

**Y**ou've probably already heard many times that the Airbus A380 is a very large aircraft. In fact, it's the largest passenger airliner in the world and one of the largest aircraft to ever fly. The A380's upper deck extends along the entire length of the fuselage, which allows for a large cabin with about half again as much floor space than the next largest airliner, the Boeing 747-400 and provides seating for 555 people in a standard three class configuration or up to 853 people in full economy class configuration.

Although earlier Airbus models include the A320, A330, A340, 350, etc., Airbus is using the out of sequence A380 designation because the "8" represents the twin decks of the A380.

Airlines will fly it from point A to point B, particularly overseas, on extremely long flights without worrying about refueling. Also, the seating capacity of over 500 passengers is a bonus for the airlines.

Airbus is currently selling two models of the A380: The A380-800 is the passenger model and the A380-800F is the freighter version. The 800F will be one of the largest freight aircraft, military or commercial, and will have a payload capacity exceeded only by the Antonov An-225. The A380-800 has a maximum range of about 8,000 nautical miles, which means it can fly nonstop from Chicago to Sydney Australia, at a speed of about 560 mph (Mach 0.85) at cruise altitude.

Airbus also has future plans for a longer range A380-800R, a shortened A380-700 (480 seats) and a stretched A380-900 (656 seats).

Many airlines from around the world, such as Air France, Emirates, Lufthansa, Qantas, Qatar Airways, Singapore Airlines and Virgin Atlantic) have placed or will be placing orders for the A380. No US carriers, however, have placed orders for the A380; FedEx and UPS have cancelled orders for the A380F model (see below).

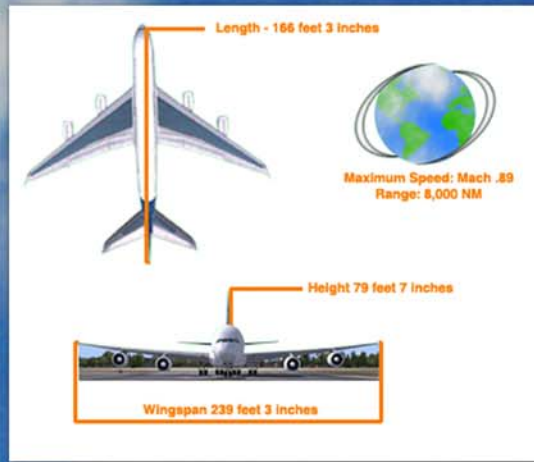
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# ***FS Free Press Takes A Quick Look At The Airbus A380***



***by Scott Slaughter***

# AIRBUS A380



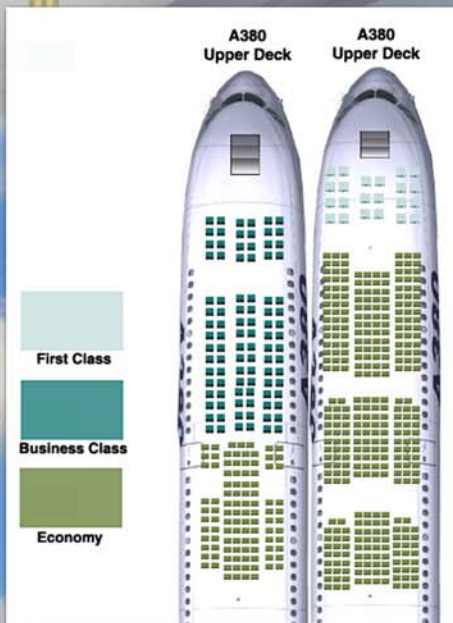
The Airbus A380 will be the largest passenger airliner flying when it goes into service. It's also one of the largest aircraft ever designed and flown.

Airlines will fly it particularly overseas or other long flights without worrying about refueling.

The A380's upper deck extends along the entire length of the fuselage, which allows for a large cabin with about half again as much floor space of the next largest airliner, the Boeing 747-400 and provides seating for 555 people in a standard three class configuration or up to 853 people in full economy class configuration

## PASSENGER CONFIGURATION

Airlines refer to passenger configuration as the number and type of seats and how those seats are arranged inside an airliner. Most airlines squeeze cheaper seats together so an aircraft can carry more passengers; business and first class seats have more room. This is only an example of an A380 configuration. The passenger configuration can change quickly depending on the airline and aircraft.



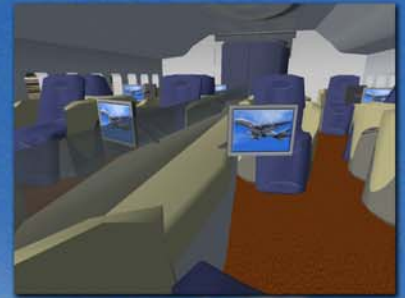
### WINGLET

The winglet, located at the tip of each wing, helps keep your A380 more stable in flight.



