The 757 has had an impressive history. It has been in a class of its own and offered airlines some of the lowest seat-mile costs possible for narrowbody aircraft. Weakened yields and traffic volumes and more efficient alternatives mean its now time to consider the 757's replacement.

Analysing the options for 757 replacement

The 757 has been in operation for 23 years, and a large number of aircraft are now of an age when operators are considering their replacement. The problem is that the 757 is in a class of its own as the largest narrowbody, so there are no direct replacement candidates. The narrowbodies with the closest seat capacities are the A321 and 737-900ER. The 787-3 and A330-200 are 100 seats larger, but are the smallest widebodies that could be considered.

Airlines will therefore have to consider replacing the 757 with smaller or larger aircraft, operating at similar, lower or higher frequencies than they currently use on their route networks.

Before considering which aircraft is a suitable substitute for the 757, the need for replacement must be examined, including the 757's operating cost trend and disposal options.

757 profile

The 757-200 is mainly used on short- and medium-range routes, with seat numbers typically totalling between 178 and 208 in various arrangements. While seat arrangements vary, a typical two-class configuration is 190 seats.

American Airlines, is the biggest operator, with an average stage length of 1,178nm, and configured with 186 seats. This is close to the average for many 757 operations. Overall, a 1,000nm sector length and annual utilisation of about 2,700 flight hours (FH), 3,000 block hours (BH) and 1,050 flight cycles (FC) is representative of how many 757s are used.

Despite being about 33% bigger than the 727-200, the 757-200 consumes up to 43% less fuel per seat.

The 757-300 is a stretch version of the -200, carrying about 245 passengers. The 757-300's maximum take-off weight (MTOW) was increased to 272,500lbs.

There are 986 757-200s in service with 98 airlines, most of them in North America and Europe. Only 55 757-300s were acquired by seven airlines, including Northwest, Condor Flugdienst and ATA Airlines. The 757-300's poor sales performance is partially due to the A321. The 757-300 is also a very long aircraft. So, despite being very efficient and having attractive seat-mile costs, it takes a long time to load and off-load passengers.

The majority of 757s fly short- and medium-haul trunk routes in the US domestic market. It has proved popular with European charter carriers, since it can operate across all of Europe, as well as to the US East coast.

The 757's largest operators are American, Delta, Northwest and United. America West, Continental, National and USAirways also have large fleets, as do British Airways, Iberia, and various European charter airlines. China is also an important market, with Air China and China Southern operating 42 757-200s.

Case for 757 replacement

Many 757 operators are split between those that may benefit from downsizing and those that require higher capacity aircraft. This needs careful consideration, since new aircraft will offer operating efficiencies and lower cash operating costs, but will also have high capital and financing charges. This raises the issue of whether the 757's maintenance costs are increasing at a high rate, and if its fuel burn is high in relation to the aircraft that could potentially replace it. Besides the 787-3, A330-200, A321 and 737-900, the smaller A320, A319, 737-800 and 737-700 are all replacement candidates.

Maintenance costs

The 757's maintenance programme includes a base check cycle based on four C checks. The basic interval for 1C tasks is 6,000 FH or 18 months. There are multiples of the basic 1C tasks, and the heavy check at the end of the cycle is the C4 check with an interval of 24,000FH and 72 months.

In practice, most airlines utilise about 85% of this interval. With an annual utilisation of about 2,700 FH and 1,050 FCs, the C check will be about every 15 months and 3,375 FH, suggesting that the C check cycle will be completed about every 13,500FH and five years. The youngest aircraft will still be in their first base check cycle, but many older ones will be in their third and fourth. They will have reached maintenance maturity, and their man-hour (MH) and material expenditure could increase with age.

