standing for "twin aisle". Development costs were reduced by using the same [fuselage](https://en.wikipedia.org/wiki/Fuselage) and wing for the two aircraft, with projected savings of US$500 million. Another factor was the split preference of those within Airbus and, more importantly, those of the company's prospective customers; twinjets were favored in North America, quad-jets desired in Asia, and operators had mixed views in Europe. Airbus ultimately found that most potential customers favored four engines due to their exemption from existing twinjet range restrictions and their ability to be ferried with one inactive engine. As a result, development plans prioritized the four-engine TA11 ahead of the TA9.

**Design effort**

The first specifications for the TA9 and TA11, aircraft that could accommodate 410 passengers in a one-class layout, emerged in 1982. They showed a large underfloor cargo area that could hold five cargo pallets or sixteen [LD3](https://en.wikipedia.org/wiki/Unit_Load_Device) cargo containers in the forward, and four pallets or fourteen LD3s in the aft hold—double the capacity of the Lockheed L-1011 TriStar or DC-10, and 8.46 meters (27.8 ft) longer than the Airbus A300. By June 1985, the TA9 and TA11 had received more improvements, including the adoption of the A320 [flight deck](https://en.wikipedia.org/wiki/Flight_deck), digital fly-by-wire (FBW) control system, and [side-stick](https://en.wikipedia.org/wiki/Side-stick) control. Airbus had developed a common cockpit for their aircraft models to allow quick transition by pilots. The flight crews could transition from one type to another after only one week's training, which reduces operator costs. The two TAs would use the [vertical stabilizer](https://en.wikipedia.org/wiki/Vertical_stabiliser), [rudder](https://en.wikipedia.org/wiki/Rudder), and circular fuselage sections of the A300-600, extended by two barrel sections.

Airbus briefly considered the [variable camber wing](https://en.wikipedia.org/wiki/Variable_camber_wing), a concept that requires changing the wing profile for a given phase of flight. Studies were carried out by [British Aerospace](https://en.wikipedia.org/wiki/British_Aerospace) (BAe), now part of [BAE Systems](https://en.wikipedia.org/wiki/BAE_Systems), at [Hatfield](https://en.wikipedia.org/wiki/Hatfield_Aerodrome) and [Bristol](https://en.wikipedia.org/wiki/Filton_Aerodrome). Airbus estimated this would yield a two per cent improvement in aerodynamic efficiency, but the feature was rejected because of cost and difficulty of development. A true [laminar flow](https://en.wikipedia.org/wiki/Laminar_flow) wing (a low-drag shape that improves fuel efficiency) was also considered but rejected.

The A330 was the first Airbus application for which Rolls-Royce supplied engines, with its [Trent 700](https://en.wikipedia.org/wiki/Trent_700) turbofans.

From the beginning of the TA9's development, a choice of [engines](https://en.wikipedia.org/wiki/Aircraft_engines) from the three major engine manufacturers, [Rolls-Royce](https://en.wikipedia.org/wiki/Rolls-Royce_plc), [Pratt & Whitney](https://en.wikipedia.org/wiki/Pratt_%26_Whitney), and [GE Aviation](https://en.wikipedia.org/wiki/GE_Aviation), was planned. GE Aviation first offered the [General Electric CF6-80C2](https://en.wikipedia.org/wiki/General_Electric_CF6#F6-80). However, later studies indicated that more thrust was needed to increase the initial power capability from 267 to 289 [kN](https://en.wikipedia.org/wiki/Newton_%28unit%29) (60,000 to 65,000 [lbf](https://en.wikipedia.org/wiki/Pound-force)). GE enlarged the CF6-80C2 fan from 236 to 244 centimeters (93 to 96 in) to create the [CF6-80E1](https://en.wikipedia.org/wiki/General_Electric_CF6#CF6-80E1), giving a new thrust output of 300–320 kN (67,000–72,000 lbf). Rolls-Royce initially wanted to use the 267 kN (60,000 lbf) [Trent 600](https://en.wikipedia.org/wiki/Rolls-Royce_Trent#Trent_600_.E2.80.93_First_proposal) to power Airbus's newest twinjet and the upcoming [McDonnell Douglas MD-11](https://en.wikipedia.org/wiki/McDonnell_Douglas_MD-11). However, the company later agreed to develop an engine solely for the A330, the [Trent 700](https://en.wikipedia.org/wiki/Rolls-Royce_Trent_700), with a larger diameter and 311 kN (70,000 lbf) of thrust. Similarly, Pratt & Whitney signed an agreement that covered the development of the A330-only [PW4168](https://en.wikipedia.org/wiki/Pratt_%26_Whitney_PW4000). The company increased the fan size to augment power, enabling the engine to deliver 311 kN (70,000 lbf) of thrust.

On 27 January 1986, the Airbus Industrie Supervisory Board held a meeting in [Munich](https://en.wikipedia.org/wiki/Munich), [West Germany](https://en.wikipedia.org/wiki/West_Germany). Afterwards, the board chairman, [Franz Josef Strauß](https://en.wikipedia.org/wiki/Franz_Josef_Strau%C3%9F), released a statement that said, "Airbus Industrie is now in a position to finalize the detailed technical definition of the TA9, which is now officially designated the A330, and the TA11, now called the A340, with potential launch customer airlines, and to discuss with them the terms and conditions for launch commitments". The designations were originally reversed; they were switched so the quad-jet airliner would have a "4" in its name. Airbus hoped for five airlines to sign for both the A330 and A340, and on 12 May sent sale proposals to the most likely candidates, including [Lufthansa](https://en.wikipedia.org/wiki/Lufthansa) and [Swissair](https://en.wikipedia.org/wiki/Swissair).

**Production and testing**

In preparation for production of the A330 and A340, Airbus's partners invested heavily in new facilities. In England, [Filton](https://en.wikipedia.org/wiki/Filton) was the site of BAe's [£](https://en.wikipedia.org/wiki/Pound_sterling)7 million investment in a three-story technical center with 15,000 m2 (160,000 sq ft) of floor area. BAe also spent £5 million adding a new production line to its [Chester](https://en.wikipedia.org/wiki/Chester) wing production plant. In Germany, [Messerschmitt-Bölkow-Blohm](https://en.wikipedia.org/wiki/Messerschmitt-B%C3%B6lkow-Blohm) (MBB) invested [DM](https://en.wikipedia.org/wiki/Deutsche_Mark)400 million ($225 million) at various manufacturing facilities in the [Weser](https://en.wikipedia.org/wiki/Weser) estuary, including at [Bremen](https://en.wikipedia.org/wiki/Bremen), Einswarden, [Varel](https://en.wikipedia.org/wiki/Varel), and [Hamburg](https://en.wikipedia.org/wiki/Hamburg). France saw the biggest investments, with [Aérospatiale](https://en.wikipedia.org/wiki/A%C3%A9rospatiale) starting construction of a new [Fr.](https://en.wikipedia.org/wiki/French_franc)2.5 billion ($411 million) final-assembly plant adjacent to [Toulouse-Blagnac Airport](https://en.wikipedia.org/wiki/Toulouse-Blagnac_Airport) in [Colomiers](https://en.wikipedia.org/wiki/Colomiers); by November 1988, the pillars for the new [*Clément Ader*](https://en.wikipedia.org/wiki/Cl%C3%A9ment_Ader) assembly hall had been erected. The assembly process would feature increased automation, such as robots drilling holes and installing fasteners during the wing-to-fuselage mating process.

