

The A330-200 and 767-400ER have similar performance. They also have a high degree of commonality with other Airbus and Boeing aircraft. Neither aircraft provide a compelling reason for an airline to lose its status as an all Boeing or Airbus fleet.

A330-200 & 767-400ER: can one ever have a decisive edge?

The arrival of the 767-400ER and A330-200 has re-opened the debate on medium size widebody twins. Airbus's great selling point with the A330-200 is its claims to have an eight seat larger capacity and 800nm longer range than the 767-400ER.

A major advantage of both types is the A330-200's and 767-400ER's level of commonality with other aircraft from the same stables. This makes the issue of selection almost a foregone conclusion for those operators with an existing Boeing or Airbus fleet.

Markets

The A330-200 and 767-400ER are positioned to serve the trans-Atlantic and other long-haul routes with their 250-seat capacity. Both provide extra capacity for traffic growth. The North Atlantic is one of the biggest markets and replacing the 218-seat 767-300 will be a prime target. All the major US carriers flying North Atlantic operations use the 767-200 and -300. This is probably the greatest obstacle for the A330 in its largest potential market of North American operators.

Delta, Continental and American have committed to all Boeing fleets for another two decades. Delta and Continental are the only two 767-400 airline customers and both already operate the 767-300ER. Although United

has a large commitment to the A319 and A320, it uses the 777 as its trans-Atlantic workhorse. US Airways has firm orders for the A330-300 and could later make a commitment to the A330-200. This leaves Air Canada as the only major remaining potential North American customer. It has a fleet of 767s but also operates A320s and A319s. The airline could therefore be persuaded either way. Overall, prospects for the A330-200 are limited in North America and the 767-400ER appears stronger.

The A330-200 has won a larger number of customers in Europe than the 767-400 has in the US. Austrian, Sabena and Swissair ordered the A330-200 together. These three airlines also operate or have orders for A320 family aircraft. The A330-200 has also gained order success with Emirates. None of these airlines have operated the 767 before.

Musical chairs

Manufacturer's information shows the A330-200 to have a tri-class seat capacity of 253 and a range of 6,400nm. This puts the A330-200 in the same realm as the DC-10-30, making it a suitable replacement. However, the A330-200 is more targeted as a 767-300 replacement. The A330's advantage over the 767-400 in this respect is the A330's higher capacity and capability. The 767-400ER has a standard tri-class capacity of 245 and a 5,625nm range.



Airbus data shows the A330-200 to have an operating empty weight (OE) of 262,300lbs, maximum zero fuel weight of 370,400lbs and a maximum structural payload of 108,100lbs. The tri-class seat capacity comes from a configuration of 12 first class, 36 business class and 205 economy class seats, a total of 253.

Boeing created the 767-400ER with a 245 seat capacity made up of a mix of 20 first class, 50 business class and 175 economy seats. Boeing has a higher portion of first and business class seating. The 767-400ER has a structural payload of 102,700lbs.

Using the same Boeing division for first, business and economy cabins brings the A330-200's seat capacity down to 245; equal with the 767-400ER and eight seats less than Airbus's standard configuration. This is calculated by configuring the A330-200 with 20 first, 52 business and 173 economy seats. Boeing makes the further claim that it includes more space for galley volume per seat than Airbus uses for its comparisons.

The deciding factor in seat capacity is the floor area of the aircraft cabin. The 767-400ER has 2,328 square feet opposed to the A330-200's 2,305 square feet.

The actual seat capacity and range performance of each aircraft are crucial to seat-mile economy. Seat numbers not only affect seat-mile economy but also revenue earning capacity. Revenue



The A330-200 has won orders from operators of other Airbus equipment and the 767-400ER has sold to airlines with Boeing fleets.

earning capacity is also determined by freight capacity.

Taking passenger weights at 210lbs, the structural freight capacity of the A330-200 comes to 54,870lbs with a full tri-class passenger load and 51,250lbs with a full passenger load for the 767-400ER. Assuming that the aft cargo hold will be used to hold passenger bags in containers this leaves the forward cargo hold to carry freight on pallets.

The A330-200's forward hold can take four 96 inch by 125 inch pallets and two LD-3 containers. The 767-400ER can take five 96 inch by 125 inch pallets. Given that the tare weights of pallets and containers for the two aircraft will be similar, the A330-200 has a small advantage in freight capacity.

A good measure of capability is the aircraft's range at maximum payload. The A330-200 is able to carry a full amount of freight payload up to 4,000nm and the 767-400ER can carry a full payload up to about 3,800nm. The A330-200's freight carrying capacity is therefore marginally better than the 767's.

Configuration

Boeing takes issue with Airbus' range claims for the A330-200 on the basis that the A330-200's OEW does not include the weight for crew and catering. This would add a further 4,200lbs and so reduce the aircraft's payload capability and affect its range performance. Boeing

has calculated a reduced A330-200 range of 6,180nm because of reconciled passenger weights, fuel reserves and contingencies. There are also range differences in the engines available to power each aircraft.