"The MH used for routine tasks in the C1, C2, C3 and C4 checks during the first base check cycle are about 1,500MH, 2,400MH, 1,600MH and 5,000MH," explains Patrick Ryan, head of engineering and planning at Shannon Aerospace. "The non-routine ratio for C1 and C2 checks is 0.4 and for C3 and C4 increases to 0.5. The MH for modifications, service bulletins (SBs) and airworthiness directives (ADs) in C1, C2 and C3 checks are 200, but increase to about 1,000 in the C4. Interior work requires about 200 MH in the C1, C2 and C3 checks, and about 1,500 MH in C4 checks. The total MH for the first C check cycle therefore reach 19,060 MH."

Given a labour rate of $50 per MH, labour cost for the base check cycle is about $950,000. This has to be amortised over the interval of about 13,500FH, and results in a reserve of $70 per FH for the labour portion.

"Routine MH increase in the second C check cycle, as does the non-routine ratio. MH for modifications, SBs and ADs and interior work in the second C check cycle are similar to the first C check cycle," says Ryan. Total labour for the second base check cycle totals about 23,360MH, which is equal to a cost of about $1.2 million, 22.5% higher than the first C check cycle.

"MH for routine job cards increase

Although the 757 has proved popular with the US majors, it was ordered at a time when these carriers experienced little competition. The US domestic market now suffers from overcapacity, and the 757-200 has become harder to fill at an economic level.

again slightly in the third base check cycle, while the non-routine ratio, however, increases to about 1.0 in the C4 check. Total MH climbs to about 28,100," says Ryan. Labour cost thus reaches about $1.4 million, a 20% increase over the second cycle. The reserve for labour therefore increases to about $104 per FH, a $34 increase over the first cycle. This is equal to about an increase in $90 per average flight, and is small when all other costs are considered. The consumption of materials increases with each base check cycle, however.

In general, although the 757's airframe maintenance cost steadily increases with age, it will not impose an unexpected and heavy maintenance burden on operators.

The 757's engines, however, have high costs compared to narrowbodies that could replace it. In the case of the RB211-535E4, reserves for life limited parts are in the region of $85 per engine flight cycle (EFC), while reserves for shop visits are about $160 per engine flight hour (EFH).

Fuel burn

With the fuel price soaring, the 757's fuel cost has become a concern for some operators. On a typical sector of 1,000nm, the 757-200 burns about 2,805 US Gallons (USG) of fuel. At the current fuel price of $1.60 per USG, the fuel cost is about $4,500 and is equal to 2.41 cents per available seat mile (ASM) *(see table, page 29)*.

On the same route length, a 757-300 burns about 3,250 USG, equal to $5,200 and 2.13 cents per ASM *(see table, page 29)*.

Fuel burn for the A321, A320, A319, 737-900ER, 737-800, 737-700, 787-3 and A330-200 on the same sector length is summarised *(see table, page 29)*.

The 787-3 has about a 20% lower fuel burn than the 787-300, and will thus have the lowest unit fuel cost. Unit cost is 1.51 cents per ASM *(see table, page 29)*. The A330-200 and A321 then have the next highest unit fuel cost. All other replacement candidates have lower unit fuel costs than the 757-200, but only in the order of 0.10-0.35 cents per ASM.

Blended winglet

Modification with blended winglets is one option to be considered for continued or extended use of the 757-200.

The 757-200 Blended Winglet system from Aviation Partners Boeing reduces fuel burn by about 3% on a 1,000nm sector, reducing unit fuel cost by 2.35 cents per ASM. This translates into a saving of 99,651 USG and $160,000 per year at current fuel prices. With a list price of $1.05 million for a winglet system, it will pay for itself in about seven years.

The fuel saving is improved to 4.4% on longer routes of 3,000nm. In this case the saving equals 196,259 USG and about $314,000 per year at current fuel prices, generating a return for the operator after about four years.

Freighter conversion

Lessors and some 757 operators can consider passenger-to-freighter conversion programmes as an exit strategy. The two independent passenger-to-freighter conversions for the 757-200 are offered by Precision Conversions and Alcoa-SIE.