### ARE YOU SITTING COMFORTABLY?

Airlines always want their customers to feel comfortable. Some configurations of the A380 may include seats that convert into beds. A380 business class seats may have their own computer screens and fax machines.



A380 AIRBUS

The twin-aisle, twin-deck passenger cabin in the A380 offers passengers a new level of comfort. Airbus designed the cabin on a large sample of passengers flying today. It provides passengers with wider seats and aisles and more space regardless of class of ticket. Passengers will also enjoy optional amenities such as lower deck use for rest areas, business, bar, workout areas and more.

Despite its size, the A380 has a two-person crew (pilot and copilot). All the other staff in the aircraft are called the aircrew.

### ENGINES

All aircraft require at least one engine to push them forward. Many smaller aircraft use piston engines to drive propellers but fast military aircraft and large modern airliners use jet, or turbine, engines.

The Airbus A380 will use either four Rolls Royce Trent 900 engines, each able to produce 84,000 pounds of thrust, or four General Electric-Pratt & Whitney GP-7200 turbofan engines, each able to produce 81,500 pounds of thrust.



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## A380 Development

American manufacturers such as Boeing, McDonnell-Douglas, Lockheed and others dominated the aircraft manufacturing business so much that by the late 1960s, European aircraft manufacturers realized that their only way they could compete effectively with the U.S. aircraft builders was by working with each other.

Although this might sound easy, they had to overcome several problems such as political differences, sharing development costs and even agreeing on common measurements and a common language.

Nevertheless, Airbus was established in 1970 as a European consortium of French, German and later, Spanish and U.K. companies. The two full partners in the original consortium were Aerospatiale for France and Deutsche Aerospace for Germany. Hawker Siddeley and Fokker were also associated with the program and CASA of Spain became a full member of the GIE in 1971. Initially headquartered in Paris, the GIE moved to Toulouse in 1974. British Aerospace became a full partner in 1979.

Many Flight Simmers in the U.S. might be surprised to know that Airbus actually had its origins based on the work of Frank Kolk, an American Airlines executive.

When Boeing announced in 1966 that it would build its 747, a new wide-body jet much larger than the biggest jetliners of the day (Boeing's own 707 and the DC-8 from rival Douglas), Kolk thought that the airlines needed an aircraft somewhere between the size of a 707 or a DC-8 but smaller than a 747. He wanted a wide-body layout, featuring a big cabin with two aisles. But whereas those other jets had four engines, his idea called for only two engines.

Unfortunately, U.S. regulations at the time prevented his idea for a wide-body twinjet. Keep in mind that jet engines at that time were not as reliable or as powerful as the engines used today and US regulations at the time required passenger jet liners on routes flying over the Rocky Mountains or over oceans to have at least three engines in case an engine shut down during flight. (On other routes, a twinjet indeed could comply with the safety regulations.) This is one reason that three-engine

designs such as the McDonnell Douglas DC-10 and Lockheed L-1011 shaped the American jetliners designs in the 1970s.

However, because U.S. regulations did not apply to European carriers and manufacturers, Roger Beteille, chief engineer of Sud Aviation in France, urged Sud to consider a large twinjet based on Kolk's idea. But a project for designing and building a new aircraft was too big for Sud by itself, Beteille sought and received promises of cooperation from government officials in Britain and Germany who agreed to build the new aircraft. They called it the Airbus A-300.

Roger Beteille and a secretary were all that France contributed to the project at first. However, French president Charles de Gaulle resented how the American companies dominated commercial aviation, and he was anxious to build a French or European airliner to compete with the American companies.

De Gaulle at first hoped the Concorde supersonic jet was the answer but it was unfortunately experiencing technical delays and cost overruns. So he had Henri Ziegler take control of Sud Aviation, which was building the Concorde, in an attempt to get the Concorde project back on track. However, Ziegler was also a strong supporter of the Airbus project and convinced De Gaulle to consider the Airbus project very seriously.

In the meantime, the delays in developing the Concorde, gave Boeing enough time to develop its 747 project. Although much slower than the Concorde, passengers liked its low fares and the airlines liked its lower operating costs compared to the Concorde.

The Concorde gave the Europeans valuable experience in aircraft design and what the airlines required. Their next project started with an international collaboration called Airbus Industrie, which added British Aerospace and a subsidiary of Messerschmitt-Bolkow-Blohm from Germany as partners. They proceeded to build the two-engine Airbus A-300 jetliner.