Final assembly area for the A330, next to [Toulouse-Blagnac Airport](https://en.wikipedia.org/wiki/Toulouse-Blagnac_Airport)

On 12 March 1987, Airbus received the first orders for the twinjet. The domestic French airline [Air Inter](https://en.wikipedia.org/wiki/Air_Inter) placed five firm orders and fifteen [options](https://en.wikipedia.org/wiki/Option_%28aircraft_purchasing%29), while [Thai Airways International](https://en.wikipedia.org/wiki/Thai_Airways_International) requested eight aircraft, split evenly between firm orders and options. Airbus announced the next day that it would formally launch the A330 and A340 programs by April 1987, with deliveries of the A340 to begin in May 1992 and A330 deliveries to start in 1993. [Northwest Airlines](https://en.wikipedia.org/wiki/Northwest_Airlines) signed a letter of intent for twenty A340s and ten A330s on 31 March.

BAe eventually received £450 million of funding from the UK government, well short of the £750 million it had originally requested for the design and construction of the wings. The German and French governments also provided funding. Airbus issued subcontracts to companies in Australia, Austria, Canada, China, Greece, Italy, India, Japan, South Korea, Portugal, the United States, and the former Yugoslavia. With funding in place, Airbus launched the A330 and A340 programs on 5 June 1987, just prior to the [Paris Air Show](https://en.wikipedia.org/wiki/Paris_Air_Show). At that time, the order book stood at 130 aircraft from ten customers, including lessor [International Lease Finance Corporation](https://en.wikipedia.org/wiki/International_Lease_Finance_Corporation) (ILFC). Of the order total, forty-one were for A330s. In 1989, Asian carrier [Cathay Pacific](https://en.wikipedia.org/wiki/Cathay_Pacific) joined the list of purchasers, ordering nine A330s and later increasing this number to eleven.

The wing-to-fuselage mating of the first A330, the tenth airframe of the A330 and A340 line, began in mid-February 1992. This aircraft, coated with anti-corrosion paint, was rolled out on 31 March without its General Electric CF6-80E1 engines, which were installed by August. During a static test, the wing failed just below requirement, but BAe engineers later solved the problem. At the [Farnborough Airshow](https://en.wikipedia.org/wiki/Farnborough_Airshow) that year, Northwest deferred delivery of sixteen A330s to 1994, following the cancellation of its A340 orders.

The first completed A330 was rolled out on 14 October 1992, with the [maiden flight](https://en.wikipedia.org/wiki/Maiden_flight) following on 2 November. Weighing 181,840 kg (401,000 lb.), including 20,980 kg (46,300 lb.) of test equipment, the A330 became the biggest twinjet to have flown, although it was later eclipsed by the Boeing 777. The flight lasted five hours and fifteen minutes during which speed, height, and other flight configurations were tested. Ultimately Airbus intended the test flight program to consist of six aircraft flying a total of 1,800 hours. On 21 October 1993, the Airbus A330 received the European [Joint Aviation Authorities](https://en.wikipedia.org/wiki/Joint_Aviation_Authorities) (JAA) and US [Federal Aviation Administration](https://en.wikipedia.org/wiki/Federal_Aviation_Administration) (FAA) certifications simultaneously after 1,114 cumulative airborne test hours and 426 test flights. At the same time, weight tests came in favorable, showing the plane was 500 kg (1,100 lb.) underweight.

On 30 June 1994, [trouble struck](https://en.wikipedia.org/wiki/1994_A330_test_flight_crash) during certification of the Pratt & Whitney engine when an A330 crashed near Toulouse. Both pilots and the five passengers died. The flight was designed to test [autopilot](https://en.wikipedia.org/wiki/Autopilot) response during a one-engine-off worst-case scenario with the [center of gravity](https://en.wikipedia.org/wiki/Center_of_gravity_of_an_aircraft) near its [aft limit](https://en.wikipedia.org/wiki/Center_of_gravity_of_an_aircraft#CG_aft_of_aft_limit). Shortly after takeoff, the pilots had difficulty setting the autopilot, and the aircraft lost speed and crashed. The accident was investigated by an internal branch of *Direction Generale d'Aviation*, which concluded that the accident resulted from slow response and incorrect actions by the crew during the recovery. This led to a revision of A330 operating procedures.

**Entry into service**

[Cathay Pacific](https://en.wikipedia.org/wiki/Cathay_Pacific) was one of the first operators of the A330.

[Air Inter](https://en.wikipedia.org/wiki/Air_Inter) became the first operator of the A330, putting the aircraft into service on 17 January 1994 between [Orly Airport](https://en.wikipedia.org/wiki/Orly_Airport), Paris, and [Marseille](https://en.wikipedia.org/wiki/Marseille). Deliveries to [Malaysia Airlines](https://en.wikipedia.org/wiki/Malaysia_Airlines) (MAS) and Thai Airways International were postponed to address [delamination](https://en.wikipedia.org/wiki/Delamination) of the [composite materials](https://en.wikipedia.org/wiki/Composite_material) in the PW4168 engine's [thrust reverser](https://en.wikipedia.org/wiki/Thrust_reversal) assembly. Thai Airways received its first A330 during the second half of the year, operating it on routes from [Bangkok](https://en.wikipedia.org/wiki/Bangkok) to [Taipei](https://en.wikipedia.org/wiki/Taipei) and [Seoul](https://en.wikipedia.org/wiki/Seoul). Cathay Pacific received its Trent 700 A330s following the certification of that engine on 22 December 1994. MAS received its A330 on 1 February 1995 and then rescheduled its other ten orders.