Precision Conversions has a 15-pallet conversion, which has been approved by the Federal Aviation Administration (FAA) and by China's aviation regulator. The aircraft has maximum structural payload of 67,000-71,000lbs, and up to 6,600 cubic feet of cargo space on the main deck, with an additional 1,790 cubic feet on the lower deck.

Alcoa-SIE is still developing its 14.5-pallet conversion. The aircraft will have a gross structural payload of 66,000lbs, and a lower total container volume on the maindeck than aircraft modified with the Precision Conversions' programme.

Conversion is dependent on various factors. The first is lessors' concern about whether the lease rate of 757-200SFs will be high enough to generate a return on the book value or investment in the aircraft and the cost of freight conversion.

The current market value for 757s built before 1989 is less than $8 million. Including the conversion and probable maintenance expenses, the total cost of acquiring a converted 757 is about $13 million. Given a lease factor of 1.5%, a monthly lease rate of about $195,000 for the 757-200SF is necessary to make conversion economic, which is similar to the expected market lease rate for converted aircraft. This suggests that lessors are only likely to be interested in converting the 757 when its market or book value has declined to $8 million or less.

Airlines that own the 757 might also be interested in the conversion if they have dedicated freight operations. This is likely to be when the aircraft reach a low or zero book value. Airlines therefore only need to pay for conversion and maintenance costs, which will total about $5 million, but will depend heavily on the need for engine shop visits.

China's airlines, such as Shanghai Airlines, are more active in converting their 757s to meet strong cargo growth.

Replacement strategy

There are three options for replacing the 757-200.

The first, for airlines experiencing weaker passenger volumes and yields, is to replace the 757 with smaller aircraft and operate them at the same frequency. This will reduce capacity offered on a route, resulting in operating cost savings and an improved yield mix.

The second option is to replace the

China Southern uses its 757-200s on trunk routes from its Guangzhou base. It has experienced passenger traffic growth rates as high as 14% per year. As a consequence, it will replace these aircraft with 787-3s.

757 with smaller narrowbodies and increase frequencies to maintain total capacity on each route.

The third is for airlines experiencing high load factors and traffic growth, and examines replacing the 757 with bigger aircraft, thereby increasing capacity on each route. China Southern Airlines, for example, has ordered 10 787s to replace its 757s. Its 757s are flown on busy routes, such as Guangzhou-Beijing, which have been recording double-digit growth rates.

A321/A320/A319

In a similar cabin configuration to the 757-200, the A321 has about 10 fewer seats, putting the A321's capacity at 180 in this analysis. A high MTOW variant of 205,000lbs gives the A321-200 a range of up to 3,000nm, which enables it to operate a number of important US trans-continental routes, as well as some of the longer European intercontinental sectors.

The A320 has a typical two-class seat size of 150. There are various MTOW variants, and the aircraft can operate the 1,000nm sectors operated by the 757 without any payload restrictions. This is true for the A319, which has a seat count of about 124 on this comparative basis.

The A321, A320 and A319 have the same pilot type rating, share many system rotables, and can all be powered by the same variants of the CFM56-5B or V.2500 engine, thereby providing attractive commonality benefits.

737-900ER/737-800/737-700

Over the past several years the 737-900 has posed a threat to the 757-200 and A321. A new higher gross weight and longer range version, the -900ER, has now been launched. The 737-900ER can carry up to 26 more passengers, or fly about 500nm further than the 737-900. An additional pair of exit doors and a flat rear pressure bulkhead allow room for up to 215 passengers in the same fuselage. Other changes, which include optional Blended Winglets and auxiliary fuel tanks, increase range to 3,205nm.

The 737-900ER connects distant city pairs across continents, such as San Francisco-Boston, in a general two-class configuration of 177 seats. It has two other smaller family members.

The 737-800 has a seat capacity of 160, and is larger than the A320. The 737-700 has a seat capacity of 128, and the performance capability to operate 1,000nm sectors without payload or performance restrictions.

The 737-700/-800/-900ER are powered by the CFM56-7B set at different thrust ratings between 24,000lbs and 27,300lbs. Like the A320 family, the 737NG has a single pilot type rating and common system components, offering airlines attractive commonality benefits.