The A-300B was launched at the 1969 Paris air show. It was the first widebody twinjet and could carry 226 passengers in a comfortable two-class layout. A stretched 250-seat version called the A300B2 went into full-scale production. By the end of 1975, Airbus had 10 per cent of the market and a total of 55 aircraft on order.

Ironically, the high price of fuel that helped doom the Concorde also may have saved Airbus. The two-engine A-300 burned less fuel than its triple-engine widebody American built rivals.

In 1978, Boeing responded to the Airbus challenge when it announced it was building a widebody three-engine jet called the 767. Unfortunately for Boeing, the 767 was only in the planning stages but the A-300 was already flying. Airbus Industrie saw a great opportunity and offered the A-310, a downsized version of the A-300. The aircraft featured the first two-man cockpit equipped with six cathode ray tubes displays replacing the older dials

Also in the late 1970s, British Aerospace, which had taken over Hawker-Siddeley, became a full partner in the Airbus consortium in 1979. All the major European manufacturers were now firmly united and ready to challenge the U.S. industry.

The next aircraft was the Airbus A-320, which came out in 1984 and was a 150-seat airplane aimed at the low end of the market. Airbus was hoping the A-320 would be used for short distance routes that carried fewer passengers. Although the A-320 competed with the Boeing 737 and the McDonnell Douglas MD-80 series, for those routes, airlines were demanding the smaller aircraft and the A-320 rolled up large numbers of sales.

In 1986, Airbus began a new program called the A-330/340. This design was a single airplane that could accommodate either two or four engines. The twinjet A-330 was larger than both the A-300 and the Boeing 767. The A-340 was the four-engine version and was built for long range; it served transoceanic routes that covered world-spanning distances but attracted too few travelers.

Thanks to the A-330/340, Airbus became a major competitor to Boeing when sales of these aircraft increased quickly. In 1990 Airbus sold the largest number of jets smaller than the 747 and by 1991 had nearly matched Boeing's new orders with American airlines in North America. Then Airbus passed Boeing in 1994 for the first time for new orders.

U.S. regulators helped increase demand for twinjets by allowing twinjets to fly the Atlantic. Boeing, therefore, introduced the 777, its own new twinjet, which was as large as first versions of the 747.

Airbus first began studies on a large 500-plus seat airliner in the early 1990s. Airbus saw its new jumbo as not only a competitor to the Boeing 747 but also as a successor. In June 1994, Airbus began engineering and development work on the new design, which was the then designated A3XX. Early A3XX design configurations included a single deck that would have seated twelve across and that used twin vertical tails. Airbus decided to use the now familiar twin deck configuration because of the much lighter structure than such a design required.

Airbus is hoping the A380 can use existing airport infrastructure with little modifications to the airports (although this is hotly debated). Airbus is expecting direct operating costs per seat to be up to 20% lower than those for the 747-400 as well as having 10-15% more range, lower fuel burn and less noise. Because the A380 has almost 50% more floor space but only 35% more seating capacity than the largest 747s, Airbus is also promoting passenger comfort with wider seats and aisles.

A380 final assembly occurs in Toulouse, France, and interior work is done in Hamburg, Germany. Major A380 assemblies will be transported to Toulouse by ship, barge and overland.

## A380 Tests & Demonstrations

As of April 2007, Airbus has built five A380s for testing and demonstration purposes. Airbus introduced its first A380 prototype, (Serial Number 001 - Registration F-WWOW), in Toulouse in early January 2005. Its maiden flight was on April 27, 2005 when it took off from runway 32L of Toulouse Blagnac International Airport with a flight crew of six. Although the takeoff weight of this prototype aircraft was only 75% of its maximum takeoff weight, it was nevertheless the heaviest takeoff weight of any passenger airliner flown to that time.

In mid-November 2005, the A380 flew to Asia and Australia as both a promotional tour and for long haul flight-testing. The A380 made its first transatlantic flight in January 2006 when it flew to Colombia so its engine performance could be tested at a high altitude airport. The first North American landing for the Airbus

A380 occurred in early February 2006 when an A380 landed in northern Canada for cold-weather testing.

The A380 underwent evacuation certification in March 2006 at an airport in Hamburg, Germany. The test, done to meet various international regulatory requirements, involved evacuating 873 passengers and crew from the aircraft within 90 seconds but with half of the 16 exits blocked. The evacuation was successfully completed in 78 seconds. Three days later, the A380 received approval from both the European Aviation Safety Agency (EASA) and the Federal Aviation Administration (FAA in the US) to carry up to 853 passengers. This was strong evidence that the evacuation trial met the certification standards of the FAA and EASA.

