A350 challenges 7E7 & 777-200ER

Launch of the 7E7 by Boeing has resulted in Airbus offering a derivative of the A330; the A350-800 and -900. These aircraft will have ultra long-range capability of 7,500-8,500nm.

While Boeing has committed itself to developing the all-new 7E7, Airbus has launched the A350, derived from the A330-200/-300, in response. So how do the two families compare?

The 7E7 has two basic fuselage sizes: the longer variant shared by the -3 and-9; and a slightly shorter fuselage used by the -8. The longer fuselage has capacity for 289 seats in two classes and 257 in a tri-class arrangement. The shorter -8 can accommodate 217 passengers in a tri-class configuration.

The A350 has two variants: the -800 and the longer -900, which share the same fuselage sizes as the A330-200 and -300. The A350 models, however, have longer-range capability and so slightly fewer seats than their A330 counterparts. Extra room is required in the A350's cabin for crew rest. The A350-800 has a tri-class seat capacity of 245 versus the A330-200's 253-seat layout. The A350-900 has 285 seats compared to 295 in the A330-300.

This puts the A350-800 in close competition to the 7E7-9. The A350-900 is about 40 seats larger than the A350-800, but it is only about 15-20 seats smaller than the 777-200ER in a standard tri-class layout.

Both A350 variants have a 12 tonne heavier maximum take-off weight than the heaviest A330 models. Airbus has designed the aircraft with weight saving materials to lower the hull weight. It has will use carbon fibre in the outer wing and central wingboxes, spars and other parts of the wing structure, and introduced Aluminium-Lithium alloys in the aircraft. These materials have reduced the hull weight by about eight tonnes. The only engine to be selected for the A350 so far is the General Electric GEnx rated at 72,000lbs thrust. A pair of these engines is about four tonnes heavier than the weight of the A330's engines. A further 2.5 tonnes are added to the hull weight of the A330 models by adding product enhancements to the A350. Overall the A350 variants will have hull weights about 1.5 tonnes lighter than their A330 counterparts.

The A350-800 can therefore be expected to have an operating empty weight (OEW) in the region of 263,900lbs, and the -900 an OEW of 272,100lbs. OEW data are not yet available for the 7E7 models.

Both A350 models will have a central fuel tank and a usable fuel capacity of 139,100 litres (36,750 USGallons). This is the same as the longest-range variant of the A330-200. The A330-300, by comparison, does not have a central fuel tank and so has a smaller usable fuel volume. Fuel tank capacities are not available for the 7E7.

The A350's specification and configuration will give the -800 model a range of 8,600nm, about 2,200nm more than the A330-200. This compares to the 7E7-9's range of 8,300nm with 257 passengers.

The A350-900 will have a range of about 7,500nm with 285 passengers, an increase of 2,000nm over the A330-300, compared with the 777-200ER's range of 7,750nm with 305 passengers.

These increases in range capability are the largest improvement in performance offered by the A350 over the A330-200/-300. The range capabilities of 7,500nm and 8,600nm allow the A350-800 and -900 to serve most city-pairs in the world non-stop. This product strategy is similar to Boeing's, because Airbus is offering 250- to 280-seat aircraft to operate ultra long-distance routes. This is counter to its A380 product strategy which goes in-hand with the prediction that traffic will continue to grow on the world's major long-haul routes.

The 7E7 has been developed to cater for fragmentation of the long-haul market into a greater number of routes as traffic growth continues, as Boeing expects the market to develop this way over the next 20 years. Airbus comments that the A350 will allow it to provide an aircraft for both developments in the long-haul market, since it sees a requirement for both types of aircraft.

Although Airbus has elected to use carbon fibre in its wingboxes and wing skins, and Aluminium-Lithium alloys, it has retained a metallic fuselage. The GEnx engine selected is the same basic engine as used on the 7E7, but Airbus is in discussions with Pratt & Whitney and Rolls-Royce about selecting a second engine option.

Airbus will retain conventional bleed systems from the engines to supply the aircraft cabin, because this is more efficient than an all-electric aircraft.

Another important feature will be the freight capacity of each aircraft. The 7E7 -9 and 777-200ER can both accommodate 32 LD-3 containers in their underfloor compartments. The A330-200 can accommodate 26 LD-3s, and the longer A330-300 has the same capacity as the 777-200ER.

Overall, the A350-800 and 7E7 will be close in seat capacity and range, with the A350-800 having a slightly smaller freight capacity of about six LD-3 containers. The A350-900 is 15-20 seats smaller and its range is 250nm shorter than that of the 777-200ER, its closest target. The 777-200LR has another 1,100nm range, but this is met by the A340-500.

Airbus has forecast a demand for about 3,100 aircraft in the A350 and 7E7's size category over the next 20 years. This also includes A330 models. Despite the technological upgrades to the A350, the A330 will remain in Airbus's product line. The A350 will be a derivative of the A330, with the two having identical flightdecks and a single type rating. The A350 will therefore have cross-crew qualification with the A330 and A340. AC

A350, 7E7-9 & 777-200ER SPECIFICATIONS

Aircraft type	A350-800	A350-900	7E7-9	777-200ER
MTOW-lbs	533,000	533,000	N/A	656,000
OEW-lbs	263,900	272,100	N/A	310,000-317,000
Range-nm	8,600	7,500	8,300	7,750
Tri-class seats	245	285	257	300
Belly freight capacity	26 X LD-3	32 X LD-3	32 X LD-3	32 X LD-3