787-3

The new 787-3 is expected to have a two-class capacity of 289 seats. Its 3,500nm range capacity will allow it to operate most city-pairs in the Asia Pacific region, and many of the same routes where the 757-200/-300 is deployed.

The 787-3 will be powered by the General Electric GENX or the Rolls-Royce Trent 1000. Both have wide intake fans and high bypass ratios. One main result will be a 20% lower fuel burn than the 767-300.

The 787 will also have a carbon fibre content exceeding 80%, whose main benefit will be resistance to structural damage and corrosion. This should contribute to lower base-check-related maintenance costs, and also result in a low rate of increase in MH consumption for these checks as the aircraft ages.

A330-200

The A330-200 is similar in size to the 787-3, with a seat capacity of 293. The older design and use of Trent 700, PW4000-100 or CF6-80E1 engines means it has higher fuel burn than the 787-3. This aircraft is already used by Dragonair for high-density routes into mainland China from Hong Kong. The A350-800 could possibly be used to replace the 757 on similar routes, but the A350 has been designed for ultra long-haul missions.

Economic analysis

The three 757-200 replacement options have each been analysed.

The first two options consider replacing the 757 with one of three A320 family types and three 737NG variants either at the same or higher frequencies as the 757-200 on a 1,000nm route. This examines the difference in total aircraft trip costs and seat capacities between the 757 and six narrowbody replacement candidates to identify the most economic option.

The third option considers replacing the 757 with larger aircraft, by examining the quantity of additional seats supplied by either the 787-3 or A330-200, the net increase in aircraft trip costs, and the incremental revenue required by additional passengers to cover this.

All three options are analysed on a 1,000nm sector length. The flight time for a 1,000nm sector is 152-160 minutes, and a taxi time of 20 minutes has been applied. This will result in annual utilisations already described.

The 757-200 is also assumed to operate at a frequency of five flights per day. This generates a daily capacity of 950 seats each way.

All aircraft have been analysed in two classes, with seat numbers as previously described *(see table, page 29)*. The MTOWs used for each aircraft are also summarised.

The trip costs analysed for these

CHARACTERISTICS & TRIP COSTS OF 757-200 & REPLACEMENT CANDIDATES

Aircraft type	757-200	787-3	A330-200	A321-200	A320	A319	737-900ER	737-800	737-700
MTOW lbs	255,000	400,000*	513,700	205,000	169,800	166,450	187,700	174,200	154,500
Seats	190	289	293	180	150	124	177	160	128
Fuel burn-USG	2,805	2,800	3,400	2,200	1,915	1,791	2,350	2,100	1,700
Fuel cost-$	**4,488**	**4,352**	**5,440**	**3,520**	**3,064**	**2,866**	**3,760**	**3,360**	**2,720**
Fuel cost/ASM	2.41	1.51	1.86	1.90	2.04	2.31	2.12	2.10	2.13
Maintenance cost $/FH	1,140	1,275	1,320	652	637	617	662	632	602
Maintenance cost-$	**2,887**	**3,230**	**3,366**	**1,652**	**1,614**	**1,573**	**1,677**	**1,601**	**1,534**
Annual flightcrew employment cost-$	175,000	195,000	195,000	165,000	165,000	165,000	165,000	165,000	165,000
Flight crew hours/year	650	650	650	650	650	650	650	650	650
Flightcrew cost-$	**965**	**1,075**	**1,080**	**910**	**910**	**910**	**910**	**910**	**910**
Flight attendants	8	9	9	7	6	4	7	6	4
Flight attendant annual employment cost-$	44,400	44,400	44,400	44,400	44,400	44,400	44,400	44,400	44,400
Crews/aircraft	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Flight attendant cost-$	**1,455**	**1,636**	**1,636**	**1,273**	**1,091**	**732**	**1,273**	**1,091**	**732**
Landing & navigation cost-$	**1,129**	**1,408**	**1,500**	**973**	**856**	**852**	**922**	**868**	**823**
Catering cost-$	**1,520**	**2,312**	**2,344**	**1,440**	**1,200**	**992**	**1,416**	**1,280**	**1,024**
Total cash DOC-$	**10,923**	**14,141**	**15,376**	**8,327**	**7,534**	**6,938**	**8,541**	**7,829**	**6,725**
Cash DOC/seat-$	**57**	**49**	**52**	**46**	**50**	**56**	**48**	**49**	**53**
Lease rate-$	350,000	810,000	750,000	390,000	350,000	310,000	385,000	350,000	320,000
Trip lease cost-$	4,000	9,257	8,563	4,457	4,000	3,539	4,400	4,000	3,654
Total trip cost-$	**14,923**	**23,400**	**23,940**	**12,784**	**11,534**	**10,477**	**12,941**	**11,829**	**10,379**
Trip cost/seat-$	**79**	**81**	**82**	**71**	**77**	**84**	**73**	**74**	**81**
Unit cost-CASM	**7.85**	**8.10**	**8.16**	**7.10**	**7.69**	**8.44**	**7.31**	**7.39**	**8.11**

