

# B747-8F vs A380F

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MARKET ANALYSIS

For some time now, Boeing's 747 family of freighters has dominated the international air cargo market. With over 200 747 freighters in operation, these aircraft carry about half the world's airfreight. A while back Airbus challenged Boeing's supremacy in the large freighter category with the development of the 150-tonne capacity A380F to compete with the 113 tonne 747-400F. Boeing had been studying the market feasibility of a



stretched 747 for a number of years, but turned its attention early in 2001 to the development of the Sonic Cruiser. Boeing also indicated it felt that Airbus had overestimated the demand for very large aircraft. With changes in the market since the Sonic Cruiser was first announced, Boeing focussed its attention back to the 747 in a big way, and has now responded with its new 140 tonne 747-8F.



So how do the two freighters compare?

**Capacity.** The A380F offers 150 tonnes of payload and 938.4 cubic metres of space. While the 747-8F offers significantly more capacity than the 747-400F at 140 tonnes payload and 854.3 cubic metres of space, the A380F still provides 7% greater payload and 10% greater volume. Boeing has on occasion referred to the ability of its aircraft to handle "real world" densities (by implication suggesting Airbus aircraft do not); however, the 747-8F could only carry slightly more dense cargo than the A380F, at an average of 164 kg/m<sup>3</sup> versus 160 kg/m<sup>3</sup>. It is doubtful that this will give it much of an advantage, so the A380 clearly offers greater cargo carrying capacity.

**Range.** Based on aircraft characteristics downloaded from the Airbus website, the A380F can fly about 10,400 to 10,500 km with a full payload, depending on engine choice. The 747-8F will have a maximum range of about 8,275 km. Clearly, the A380F has a significant advantage here. If we look at the ability to carry 140 tonnes (the 747-8F maximum), the difference is more pronounced, with the A380F being able to cover some 11,400 km. From a point such as Dubai, the 747-8F can reach all of Europe and Africa, as well as most of Asia. It cannot, however, reach the Americas. The A380F, on the other hand, can reach into North America as far as Washington, and can cover all of Asia and even virtually all of Australia (though the key communities on the southeast coast are just out of range). If the A380F were to be loaded with 113 tonnes (the maximum payload of today's 747-400F), it could reach any point other than southern California, Mexico and Central America, the western half of South America and New Zealand. A clear edge to the A380F.



Great Circle Mapper

**Economics of Operation.** Here the data is murky. Boeing is claiming 20 percent lower trip costs, and 23% lower ton-mile costs than the A380. It attributes this to the fact that the empty weight of a 747-8F is 86 tonnes less than that of the A380F, which translates into less fuel required to move the airplane itself. Airbus has responded that the Boeing calculations are based on overstated weight and fuel burn numbers for the A380F. Some comments made with respect to the passenger version suggest the Boeing advantage may be closer to 12% on a trip cost basis. Nevertheless, it would seem that Boeing has a very important edge here.

# B747-8F vs A380F – Con't

**Cost.** The A380F lists at about \$282 million; the 747-8F at about \$278 million. Not much to choose from here. Of course, the actual price can vary significantly from the list price, depending on the air carriers' negotiating leverage and the aerospace manufacturers' hunger for sales.

**Airport Issues.** Both aircraft will meet Stage 4 and QC2 noise requirements. (QC refers to Quota Count, in use at London airports for night flights.) Comparative emissions levels are hard to determine given the mixed signals on relative fuel burn.

The 747-8F, though larger than the 747-400F, will operate at existing airports handling the 747-400. The A380, as has been widely noted, requires modifications at some airports in order to handle this very large aircraft.

There have also been some concerns that wake turbulence from the A380 may require longer waits between take-offs. This could be an issue at congested airports – an ironic situation as one of the motivations for the A380 was to reduce congestion at hub airports.

**Conclusions.** At this early point in time, with few hard numbers on performance, it is difficult to say which aircraft is "better." As well, which is "better" will vary by carrier, depending on its needs. So far, Cargolux has ordered 10 747-8Fs and Nippon Cargo Airlines has ordered 8. The A380F has been ordered by Emirates (2), FedEx (10), International Lease Finance Corporation (5) and UPS (10 firm and options for another 10). It is certain that both aircraft will become important fixtures in the international air cargo world.