Airbus intended the A330 to compete in the [Extended-range Twin-engine Operation Performance Standards](https://en.wikipedia.org/wiki/ETOPS) (ETOPS) market, specifically with the Boeing 767. (ETOPS is a standard that allows longer range flights away from a diversion airport for aircraft that have met special design and testing standards.) Instead of the "ETOPS out of the box" or "Early ETOPS" approach taken by Boeing with its 777, Airbus gradually increased ETOPS approval on the A330 using in-service experience. Airbus suggested that the A340 and A330 were essentially identical except for their engine number, and that the A340's experience could be applied to the A330's ETOPS approval. The plans were for all three engine types to enter service with 90-minute approval, before increasing to 120 minutes after the total A330 fleet accumulated 25,000 flight hours, and then to 180 minutes after 50,000 flight hours, in 1995. [Aer Lingus](https://en.wikipedia.org/wiki/Aer_Lingus) and Cathay Pacific were two important airlines assisting Airbus in this endeavor by building up in-service flight hours on over-ocean flights. In November 2009, the A330 became the first aircraft to receive ETOPS–240 approval, which has since been offered by Airbus as an option.

**Further developments**

In response to a decline in A330-300 sales, increased market penetration by the [Boeing 767-300ER](https://en.wikipedia.org/wiki/Boeing_767#767-300ER), and airline requests for increased range and smaller aircraft, Airbus developed the Airbus A330-200. Known as the A329 and A330M10 during development, the A330-200 would offer nine per cent lower operating costs than the Boeing 767-300ER. The plane was aimed at the 11,900 km (6,400 [nmi](https://en.wikipedia.org/wiki/Nautical_mile)) sector, where Airbus predicted demand for 800 aircraft between 1995 and 2015. The project, with US$450 million in expected development costs, was approved by the Airbus Industrie Supervisory Board on 24 November 1995.

[Aeroflot](https://en.wikipedia.org/wiki/Aeroflot) A330-200 after taking off from [Sheremetyevo Airport](https://en.wikipedia.org/wiki/Sheremetyevo_Airport) in 2011

The A330-200 first flew on 13 August 1997. The sixteen-month certification process involved logging 630 hours of test flights. The A330-200's first customer was ILFC; these aircraft were leased by [Canada 3000](https://en.wikipedia.org/wiki/Canada_3000), who became the type's first operator.

As Airbus worked on its A330-200, [hydraulic pump](https://en.wikipedia.org/wiki/Hydraulic_pump) problems were reported by both A330 and A340 operators. This issue was the suspected cause of a fire that destroyed an [Air France](https://en.wikipedia.org/wiki/Air_France) A340-200 in January 1994. On 4 January that year, a Malaysia Airlines A330-300, while undergoing regular maintenance at [Singapore Changi Airport](https://en.wikipedia.org/wiki/Singapore_Changi_Airport), was consumed by a fire that started in the right-hand main undercarriage well. The incident caused US$30 million in damage, and the aircraft took six months to repair. Consequently, operators were advised to disable electrical pumps in January 1997.

Another issue was in-flight shutdowns of the Trent 700–powered A330-300s. On 11 November 1996, engine failure on a Cathay Pacific flight forced it back to [Ho Chi Minh City](https://en.wikipedia.org/wiki/Ho_Chi_Minh_City). On 17 April 1997, Cathay Pacific's affiliate [Dragonair](https://en.wikipedia.org/wiki/Dragonair) experienced an engine shutdown on an A330, caused by carbon clogging the [oil filter](https://en.wikipedia.org/wiki/Oil_filter). As a result, Cathay Pacific self-suspended its 120-minute ETOPS clearance. Another engine failure occurred on 6 May during [climbout](https://en.wikipedia.org/wiki/Climb) with a Cathay Pacific A330. The problem was traced to a bearing failure in the [gearbox](https://en.wikipedia.org/wiki/Transmission_%28mechanics%29) built by [Hispano-Suiza](https://en.wikipedia.org/wiki/Hispano-Suiza). Three days later, a Cathay Pacific A330 on climbout during a Bangkok–Hong Kong flight experienced a drop in oil pressure. The resultant [engine spool down](https://en.wikipedia.org/wiki/Flameout) forced the flight back to Bangkok. The cause was later traced to metal contamination in the engine's [master chip](https://en.wikipedia.org/wiki/Integrated_circuit). Cathay Pacific and Dragonair voluntarily grounded their A330 fleets for two weeks following a fifth engine failure on 23 May. The combined fifteen-aircraft grounding caused major disruption because Cathay's eleven A330s made up fifteen per cent of its passenger capacity. Rolls-Royce and Hispano-Suiza worked to resolve the problem, and a redesigned system for lubricating the areas involved was dispatched to airlines.

The freighter variant, the A330-200F, debuts at the Singapore Airshow 2010.

Airbus next worked on an A330 freighter variant. Responding to flagging [A300-600F](https://en.wikipedia.org/wiki/Airbus_A300) and [A310F](https://en.wikipedia.org/wiki/Airbus_A310) sales, the company began marketing the Airbus A330-200F, a derivative of the A330-200, around 2001. The freighter has a range of 7,400 km (4,000 nmi) with 65 tonnes (140,000 lb.) on board, or 5,900 km (3,200 nmi) with 70 tonnes (150,000 lb.). The plane features a larger nose gear than the passenger-carrying A330. Housed in a distinctive bulbous "blister fairing", the gear emerges to raise the nose of the aircraft so that the cargo deck is level during loading.

The A330-200F made its maiden flight on 5 November 2009. This marked the start of a four-month, 180-hour certification program. JAA and FAA certifications were expected by March the following year although approval by the JAA was delayed until April. The first delivery was subsequently made to the [Etihad Airways](https://en.wikipedia.org/wiki/Etihad_Airways) cargo division, Etihad Cargo, in July 2010.

By the end of December 2012, a total of 1,244 A330s had been ordered, with 938 delivered. The largest operators of the A330 are Cathay Pacific with 37, Air China with 34 and Delta Air Lines—which had an all-Boeing fleet before getting its A330s in its merger with Northwest Airlines—with 32. Airbus announced in February 2011 that it intended to raise production rates from seven-and-a-half to eight per month to nine per month in 2012, and ten per month in 2013. Production increased to 10 aircraft per month in April 2013, the highest for an Airbus widebody aircraft. Airbus expects the A330 to continue selling until at least 2020.

On 19 July 2013, Airbus delivered the 1000th A330 to Cathay Pacific. It is the first Airbus wide-body airliner to reach 1,000 deliveries, and the fourth wide-body to achieve the milestone after the [Boeing 747](https://en.wikipedia.org/wiki/Boeing_747), [777](https://en.wikipedia.org/wiki/Boeing_777) and [767](https://en.wikipedia.org/wiki/Boeing_767).