The first A380 built for a customer, serial number 003 and registration F-WWSA, flew for the first time in May 2006. Airbus completed the first full passenger-carrying flight test for the A380 in September 2006 when the aircraft flew from Toulouse with almost 500 lucky Airbus employees on board. This was the first in a series of flights to test passenger facilities and comfort. Additional tests, including route-proving flights, occurred in November 2006 to demonstrate the aircraft's performance for 150 flight hours under typical airline operating conditions.

By March 2007, nine A380s had flown, and the five A380s in the test program had logged over 2,900 hours over almost 2000 test flights. Lufthansa has recently conducted a route-proving flight that carried passengers from Frankfurt to the US.

The first A380 visit to the United States occurred on March 19, 2007 when an A380 landed in Los Angeles and a second landed in New York City, which then flew to Chicago's O'Hare International Airport the next day. Because New York is the media center of the US, the A380 visit generated a lot of interest. A few days later, on March 25, an A380 from Frankfurt, Germany landed at Washington-Dulles International Airport outside of Washington, DC with 500 passengers onboard.

## Delivery Delays

As you might expect, any project on the size of the A380 is likely to experience unexpected problems. Although work and testing has progressed steadily on the A380, not everything has gone well. Due to long delays in production of the A380, at least two customers cancelled orders and several launch customers either deferred delivery or seriously considered switching orders to Boeing for its Boeing 747-8 and 777F aircraft.

One early delay problem involved the 300 miles of wiring in each aircraft. One source of the problem was that different Airbus facilities were using two incompatible versions of the CATIA computer-aided design software. This and other wiring problems pushed back expected deliveries by two years.

Airbus announced a second delay in mid-2006. This delay cost the jobs of the CEO of EADS (the parent company of Airbus) as well as the CEO of Airbus and the A380 program manager. This delay caused Malaysia Airlines and others to consider canceling orders. Meanwhile, other airlines, such as Singapore Airlines, Emirates and Qantas, were publicly upset by the continuing delays in their A380 orders.

In early October 2006, the then Airbus CEO Christian Streiff, announced a third delay. This delay hit Airbus especially hard because the customer with the largest A380 order, Emirates, said it was considering scaling back its order, and possibly ordering the 747-8 from Boeing. Virgin Atlantic deferred its deliveries for a few years from 2009 to 2013.

The third delay was followed by the first cancellations to hit the A380 program. In November 2006, FedEx cancelled its order for A380F freighters and placed orders for the Boeing 777 Freighter instead. Then in March 2007, UPS, the last remaining customer for the A380F, announced it was canceling its order for the Airbus A380-800F.

Airbus has, therefore, halted work at least temporarily, on the A-380-800F model so it can concentrate on delivering the passenger model. Airbus has emphasized that would-be customers can still order the 800F, which as of March 2007, Airbus believes the A380F would be in service by 2014.

## Airport Compatibility

Although a large aircraft, the A380 was designed to fit within a 263x263-foot airport gate and operate on any runway that can handle a Boeing 747. Nevertheless, some airports will still need to update or modify their infrastructures to handle not only the A380 itself but also the hundreds of passengers. The modifications airports are considering include the following:

- ◆ Airports may need to modify taxiway and apron areas due to the large wingspan of the Airbus A380 so there is enough space when two A380s pass each other.
- ◆ Airports and airlines may need to buy new service vehicles that have lifts capable of reaching the upper deck, as well as tractors capable of handling the maximum ramp weight of the A380.
- ◆ Because its outboard engines overhang more than 80 feet from the center line of the A380, airports may need to pave or repave taxiway shoulders to reduce the likelihood of foreign object damage caused to (or by) the outboard engines.
- ◆ Taxiways and runway bridges must be capable of supporting the maximum weight of the A380.
- ◆ Terminal gates must be built or modified so the wings of the A380 don't block adjacent gates.

- \* Airports may also need to provide additional jetway bridges for simultaneous boarding on both decks to handle the hundreds of passengers moving onto or from the A380.

The A380 test aircraft have recently started various airport compatibility tests, which are designed to verify the modifications already made at several large airports are capable of handling the A380.

## Conclusion

Over a dozen airlines have ordered a total of 156 of the A380 passenger aircraft. Although orders for the A380-800F was as high as 27 aircraft at one time, there are no orders currently for the freighter version as a result of the extensive production delays we mentioned above. Airbus expects to sell a total of 750 aircraft, which follows industry expert predictions of between 400 and 880 aircraft orders by 2025. Aviation experts believe that the "break-even" sales point for Airbus is now 420 aircraft, which is an increase from 270 due to the delays and exchange rate differences.

If you're interested in putting a real world A380 in your garage, be prepared to spend upwards of \$316 million, depending on what options you want installed (pricing current as of April 2007).