By analysing seat numbers and aircraft performance in its own way Boeing has stated that the A330-200's seat capacity is equal the 767-400ER's but allows the A330-200 a 550nm longer range.

"Swissair selected the A330-200 over the 767-300ER and -400ER. According to our analyses the A330-200 and 767-400ER has virtually the same seat capacities, but the 767-400ER did not have the range we required," explains Peter Geysel, director of aircraft purchasing and sales at Flightlease of the SR Group. "The A330-200 has been ordered to replace the A310 on our Middle East and African routes and replace the 747-300 on a two for one basis on routes across the North Atlantic."

One other major issue is the fact that the A330-200 is a shortened development of the A330-300, while the 767-400 is a stretched aircraft. As in all previous cases of shortening aircraft the A330-200 loses some degree of efficiency because it retains the -300's hull weight. The A330-200 is heavy as a result. The opposite is true of the 767-400ER.

The A330-200 has an OEW weight of 1,024lbs per seat, while the 767-400ER

has a weight equal to 928lbs per seat. The A330-200 and 767-400ER have an even larger difference in maximum zero fuel weight (MZFW) of about 40,000lbs. This is despite the two aircraft having close structural payload capacities. This difference is equal to 190 passengers and baggage, and illustrates how much higher the A330's OEW has to be over the 767-400's to have the same payload capacity.

The A330-200's higher weight will not only be reflected in basic operating efficiency, but will also mean it incurs higher weight related user charges. The rates of individual airports and stage lengths operated will determine how detrimental this is to the A330, as will its true seat number advantage which could spread higher user fees.

Taking Airbus' aircraft configuration the A330-200 has a fuel burn of between 0.014lbs and 0.016lbs per seat-mile for all stage lengths between 1,000nm and maximum range. This is close to the 767-400ER's fuel burn performance of 0.015lbs to 0.016lbs per seat-mile across the same stage length spectrum. That is, the fuel burn economy per seat of each aircraft is virtually identical.

This illustrates how the A330-200's scale advantage is offset by its weight disadvantage. If the A330-200 were configured with the same number of seats as the 767-400ER, the A330-200 would have about a 3% poorer fuel burn performance per seat-mile, making little impact on the economics of the aircraft.

Charter

The A330 has won orders from a number of European inclusive-tour airlines. The A330-200 has great appeal as a charter aircraft on account of its high seat capacity in inclusive tour configuration as well as range potential. The 767-300ER has become the long-haul workhorse of European charter operators, and many configure the aircraft with 327 seats in the highest density configuration possible. The A330-200 has a seat capacity of 380 seats in the same mode, providing appreciable growth capacity. With this number of passengers the A330-200 has 5,400nm range.

Boeing puts the A330-200's seat capacity actually higher at 397 and the 767-400ER's at 375. The 767-400ER's range in this mode is, however, too short for that required by inclusive tour carriers. UK charter carrier Leisure International, which will be merged with Air 2000, has placed orders for A330-200s.

"We were facing the end of the lease term with our 767-300s and looked at more 767-300s, the 767-400 and the A330-200 as possible replacement candidates," says Phillip Ovenden, managing director at Leisure International. "The 767-400 was immediately thrown out because it has not got the range to reach Montego Bay from the UK non-stop. At the end of the day the A330-200 won out over the 767-

COMMONALITY FEATURES OF A330-200 & 767-400ER

	A330-200	767-400ER
Line replaceable units	A320 family/A330-300/A340	757/767-200/767-300
Wheels & brakes	A330-300	777
Landing gear	identical to A330-300	unique
APU	A330-300	unique
Flight Crew	A320 family/A330-300/A340	757/767-200/767-300

300 based on pure economics because we had good offers made by Pratt & Whitney and Airbus."

Airtours is another charter airline to have ordered the A330-200. "The A330-200 won on economics," says Gene Mashlan, managing director of Airtours. "The aircraft can produce the lowest cost per seat. The A330 is a true widebodied aircraft, it can take LD-3 freight containers, has good overall economics and has the right range, speed and field performance. The 767-400's range and field performance disqualified it. It has a payload restriction to several of our long-haul destinations."

Family fortunes

Other differences between the 767 and A330 are maintenance costs, finance charges and issues relating to commonality. These factors are all based on the derivation of the aircraft and their degree of commonality with other family members.

The elements of maintenance mean both the 767-400ER and A330-200 will have similar maintenance charges to their older counterparts. Airframe checks will be based on the same maintenance programmes as the older aircraft. Manhour consumptions are also likely to be little different from the older aircraft, despite the 767-400 having been stretched and the A330-200 having been shrunk. In this case the 767-400 will have an advantage of fewer manhours required per seat.