**Design**

[Planform](https://en.wikipedia.org/wiki/Planform) view of a [Cyprus Airways](https://en.wikipedia.org/wiki/Cyprus_Airways) A330-200, showing the long slender wing

The A330 is a medium-size, wide-body airliner, with two engines suspended on pylons under the wings. On the ground, the two-wheel nose undercarriage and two four-wheel [bogie](https://en.wikipedia.org/wiki/Bogie) main legs built by [Messier-Dowty](https://en.wikipedia.org/wiki/Messier-Dowty) support a [maximum ramp weight](https://en.wikipedia.org/wiki/Maximum_Ramp_Weight) (MRW) of 230.9 tonnes (509,000 lb.), while the designed [maximum takeoff weight](https://en.wikipedia.org/wiki/Maximum_takeoff_weight) (MTOW) is 230 tonnes (510,000 lb.) on the A330-200 variant. An option allows a maximum ramp weight of 233.9 tonnes (516,000 lb.) with a maximum takeoff weight of 233.0 tonnes (514,000 lb.).

The airframe of the A330 features a low-wing [cantilever monoplane](https://en.wikipedia.org/wiki/Cantilever#Aircraft) with a wing virtually identical to that of the A340. The wings were designed and manufactured by BAe, which developed a long slender wing with a very high aspect ratio to provide high aerodynamic efficiency. The wing is swept back at 30 degrees and, along with other design features, allows a maximum operating [Mach number](https://en.wikipedia.org/wiki/Mach_number) of 0.86. The wing has a very high thickness-to-[chord](https://en.wikipedia.org/wiki/Chord_%28aircraft%29) ratio of 12.8 per cent, which means that a long span and high [aspect ratio](https://en.wikipedia.org/wiki/Aspect_ratio_%28wing%29) can be attained without a severe weight penalty. For comparison, the rival MD-11 has a thickness-to-chord ratio of 8–9 per cent. Each wing also has a 2.74 m (9.0 ft) tall [winglet](https://en.wikipedia.org/wiki/Wingtip_device) instead of the wingtip fences found on earlier Airbus aircraft.

The shared wing design with the A340 allowed the A330 to incorporate aerodynamic features developed for the former aircraft. The failure of [International Aero Engines](https://en.wikipedia.org/wiki/International_Aero_Engines)' radical [ultra-high-bypass](https://en.wikipedia.org/wiki/High-bypass_turbofan) V2500 "SuperFan", which had promised around 15 per cent [fuel burn reduction](https://en.wikipedia.org/wiki/Fuel_efficiency) for the A340, led to multiple enhancements including wing upgrades to compensate. Originally designed with a 56 m (184 ft) [span](https://en.wikipedia.org/wiki/Wingspan), the wing was later extended to 58.6 m (192 ft) and finally to 60.3 m (198 ft). At 60.3 m (198 ft), the wingspan is similar to that of the larger [Boeing 747-200](https://en.wikipedia.org/wiki/Boeing_747), but with 35 percent less wing area.

The A330/A340 cockpit used the A320's six-screen design.

The A330 and A340 fuselage is based on that of the [Airbus A300-600](https://en.wikipedia.org/wiki/Airbus_A300), with many common parts, and has the same external and cabin width: 5.64 m (18.5 ft) and 5.28 m (17.3 ft). Allowed seating is 2–2–2 six-abreast in [first](https://en.wikipedia.org/wiki/First_class_%28aviation%29) and [business class](https://en.wikipedia.org/wiki/Business_class), and 2–4–2 eight-abreast in [economy](https://en.wikipedia.org/wiki/Economy_class). The vertical stabilizer and rudder are made mostly of [composite materials](https://en.wikipedia.org/wiki/Composite_material). On the ground, the A330 uses the Honeywell 331–350C [auxiliary power unit](https://en.wikipedia.org/wiki/Auxiliary_power_unit) (APU).

The A330 shares the same glass cockpit flight deck layout as the A320 and A340, featuring electronic instrument displays rather than mechanical gauges. Instead of a conventional [control yoke](https://en.wikipedia.org/wiki/Yoke_%28aircraft%29), the flight deck features side-stick controls, six main displays, and the [Electronic Flight Instrument System](https://en.wikipedia.org/wiki/Electronic_Flight_Instrument_System) (EFIS), which covers navigation and flight displays, as well as the [Electronic Centralized Aircraft Monitor](https://en.wikipedia.org/wiki/Electronic_Centralised_Aircraft_Monitor) (ECAM). Apart from the flight deck, the A330 also has the fly-by-wire system common to the A320 family, the A340, the [A380](https://en.wikipedia.org/wiki/Airbus_A380), and the upcoming [A350](https://en.wikipedia.org/wiki/Airbus_A350). It also features three primary and two secondary [flight control systems](https://en.wikipedia.org/wiki/Aircraft_flight_control_system), as well as a [flight envelope](https://en.wikipedia.org/wiki/Flight_envelope) limit protection system which prevents maneuvers from exceeding the aircraft's aerodynamic and structural limits.

**Variants**

**A330-300**

An A330-300, the original variant, of [US Airways](https://en.wikipedia.org/wiki/US_Airways) taking off

The A330-300 is based on a stretched A300 fuselage 63.69 m (208 ft 11 in) long but with new wings, stabilizers and fly-by-wire systems. The −300 carries 295 passengers in a three-class cabin layout, 335 in two-class, or up to 440 in an all-economy layout. It has a range of 10,500 km (5,700 nmi). It has a large cargo capacity, comparable to that of early [Boeing 747s](https://en.wikipedia.org/wiki/Boeing_747). It is powered by the choice of two General Electric CF6-80E, Pratt & Whitney PW4000, or Rolls-Royce Trent 700 engines, all of which are [ETOPS-180](https://en.wikipedia.org/wiki/ETOPS/LROPS) rated. The −300 entered service in January 1994.

In 2010 Airbus offered a new version of the −300 with the maximum gross weight increased by two tonnes to 235t. This enabled 120 nmi extension of the range as well as 1.2t increase in payload. In mid-2012, Airbus proposed another increase of the maximum gross weight to 240 t. It is planned to be implemented by mid-2015. This −300 version will have the range extended by 400 nmi and will carry 5 t more payload. It will include engine and aerodynamic improvements reducing its fuel burn by about 2%. In November 2012 it was further announced that the gross weight will increase to 242 t, while the range will be extended by 500 nautical miles (930 km) (over 235 t model) to 6,100 nautical miles (11,300 km). Airbus is also planning to activate the central fuel tank for the first time for the −300 model.