***** Estimate of probable MTOW***

aircraft include: maintenance; navigation and landing fees; fuel; annual flightcrew and flight attendant employment costs; and lease charges. These are summarised *(see table, this page)*. Fuel burns and costs have been discussed.

The 787's carbon fibre content of more than 80%, and resulting resistance to structural damage and corrosion to reduce the ratio of non-routine maintenance, is expected to give it 15% lower base check costs than the 767. The 787-3's fuselage maintenance cost will be $480 per FH. The engine reserve is expected to be $260 per engine flight hour for an average FC time of about 2.5FH. This takes into consideration the probable reserves for life limited parts, shop visit costs and removal interval. The cost for rotables and heavy components is expected to be $250 per FH and $165 per FH, respectively. Hence the 787-3's total maintenance cost per FH is about $1,275 *(see table, this page)*.

The 757's total maintenance costs are $1,140 per FH *(see table, this page)*, which is high in relation to the A320 family and 737NG variants. These smaller narrowbodies benefit from the long average cycle time that results in a low engine reserves for EFH, as well as having airframe related-costs that are $200 per FH lower than the 757.

All aircraft types have two-man flightcrews, with gross salaries, allowances and annual productivity as shown *(see table, this page)*. Gross salaries are escalated by 25% to account for the additional costs of insurance and pension contributions, subsistence, uniforms and training. This does not allow, however, for possible advantages some types may have over others with respect to commonality that would result in long-term reductions in training costs.

Pilot commonality may have the effect of improving pilot productivity and reducing training costs, with the overall effect of lower employment costs and fewer crews required per aircraft and so lower costs per trip. The actual benefits of pilot commonality depend on fleet mix and airline policy.

Landing and navigation charges for each type relate to the MTOW. Catering charge is assumed to be $8 per seat.

Typical current monthly lease rates have been used for the A321/320/319, 737NG members, and A330-200. These are summarised *(see table, this page)*. A monthly finance charge for the 787-3 is based on the list price of $120 million for the 787-3, a 25% purchase discount, and lease factor of 0.9%. This results in a monthly rate of $810,000.

Monthly lease rates for the 757-200 are highly variable. Over the past four years leases have been renegotiated for many aircraft, and have come down to $180,000-220,000 per month in many cases. Moreover, rates for newly signed leases for older aircraft have approached

The A321 has about $2,000 lower trip cost on a 1,000nm sector, compared to the 757-200. This is mainly as a result of the A321's lower fuel burn and maintenance costs. The aircraft, however, has just 10 seats less than the 757-200, offering airlines the ability to make a large saving in costs for a small reduction in seat capacity. This makes the A321-200 one of the most economic options for 757-200 replacement.

levels as low as $160,000 per month. Long-term rates for financings signed prior to 2001 for a large number of aircraft are in the region of $350,000-450,000. For this reason, a lease rate of $350,000 has been used for the 757-200.