The A330-200's engines are identical to the larger -300's and on-wing times and shop visit costs charges should be little different between the two aircraft. The 767-400 uses the PW4000-94 and General Electric CF6-80C2. These are both identical to the engines used on the 747-400 and 767-300. The thrust rating of the 767-400ER's engines are the same as for the 767-300ER. This means they should have the same on-wing times and shop visit costs. The turbomachinery of the PW4000-94 and CF6-80C2 is also

common with the engines used on the MD-11, A300-600 and A310. There are, however, significant differences with the line replaceable units and accessories on the engines. This prevents complete commonality with engines on these aircraft.

The PW4000 and CF6-80C2 both have higher thrust ratings than on the 767-300ER and so are likely to have shorter on-wing times and possibly higher shop visit costs. The differences between engines on the 767-300ER and -400ER are only likely to be marginal, and so the 767 should make a small gain in seat-mile economy in this respect.

The A330-200 has complete line replaceable unit (LRU), auxiliary power unit (APU), landing gear and wheels and brakes commonality with the -300 model. The A330-200 not only has LRU commonality with the A330-300 but also the A340 and A320 family aircraft. It is this final point that which makes the selection of the A330-200 so compelling for existing A330 operators. The 767-400ER shares the same LRU with the 767 and 757 family.

This means airlines can make savings in LRU inventory levels. The A330-200 will have the same LRU maintenance costs as the A330-300 and the 767-400ER will have the same costs as the 767-300. Because the 767-400 is a stretch it will gain in seat mile economy, while the A330-200 will lose.

The 767-400ER uses a larger APU, which is the same one used by the A330-200, and a stronger and improved landing gear which supports a higher gross weight and gives higher ground clearance. This was necessary because of take-off considerations. The 767-400ER

also requires bigger brakes and uses the same ones as the 777. Since the APU, landing gear, wheels and brakes are unique to the 767-400 there is no cost per seat advantage over the 767-300. The main benefit in component costs however is the fact that the 767-400 shares the same LRUs with other 767 models and the 757.

Overall the 767-400 should have higher maintenance charges than the 767-300 because of the -400's larger APU, landing gear and wheels and brakes. This will result in a similar maintenance seat-mile cost. The A330-200 will have higher maintenance seat-mile costs than the A330-300.

The other major area of commonality is with flight crew. The 767-400 has the same type rating as the 767-200 and -300, meaning that pilots already trained on earlier models are qualified to fly the 767-400. The 767-400 also has a common type rating with the 757. This means pilots qualified on the 757 will only require differences training to become qualified on the 767-400. This spread of pilot commonality adds further incentive for existing 757 and 767 operators to select the 767-400 in favour of the A330-200.

Airbus of course has its own advantage to score in the realms of pilot commonality. Cross-crew qualification (CCQ) with eight other Airbus types has the benefits of reduced training for a fleet with multiple Airbus types.

Like all other aspects of commonality discussed above, CCQ provides even more compelling reasons for existing A320 family and A330/340 operators to select the A330-200 in favour of the 767-400ER.

Final selection

The commonality features of the 767-400 with the 767/757 family and A330-200 with A320 family and A330/340 provide little room for each aircraft to gain a decisive operating cost advantage. This is of course the plain aim of each manufacturer who wants to lock in customers to their product by making it uneconomical to have mixed fleets. "Commonality is certainly a benefit, but the advantages can be overcome in other ways such as fuel burn, maintenance and finance charges. If the direct operating costs of the aircraft are the same, however, then commonality advantages can tilt the balance," explains Geysel.

Fuel burns per seat-mile are similar for the A330-200 and 767-400ER. This just leaves operational performance, revenue generating capability, weight related costs and finance charges as the only opportunities for one aircraft to score a decisive advantage over the other. The magnitude of finance charges are such that a manufacturer can persuade an airline to stay with a uniform fleet of its aircraft by offering a purchase price incentive that will outweigh any other operating cost advantage.

Revenue generating capability leads back to the earlier claim by Boeing that the A330-200 has neither a seat number nor range advantage over the 767-400ER that Airbus claims it has. An airline's operation will determine the real difference in seat numbers and range. Even if the A330-200 does have a 245 tri-class seat capacity and 6,200nm range the 767-400ER's economics are not so significantly better to make it a more economical alternative for Airbus operators.

The debate between the two becomes more interesting when an airline with A300, A310 or 767-200/300s to replace already has a mixed fleet of Boeings and Airbuses, such as Air France, where neither the A330-200 or 767-400ER would necessarily have a commonality advantage over the other. Issues of aircraft performance and manufacturer financing would then become more important.

Also interesting is the case of an airline with only one relevant Airbus or Boeing type to replace, such as Air New Zealand or Qantas, which may want to replace all their current 767s with larger aircraft. Again neither the A330-200 or 767-400ER would have a decisive commonality advantage. This would make the competition more interesting.

The A330-200 and 767-400ER will then not be offered in isolation, but as a fleet package with other types from the same manufacturer. Virtually all airlines are now destined to have their aircraft supplied by one manufacturer. AC