As of January 2013, 618 -300s had been ordered, 443 of which had been delivered, with 441 in operation. The 2011 list price is $222.5 million. The closest competitors have been the [Boeing 777-200/200ER](https://en.wikipedia.org/wiki/Boeing_777) and the now-out-of-production [McDonnell Douglas MD-11](https://en.wikipedia.org/wiki/McDonnell_Douglas_MD-11).

**A330-200**

An [EgyptAir](https://en.wikipedia.org/wiki/EgyptAir) A330-200 during a landing approach. The absence of a center-line main undercarriage is one difference of the A330 from the A340.

The A330-200 is a shortened, longer-range variant, which entered service in 1998. Typical range with 253 passengers in a three-class configuration is 13,400 km (7,200 nmi). The A330-200 is ten fuselage frames shorter than the original −300, with a length of 58.82 m (193 ft 0 in). To compensate for the smaller [moment arm](https://en.wikipedia.org/wiki/Torque) of the shorter fuselage, the vertical stabilizer height of the −200 was increased by 104 cm (41 in). The −200's wing was also modified; structural strengthening of the wing allowed the maximum takeoff weight of the −200 to be increased to 229.8 tonnes (507,000 lb.). The −200 is offered with three engine types similar to those found on the −300, namely the General Electric CF6-80E, Pratt & Whitney PW4000, or Rolls-Royce Trent 700. Airbus also boosted fuel capacity by using the center section 139,100 L (36,700 [US gal](https://en.wikipedia.org/wiki/US_gallon)) fuel tank, standard in the A340.

In 2008, Airbus released plans for a higher [gross weight](https://en.wikipedia.org/wiki/Gross_weight) version of the A330-200 to more effectively compete against the Boeing 787 Dreamliner. The new-build A330-200HGW had a 5 ton increase in [maximum takeoff weight](https://en.wikipedia.org/wiki/Maximum_Takeoff_Weight), allowing a 560 kilometers (300 nmi) range increase and a 3.4 tonnes (7,500 lb.) payload increase. [Korean Air](https://en.wikipedia.org/wiki/Korean_Air) became the first customer on 27 February 2009 with an order for six −200HGWs. Deliveries of the first aircraft started in 2010.

In mid-2012, Airbus proposed another version of the −200 with the maximum gross weight increased by 2 t to 240 t. This version will have its range extended by 270 nmi and will carry 2.5 t more payload. It will see engine and aerodynamic improvements reducing its fuel burn by about 2%. It is planned to enter the service by mid-2015. In November 2012, it was announced that the gross weight is to be further increased to 242 t with the range extended by 350 nmi (over 238 t version).

As of December 2012, 576 of the −200 had been ordered, 481 of which had been delivered, with 476 aircraft in operation. The 2011 list price is $200.8 million. The changes made to the −200 significantly improved the economics of the aircraft and made the variant more popular than the four-engine A340. The −200 competes with the Boeing 767-300ER and to a lesser extent the [767-400ER](https://en.wikipedia.org/wiki/Boeing_767#767-400ER). The [787 Dreamliner](https://en.wikipedia.org/wiki/Boeing_787_Dreamliner) represents future competition. The A330-200 is also available as an ultra-long-range [corporate jet](https://en.wikipedia.org/wiki/Business_jet) from [Airbus Executive and Private Aviation](https://en.wikipedia.org/wiki/Airbus_Executive_and_Private_Aviation), marketed as the A330-200 Prestige.

**A330-200F**

The first Airbus A330-200F during climbout, with undercarriage still retracting. The bulge under the nose accommodates taller undercarriage, which was added to correct the inherent nose-down attitude of passenger versions

The A330-200F is an all-cargo derivative of the A330-200 capable of carrying 65 t (140,000 lb.) over 7,400 km (4,000 nmi) or 70 tonnes (150,000 lb.) up to 5,900 km (3,200 nmi). To overcome the standard A330's nose-down body angle on the ground, the A330F uses a revised nose undercarriage layout to provide a level deck during cargo loading. The normal A330-200 undercarriage is used, but its attachment points are lower in the fuselage, thus requiring a distinctive blister fairing on the nose to accommodate the retracted nose gear. Power is provided by two Pratt & Whitney PW4000 or Rolls-Royce Trent 700 engines. General Electric does not plan to offer an engine for the A330-200F.

As of December 2012, Airbus had delivered 17 aircraft with 35 unfilled orders. The list price is $203.6 million. As well as new-build freighters, Airbus has proposed passenger-to-freighter conversions of existing −200 airliners. The A330-200F is sized between the [767-300F](https://en.wikipedia.org/wiki/Boeing_767) and [777F](https://en.wikipedia.org/wiki/Boeing_777).

**A330 Converted Freighter**

In 2012, Airbus announced plans for a passenger to freighter program with [ST Aerospace](https://en.wikipedia.org/wiki/ST_Aerospace). The A330-300 (to come first) and −200 (due a year later) will be part of the P2F program. Conversion work will be done mainly in Dresden, Germany. Qatar Airways has already showed interest in the program The aircraft is expected to enter service in 2016.

The A330-300P2F variant has a payload of 60 tonnes with the range of 2,200 nautical miles (4,000 km) or 61 tonnes with the range of 3,600 nautical miles (6,600 km) for the higher MTOW variants. The A330-200P2F will carry the payload of up to 59 tons on ranges up to 4,000 nautical miles (7,400 km). Airbus estimates the market demand for the conversions at 900 units during the next 20 years.

**Military variants**

**Airbus A330 MRTT**

A team of engineering personnel assembled in front of an A330 MRTT converted from an A330-200 by Iberia Spanish Airlines Maintenance

The [Airbus A330 MRTT](https://en.wikipedia.org/wiki/Airbus_A330_MRTT) is the Multi-Role Transport and Tanker (MRTT) version of the A330-200, designed for [aerial refueling](https://en.wikipedia.org/wiki/Aerial_refuelling) and strategic transport. As of June 2011[[update]](https://en.wikipedia.org/w/index.php?title=Airbus_A330&action=edit), 28 total orders have been placed for the A330 MRTT by the air forces of Australia, Saudi Arabia, the United Arab Emirates, and the United Kingdom.

**EADS/Northrop Grumman KC-45**

The [EADS/Northrop Grumman KC-45](https://en.wikipedia.org/wiki/EADS/Northrop_Grumman_KC-45) was a proposed version of the A330 MRTT for the United States Air Force (USAF)'s [KC-X](https://en.wikipedia.org/wiki/KC-X) aerial refueling program. In February 2008, the USAF selected the aircraft to replace the [Boeing KC-135 Stratotanker](https://en.wikipedia.org/wiki/Boeing_KC-135_Stratotanker). The replacement process was mired in controversy, instances of corruption, and allegations of favoritism. In July 2010, EADS submitted a tanker bid to the USAF without [Northrop Grumman](https://en.wikipedia.org/wiki/Northrop_Grumman) as a partner However, on 24 February 2011, the USAF picked the [Boeing KC-767](https://en.wikipedia.org/wiki/Boeing_KC-767) proposal, later named [KC-46](https://en.wikipedia.org/wiki/Boeing_KC-46), as the winner because of its lower cost.