Overall, this results in the trip and unit ASM costs shown for the seven aircraft types *(see table, page 29)*.

Replacement outcome

As discussed, three replacement scenarios are analysed: replacing the 757 with smaller aircraft and maintaining a daily frequency of five flights per trip; replacing it with smaller aircraft and increasing frequency to maintain daily seat capacity on a route; and replacing it with larger aircraft at the same daily frequency where traffic growth is high.

The best aircraft to replace the 757 are those providing the largest trip cost saving per seat reduced, or the smallest increase in trip cost per seat added. The marginal cost per seat reduced or added should be considered against the average cost per seat of the aircraft concerned.

Smaller aircraft, same frequency

The effect on the total seats supplied and total trip cost for operating five daily flights with the 757-200 and the six replacement options is shown *(see table, page 31)*.

The first issue to consider is the average cost per seat for each aircraft type. Trip costs for each have already been discussed, as well as the split between cash direct operating costs (DOC) per seat and finance or lease cost per seat. The 757-200 has the highest cash DOC per seat of all seven aircraft types. A lease rate of $350,000 per month makes its total cost per seat relatively high compared to the other types except the 737-700 and A319, which are the smallest. Lease rates for the 757 are highly variable, however.

Unsurprisingly, the largest types (the A321 and 737-900ER) have the lowest costs per seat, with an advantage of $6-8 over the 757-200.

The A321 is the best option, since it offers a 10-seat smaller capacity and a $2,100 lower trip cost by comparison: a cost more than $214 lower per seat reduced. That is, the five flights have a $10,700 lower cost than the 757-200's five flights, but the A321 offers just 50 seats less *(see table, page 31)*. This saving compares to the A321's cost per seat of $71.

The 737-900ER is similar, and saves $153 per seat reduced, compared to its cost per seat of $73.

These reductions in seat numbers are also likely to be accompanied by a stronger yield mix, and so higher revenue per seat. Airlines could thus benefit from both more efficient aircraft and stronger revenues.

The 737-800 is the next most efficient and the A320 has a marginal advantage of $2 per seat. Despite having lower cash DOCs per seat than the 757-200, the A319 and 737-700 have total costs per seat higher than the 757-200.

Smaller aircraft, same frequency

If unrestricted by airport and airspace congestion, airlines may choose to replace the 757-200 with smaller narrowbodies operated at higher frequency, providing a daily seat volume close to the 950 provided by five 757-200 flights.

In this case the A321 and 737-900ER have to be operated at five flights per day to provide a total number of seats as close as possible to the 950 generated by the 757-200's five daily flights. The A320 and 737-800 have to be operated at six flights per day, and the 737-700 and A319 at seven flights per day.

The overall effect on the number of seats provided and total trip cost is shown *(see table, page 31)*. The 737-800, A321 and A319 provide the biggest saving per seat reduced or added.

The 737-800 has a $3,640 lower trip cost operating at six flights per day and giving just 10 seats more than the 757-200 at five daily flights *(see table, page 31)*. The 737-800, therefore, offers a substantial reduction in operating costs for a slightly higher seat capacity.

The A321 and A320 both offer 900 seats, 50 less than the 757-200, and also have lower trip costs. Both have a large saving per seat reduced, but the A321 and 737-900ER offer the second and third most economic options.

The A319 and 737-700 have lower total costs, but the reductions are small in relation to the reduction in total seat numbers.

Larger aircraft

In this scenario the effect of operating the 787-3 and A330-200 at four and five daily frequencies compared with the 757-200's five is analysed. This increases the number of daily seats by 200-515, or by 21-54%. The main issue is how the increase in total trip costs compares to the extra capacity. The additional cost per seat added is higher than their average cost per seat, indicating that airlines will have to increase their yield mixes and average revenue per seat to cover the higher cost of operating larger aircraft. Higher belly freight capacity may help.

