

# 747-8 characteristics analysed

Initial examination of the 747-8's characteristics and payload specifications reveal how it compares to the A380. Passenger versions of both aircraft have similar range capabilities, while freighter variants of the 747-8 and A380 have a 15 ton payload difference. The market will decide which aircraft has the highest demand.

Examination of the 747-8's specification characteristics reveals that while its maximum take-off weight (MTOW) is 270,000-340,000lbs lower than the A380's, the two freighter variants of both types have similar payload capacities.

Boeing has chosen a single engine type on the 747-8: the GENx-2B67. This will be rated at 66,500lbs.

The intercontinental, passenger-configured 747-8I is clearly about 100 seats smaller than the A380-800. In terms of weight efficiency, the A380 is just 4% heavier per seat. The two aircraft have almost identical belly freight capacities.

The 747-8I's 450 seat capacity is only a 30-seat increase over the 747-400 series, and is smaller than the seat capacity of the 747-600X proposed in the mid-1990s. This raises the issue of whether the -8 will provide enough capacity to the world's 747-400 operators. The 747-8 also leaves about a 100-seat gap with the A380, and may force airlines to acquire the A380 in some circumstances where it is too large.

The 747-8 was launched with an

order from two customers for freighter variants. Although there are 31 airlines operating more than 440 747-400s, only eight of these have so far specified the A380. The A380 has 131 orders for passenger-configured variants. This raises the issue of what proportion of 747-400s will be replaced by 747-8Is or A380s.

The first delivery of the 747-8I is due in 2010, 21 years after the first 747-400 was delivered. This is the longest period between successive 747 models. While the industry has clearly experienced traffic growth since 1989, most 747-400 operators have so far not indicated a strong need for a much larger aircraft. The air transport market has seen a high level of liberalisation, increased competition, a re-thinking of revenue management philosophies, and the opening of new long-haul city-pairs. These have all combined to limit the demand for a large increase in aircraft size on established routes.

Another indication of a tempered demand for ultra-large aircraft is the fact that the 777-200/-300 and A340-600 have had the effect of reducing sales of

the 747-400 over the past five years. Many 747s have been replaced by these smaller widebodies on several long-haul routes.

The largest 747-400 operators are British Airways (57), Japan Airlines (41), United Airlines (30), Singapore Airlines (28), Qantas (24), Korean Air (23), Lufthansa (23) and All Nippon Airways (23).

The size requirements of most 747-400 operators are as yet unclear. With the 747-8I and A380 having the same range performance of 8,000nm, most airlines would be able to operate more long-haul city-pairs that might conceivably require an aircraft with up to 550 seats. Nevertheless, some routes from Singapore to the central and eastern parts of the US, or from Sydney to Frankfurt or London would still remain impossible to fly non-stop.

In terms of the 747-8 and A380 as freighter aircraft, the 747-8 has only about 92% of the volume offered by the A380 (see table, this page), which is equal to a payload difference of 35,400lbs. This is despite the MTOW of the 380 being 340,700lbs higher than that of the 747-8F. The 747-8F has a higher structural payload as a percentage of its gross weight than the A380 (see table, this page). The two aircraft have a maximum packing density of about 10lbs per cubic foot.

Demand for factory-built freighters of this size is mainly coming from airlines serving the Chinese and Asia Pacific markets. The 747-8's first two orders come from Cargolux and Nippon Cargo Airlines.

While the 747-400F has continued to sell well in recent years, the A380-800F has only been ordered by express package operators FedEx and UPS.

While the 747-8F has an impressive payload in relation to its gross weight, its range is limited to 4,470nm with a full payload (see table, this page). This range can be increased to about 7,000nm if a full volumetric payload is carried, but packing density is reduced from its maximum of about 10lbs per cubic foot to 7lbs per cubic foot, thereby taking payload down from 295,000lbs to 200,000lbs.

The full payload range capability of 4,470nm, however, will allow trans-Pacific operations with technical refuelling stops to operate.

The 747-8F's volume and payload is about 47,000lbs and 2,000 cubic feet greater than the 747-400F's. This is only an increase of 16%, and equal to a few years' growth. Since the A380's weight capability is only 12% more than the 747-8F's, freight operators may adopt a policy of acquiring more, rather than larger, aircraft in order to accommodate traffic growth on some routes. **AC**

## 747-8 & A380 SPECIFICATIONS & CHARACTERISTICS

Aircraft type	747-8I	A380-800	747-8F	A380-800F
MTOW lbs	960,000	1,234,600	960,000	1,300,700
MZFW lbs	610,000	795,900	702,000	886,300
Structural payload lbs	161,100	184,200	295,200	330,600
Fuel capacity USG	60,171	81,433	56,871	81,433
Belly freight	36 X LD-1	36 X LD-3	36 X LD-1	36 X LD-3
Total freight volume	N/A	N/A	29,426	31,991
Maximum freight packing density lbs/cu ft			10.0	10.3
Tri-class seats	450	555	N/A	N/A
Range nm	8,000	8,100	4,470	5,600