**Undeveloped variants**

**A330-200Lite**

See also: [Airbus A350](https://en.wikipedia.org/wiki/Airbus_A350)

To compete with Boeing's [7E7](https://en.wikipedia.org/wiki/Boeing_787_Dreamliner#Background), Airbus offered a minimum-change derivative called the A330-200*Lite* in 2004. As the name indicated, this proposed variant would have had a lower maximum takeoff weight of 202 tonnes (450,000 lb.), coupled with de-rated engines, giving a range of 7,400 km (4,000 nmi). It was aimed at [Singapore Airlines](https://en.wikipedia.org/wiki/Singapore_Airlines), who had looked to replace its Airbus A310-300s. The variant was also to be a replacement for Airbus A300-600Rs and early Boeing 767s. Airlines, however, were not satisfied with the compromised aircraft; the company instead proceeded with an entirely new aircraft, the A350 XWB.

**A330-300HGW**

In 2000, it was reported that Airbus was studying an A330-300 version with a higher gross weight. It was named A330-300HGW and had a takeoff weight of 240 tonnes (530,000 lb.), 7 tonnes (15,000 lb.) greater than the −300's weight. The version would have a strengthened wing and additional fuel capacity from a 41,600-litre (11,000 US gal) center section fuel tank. The A330-300HGW's range was increased to over 11,000 km (5,900 nmi). Among those that showed interest was leasing company ILFC, which sought airliners that could fly from the U.S. West Coast to Europe.

Power was to be supplied by all three engines offered to the two other A330 passenger models. Airbus also considered using the new [Engine Alliance GP7000](https://en.wikipedia.org/wiki/Engine_Alliance_GP7000) engine for the A330-300HGW, which would have been the engine's first twinjet application. The −300HGW was to enter airline service in 2004. However, the program was not launched and quietly disappeared. The 240-tonne A330 would reappear years later when Airbus announced at the 2012 [Farnborough Airshow](https://en.wikipedia.org/wiki/Farnborough_Airshow) that it would be an available option for both the A330-300 and the A330-200.

**A330-500**

Also known as the A330-100, the A330-500 was a proposed "shrink" of the A330-200 version launched in July 2000 at the Farnborough Airshow, with eight fuselage frames removed — four ahead and four behind the wing. This would allow for the seating of 222 passengers. The −500's maximum takeoff weight was to be 228 tonnes (500,000 lb.), a 5-tonne (11,000 lb.) decrease from the A330-200, allowing a range of 12,970 km (7,000 nmi). A lighter sub-variant, at 195 tonnes (430,000 lb.), would have flown up to 8,060 km (4,350 nmi). The aircraft would have had 5 per cent better [specific fuel consumption](https://en.wikipedia.org/wiki/Thrust_specific_fuel_consumption) than the A300-600, powered by either the CF6-80G2, PW4000, or the Trent 500.

Prospective customers included ILFC, [CIT Aerospace](https://en.wikipedia.org/wiki/CIT_Group), Lufthansa, and [Hapag-Lloyd](https://en.wikipedia.org/wiki/Hapag-Lloyd). The latter two, however, were unimpressed with the long-range variant, preferring a shorter-range aircraft, which was better suited to their route structure. Singapore Airlines was also an expected customer because it was looking for a replacement for the A310. Airbus intended to freeze the design in late 2001, with the first flight scheduled for the third quarter of 2003 and entry into service within a year. The program was later abandoned, as interest from customers was lacking.

**Operators**

Main article: [List of Airbus A330 operators](https://en.wikipedia.org/wiki/List_of_Airbus_A330_operators)

[TAM Linhas Aereas](https://en.wikipedia.org/wiki/TAM_Linhas_Aereas) Airbus A330-200 powered by PW4168

As of May 2013, there are 972 examples of all A330 variants in airline service, including 493 A330-200s, 22 -200Fs, and 457 -300s. Airline operators are [Air China](https://en.wikipedia.org/wiki/Air_China) (37), [Cathay Pacific](https://en.wikipedia.org/wiki/Cathay_Pacific) (37), [Delta Air Lines](https://en.wikipedia.org/wiki/Delta_Air_Lines) (32), [Qatar Airways](https://en.wikipedia.org/wiki/Qatar_Airways) (32), [China Eastern Airlines](https://en.wikipedia.org/wiki/China_Eastern_Airlines) (30), [Etihad Airways](https://en.wikipedia.org/wiki/Etihad_Airways) (30), [Thai Airways International](https://en.wikipedia.org/wiki/Thai_Airways_International) (27), [China Southern Airlines](https://en.wikipedia.org/wiki/China_Southern_Airlines) (25), [Emirates](https://en.wikipedia.org/wiki/Emirates_%28airline%29) (25), [Turkish Airlines](https://en.wikipedia.org/wiki/Turkish_Airlines) (25), [Korean Air](https://en.wikipedia.org/wiki/Korean_Air) (24), [Aeroflot](https://en.wikipedia.org/wiki/Aeroflot) (22), [China Airlines](https://en.wikipedia.org/wiki/China_Airlines) (22), [Malaysia Airlines](https://en.wikipedia.org/wiki/Malaysia_Airlines) (22), [Singapore Airlines](https://en.wikipedia.org/wiki/Singapore_Airlines) (21), [TAM Linhas Aereas](https://en.wikipedia.org/wiki/TAM_Linhas_Aereas) (20), [Qantas](https://en.wikipedia.org/wiki/Qantas) (19), [Dragonair](https://en.wikipedia.org/wiki/Dragonair) (18), [Lufthansa](https://en.wikipedia.org/wiki/Lufthansa) (18), [US Airways](https://en.wikipedia.org/wiki/US_Airways) (18), [Garuda Indonesia](https://en.wikipedia.org/wiki/Garuda_Indonesia) (16), [KLM](https://en.wikipedia.org/wiki/KLM) (16), [Air France](https://en.wikipedia.org/wiki/Air_France) (15) and others with fewer of the type. In 2007, [Northwest Airlines](https://en.wikipedia.org/wiki/Northwest_Airlines) took delivery of its 32nd A330, and became the type's largest customer at the time; the carrier has since merged with Delta Air Lines. As of May 2013, the largest operator of A330s is Cathay Pacific, which together with its subsidiary [Dragonair](https://en.wikipedia.org/wiki/Dragonair) has 55 aircraft in service.