The option of using larger aircraft is, however, only likely to be partially adopted by airlines replacing their 757s with larger aircraft on two or three of the busier daily frequencies. This will be at times of the day when load factors on the 757 are so high that unacceptable levels of spill occur, and also when there is a

RELATIVE TRIP COST PER SEAT OF 757-200 REPLACEMENT OPTIONS

Replacement with same frequency

Aircraft type	757-200	A321	A320	A319	737-900ER	737-800	737-700
Two-class seat capacity	190	180	150	124	177	160	128
Daily frequency	5	5	5	5	5	5	5
Daily seat capacity	950	900	750	620	885	800	640
Trip cost	$14,923	$12,784	$11,534	$10,477	$12,941	$11,829	$10,379
Daily trip cost	$74,615	$63,920	$57,670	$52,385	$64,705	$59,145	$51,895
Cost per seat	$79	$71	$77	$84	$73	$74	$81
Cost saved per seat reduced	N/A	$214	$85	$67	$152	$103	$73

Replacement with same seat capacity

Aircraft type	757-200	A321	A320	A319	737-900ER	737-800	737-700
Two-class seat capacity	190	180	150	124	177	160	128
Daily frequency	5	5	6	7	5	6	7
Daily seat capacity	950	900	900	868	885	960	896
Trip cost	$14,923	$12,784	$11,534	$10,477	$12,941	$11,829	$10,379
Daily trip cost	$74,615	$63,920	$69,204	$73,339	$64,705	$70,974	$72,653
Cost per seat	$79	$71	$77	$84	$73	$74	$81
Cost saved per seat reduced/added	N/A	$214	$108	$16	$152	$364	$36

Replacement with larger aircraft

Aircraft type	757-200	787-3	787-3	A330-200	A330-200
Two-class seat capacity	190	289	289	293	293
Daily frequency	5	4	5	4	5
Daily seat capacity	950	1,156	1,445	1,172	1,465
Trip cost	$14,923	$23,400	$23,400	$23,940	$23,940
Daily trip cost	$74,615	$93,600	$117,000	$95,760	$119,700
Cost per seat	$79	$81	$81	$82	$82
Additional cost per additional seat	N/A	$92	$86	$95	$88

high level of demand from business passengers paying high yielding fares.

The 787-3 has a trip cost of $81 per seat, and the A330-200 a trip cost of $82 per seat, $2 and $3 more than the 757-200 respectively. Their modern designs give the 787-3 and A33-200, however, lower cash DOCs per seat than the 757-200. The difference in overall cost per seat is marginal, however, and remains highly sensitive to the actual lease rates of the aircraft analysed. Lease rates will be the most important factor determining if it is economic to replace the 757 with larger types. While airlines experiencing high traffic growth may have little option about introducing larger aircraft, they should at least benefit from stable passenger yields when growth rates are high.

Summary

Although the 757 is old, its fuel burn performance is still affordable. Its maintenance costs, although not significantly increased with age, are higher than those of the narrowbody aircraft offered by Airbus and Boeing. The Blended Winglet system may prolong the 757's operating life with original operators. The conversion-to-freighter modifications for the 757 are likely to provide an attractive exit strategy for some airlines.

Replacement with the A321 or 737-900ER in an environment of strong competition and weak yields are among the most attractive options. These aircraft are of lighter designs, have lower maintenance costs, particularly engine reserves, and have lower fuel burns.

The A320 and 737-800 also provide economic solutions in some circumstances. Although not analysed, airlines can of course finely adjust their capacity requirements by replacing 757s with mixed A321/320 or 737-900/-800 fleets as required. This is the main purpose of three- and four-aircraft families, which is to provide airlines with seat capacity flexibility and match supply more closely with demand.

Replacement with larger aircraft in strong passenger markets is most likely to be economic when 757s are replaced on busier flights. This is because high yield mixes will be required to cover the higher costs of operating these aircraft. This will be at peak periods when demand from business passengers is high. AC