**Orders and deliveries**

|  |  |  |
| --- | --- | --- |
|  | **Orders** | **Deliveries** |
| **Type** | **Total** | **Backlog** | **Total** | **2013** | **2012** | **2011** | **2010** | **2009** | **2008** | **2007** | **2006** | **2005** | **2004** | **2003** | **2002** | **2001** | **2000** | **1999** | **1998** | **1997** | **1996** | **1995** | **1994** | **1993** |
| **A330-200** | 576 | 77 | 499 | 18 | 37 | 40 | 32 | 38 | 49 | 42 | 39 | 29 | 25 | 19 | 36 | 16 | 27 | 40 | 12 |  |  |  |  |  |
| **A330-200F** | 46 | 24 | 22 | 5 | 8 | 4 | 5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **A330-300** | 624 | 161 | 463 | 23 | 56 | 43 | 50 | 38 | 23 | 26 | 23 | 27 | 22 | 12 | 6 | 19 | 16 | 4 | 11 | 14 | 10 | 30 | 9 | 1 |
| **Total** | 1,246 | 262 | 984 | 46 | 101 | 87 | 87 | 76 | 72 | 68 | 62 | 56 | 47 | 31 | 42 | 35 | 43 | 44 | 23 | 14 | 10 | 30 | 9 | 1 |

*Data through end of May 2013. Updated on 7 June 2013.*

**Incidents and accidents**

As of February 2012, the Airbus A330 had been involved in 13 major [aviation occurrences](https://en.wikipedia.org/wiki/Aviation_accidents_and_incidents), including six confirmed [hull-loss accidents](https://en.wikipedia.org/wiki/Aviation_accidents_and_incidents) and two [hijackings](https://en.wikipedia.org/wiki/Aircraft_hijacking), for a total of 339 fatalities.

The type's first fatal accident occurred on 30 June 1994 near Toulouse [on a test flight](https://en.wikipedia.org/wiki/Airbus_Industrie_Flight_129) when an Airbus-owned A330-300 crashed while simulating an engine failure on climbout, killing all seven on board. Airbus subsequently advised A330 operators to disconnect the autopilot and limit pitch attitude in the event of an engine failure at low speed. On 15 March 2000, a Malaysia Airlines A330-300 suffered fuselage damage from leaked corrosive chemical that had been falsely labeled. The aircraft was written off.

In 2008, [Air Caraïbes](https://en.wikipedia.org/wiki/Air_Cara%C3%AFbes) reported two incidents of [pitot tube](https://en.wikipedia.org/wiki/Pitot_tube) icing malfunctions on its A330s. In 2009, after the crash of [Air France Flight 447](https://en.wikipedia.org/wiki/Air_France_Flight_447), A330/A340 operators replaced [Thales](https://en.wikipedia.org/wiki/Thales_Group)-built pitot tubes.

The type's second fatal accident, and first while in commercial service, occurred on 1 June 2009 when [Air France Flight 447](https://en.wikipedia.org/wiki/Air_France_Flight_447), an A330-200 en route from [Rio de Janeiro](https://en.wikipedia.org/wiki/Rio_de_Janeiro) to Paris with 228 people on board, crashed in the Atlantic Ocean 640–800 kilometers (350–430 nmi) northeast of the islands of [Fernando de Noronha](https://en.wikipedia.org/wiki/Fernando_de_Noronha), with no survivors. Malfunctioning [pitot tubes](https://en.wikipedia.org/wiki/Pitot_tube) provided an early focus for the investigation, as the aircraft involved had [Thales](https://en.wikipedia.org/wiki/Thales_Group)-built "–AA" models known to record faulty airspeed data during icing conditions. In July 2009, Airbus advised A330 and A340 operators to replace Thales pitots with equivalents manufactured by [Goodrich](https://en.wikipedia.org/wiki/Goodrich_Corporation). Investigators later determined that the inadequate response of the pilots to both a loss of airspeed data and subsequent autopilot disengagement resulted in Flight 447 entering into an [aerodynamic stall](https://en.wikipedia.org/wiki/Aerodynamic_stall).

On 12 May 2010, [Afriqiyah Airways Flight 771](https://en.wikipedia.org/wiki/Afriqiyah_Airways_Flight_771), an A330-200, crashed on approach to [Tripoli International Airport](https://en.wikipedia.org/wiki/Tripoli_International_Airport), Libya, on a flight from [OR Tambo International Airport](https://en.wikipedia.org/wiki/OR_Tambo_International_Airport), Johannesburg, South Africa. Of the 104 people on board, all but one nine-year-old Dutch boy died. The aftermath of the [2011 Libyan civil war](https://en.wikipedia.org/wiki/2011_Libyan_civil_war) hampered the accident investigation.

The two hijackings involving the A330 have resulted in one fatality, namely the hijacker of [Philippine Airlines Flight 812](https://en.wikipedia.org/wiki/Philippine_Airlines_Flight_812) on 25 May 2000 who jumped out of the aircraft. The hijacking of [Sabena Flight 689](https://en.wikipedia.org/wiki/Sabena#Accidents_and_incidents) on 13 October 2000 ended with no casualties when Spanish police took control of the aircraft. On 24 July 2001, two unoccupied [SriLankan Airlines](https://en.wikipedia.org/wiki/SriLankan_Airlines) A330s were destroyed amid an [attack on Bandaranaike International Airport](https://en.wikipedia.org/wiki/Bandaranaike_Airport_attack), in Colombo, Sri Lanka, by the [Liberation Tigers of Tamil Eelam](https://en.wikipedia.org/wiki/Liberation_Tigers_of_Tamil_Eelam). On 25 December 2009, passengers and crew subdued a man who attempted to detonate explosives in his underwear on an A330-300 operating [Northwest Airlines Flight 253](https://en.wikipedia.org/wiki/Northwest_Airlines_Flight_253).

Two A330 incidents due to in-flight malfunctions were survived by all on board. On 24 August 2001, [Air Transat Flight 236](https://en.wikipedia.org/wiki/Air_Transat_Flight_236), an A330-200, developed a fuel leak over the Atlantic Ocean due to an incorrectly-installed hydraulic part and was forced to glide for over 15 minutes to an emergency landing in the [Azores](https://en.wikipedia.org/wiki/Azores). On 7 October 2008, [Qantas Flight 72](https://en.wikipedia.org/wiki/Qantas_Flight_72), an A330-300, suffered a rapid loss of altitude in two sudden uncommanded pitch-down maneuvers while 150 km (81 nmi) from the [Learmonth](https://en.wikipedia.org/wiki/RAAF_Learmonth) air base in northwestern Australia. After declaring an emergency, the crew landed the aircraft safely at Learmonth. It was later determined that the incident, which caused 106 injuries, 14 of them serious, was the result of a design flaw of the plane's [Air Data Inertial Reference Unit](https://en.wikipedia.org/wiki/Air_Data_Inertial_Reference_Unit) and a limitation of the aircraft's flight computer software.

**Specifications**

A330 family

|  |  |  |  |
| --- | --- | --- | --- |
|  | **A330-200** | **A330-200F** | **A330-300** |
| **Cockpit crew** | Two |
| **Seating capacity,typical** | 253 (3-class)293 (2-class)380 (maximum) | n/a | 295 (3-class)335 (2-class)440 (maximum) |
| **Length** | 58.82 m (193 ft 0 in) | 63.69 m (208 ft 11 in) |
| **Wingspan** | 60.3 m (197 ft 10 in) |
| **Wing area** | 361.6 m2 (3,892 sq ft) |
| **Aspect Ratio** | 10.06 |
| **Wing sweepback** | 30° |  |
| **Tail height** | 17.39 m (57 ft 1 in) | 16.90 m (55 ft 5 in) | 16.83 m (55 ft 3 in) |  |
| **Cabin width** | 5.28 m (17 ft 4 in) |  |
| **Fuselage width** | 5.64 m (18 ft 6 in) |  |
| **Cargo capacity** | 136 m3 (4,800 cu ft) | 475 m3 (16,800 cu ft)70 [t](https://en.wikipedia.org/wiki/Tonne) / up to 12 couriers | 162.8 m3 (5,750 cu ft) |  |
| [**Operating empty weight**](https://en.wikipedia.org/wiki/Operating_empty_weight)**(typical)** | 119,600 kg (264,000 lb.) | 109,000 kg (240,000 lb.) | 124,500 kg (274,000 lb.) |  |
| [**Maximum Takeoff Weight**](https://en.wikipedia.org/wiki/Maximum_Takeoff_Weight)**(MTOW)** | 240,000 kg (530,000 lb.) | 233,000 kg (510,000 lb.) | 240,000 kg (530,000 lb.) |  |
| [**Maximum Landing Weight**](https://en.wikipedia.org/wiki/Maximum_Landing_Weight) | 182,000 kg (400,000 lb.) | 187,000 kg (410,000 lb.) |  |
| **Cruise speed** | [Mach](https://en.wikipedia.org/wiki/Mach_number) 0.82 (871 km/h or 470 kn; 541 mph at 11,000 m or 36,000 ft cruise altitude) |  |
| **Maximum cruise speed** | Mach 0.86 (913 km/h or 493 kn; 567 mph at 11,000 m or 36,000 ft cruise altitude) |  |
| **Maximum range, fully loaded** | 13,900 km (7,500 nmi) | 7,400 km (4,000 nmi) (65t)5,950 km (3,210 nmi) (70t) | 11,900 km (6,400 nmi) |  |
| **Takeoff distance at MTOW(sea level,** [**ISA**](https://en.wikipedia.org/wiki/International_standard_atmosphere)**)** | 3,400 m (11,200 ft) | 3,100 m (10,200 ft) | 3,300 m (10,800 ft) |  |
| **Maximum fuel capacity** | 139,090 L (36,740 US gal) | 97,530 L (25,760 US gal) |  |
| **Service ceiling** | 12,527 m (41,100 ft) |
| **Maximum service ceiling** | 13,000 m (42,651 ft) |
| **Engines (×2)(see below)** | [General Electric CF6-80E1](https://en.wikipedia.org/wiki/General_Electric_CF6)[Pratt & Whitney PW4000](https://en.wikipedia.org/wiki/Pratt_%26_Whitney_PW4000)[Rolls-Royce Trent 700](https://en.wikipedia.org/wiki/Rolls-Royce_Trent_700) | Pratt & Whitney PW4000Rolls-Royce Trent 700 | General Electric CF6-80E1Pratt & Whitney PW4000Rolls-Royce Trent 700 |  |
| **Thrust (×2)** | PW: 70,000 [lbf](https://en.wikipedia.org/wiki/Pound-force) (311 kN)RR: 71,100 lbf (316 kN)GE: 72,000 lbf (320 kN) | PW: 70,000 [lbf](https://en.wikipedia.org/wiki/Pound-force) (311 kN)RR: 71,100 lbf (316 kN) | PW: 70,000 [lbf](https://en.wikipedia.org/wiki/Pound-force) (311 kN)RR: 71,100 lbf (316 kN)GE: 72,000 lbf (320 kN) |  |

Sources: Airbus, Pratt & Whitney, EASA, FAA, *The International Directory of Civil Aircraft*

**Aircraft model designations**

*Source: EASA Type Certificate Data Sheet EASA.A.004*

|  |  |  |
| --- | --- | --- |
| **Model** | **Certification Date** | **Engines** |
| A330-201 | 31 October 2002 | General Electric CF6-80E1A2 |
| A330-202 | 31 March 1998 | General Electric CF6-80E1A4 |
| A330-203 | 20 November 2001 | [General Electric CF6-80E1A3](https://en.wikipedia.org/wiki/General_Electric_CF6) |
| A330-223 | 13 July 1998 | [Pratt & Whitney PW4168A/4170](https://en.wikipedia.org/wiki/Pratt_%26_Whitney_PW4000) |
| A330-223F | 9 April 2010 | Pratt & Whitney PW4170 (Freighter) |
| A330-243 | 11 January 1999 | [Rolls-Royce Trent 772B-60/772C-60](https://en.wikipedia.org/wiki/Rolls-Royce_Trent_700) |
| A330-243F | 9 April 2010 | Rolls-Royce Trent 772B-60 (Freighter) |
| A330-301 | 21 October 1993 | General Electric CF6-80E1A2 |
| A330-302 | 17 May 2004 | General Electric CF6-80E1A4 |
| A330-303 | 17 May 2004 | General Electric CF6-80E1A3 |
| A330-321 | 2 June 1994 | Pratt & Whitney PW4164 |
| A330-322 | 2 June 1994 | Pratt & Whitney PW4168 |
| A330-323 | 22 April 1999 | Pratt & Whitney PW4168A/4170 |
| A330-341 | 22 December 1994 | Rolls-Royce Trent 768-60 |
| A330-342 | 22 December 1994 | Rolls-Royce Trent 772-60 |
| A330-343 | 13 September 1999 | Rolls-Royce Trent 772B-60/772C-60 |

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