757-200s are good potential replacements for ageing 727 and medium-widebody freighters. There are a number of important criteria to consider when selecting the most suitable 757-200s for conversion. These include the aircraft's L/N, FC, engine type, maintenance condition and winglet status.

Cherry picking 757-200s for conversion to freighter

More than 1,000 757s were produced from 1983 to 2005. The 757 is now an attractive option for freight operators looking to replace ageing aircraft such as the 727, A310 and A300. Reduced 757 market values, resulting from its replacement with more modern aircraft in passenger fleets, have strengthened its suitability for freight conversion.

There are a number of important issues to consider when selecting 757s for conversion to freighters, including: the aircraft's line number (L/N); the number of accumulated flight cycles (FC); the presence or absence of winglets, the engine type; and fleet commonality. The most suitable conversion candidates are identified here, based on an analysis of these issues and the current passenger fleet.

Acquisition costs

Gary Fitzgerald, managing director at Stratos, estimates that monthly lease rates for a converted 757-200 freighter would be $170,000-210,000.

Fitzgerald believes that likely acquisition costs for early 1990s vintage passenger aircraft in a half-life maintenance condition would be about $6.5 million for 757-200s with Rolls-Royce (RR) engines, and about $6 million for those with Pratt & Whitney (PW) engines.

Freight conversion options

The 757 family consists of the 757-200 and the stretched -300 variant. At this time there is no freighter conversion programme available for the 757-300: most -300s are still too young and in demand with passenger operators. This means their values have not depreciated to levels that make them suitable for freight conversion. The aircraft's fuselage length, however, makes a passenger-to-freighter conversion an attractive prospect.

This leaves the 757-200 that can be converted. There are 543 active and 112 parked 757-200s in a passenger configuration.

There are already 234 active and parked 757-200 freighters. About 155 of these have been converted from passenger configurations. The remainder are factory-built freighters.

In addition, a small number of 757-200s have been converted to combi configuration. This allows them to accommodate freight pallets or containers, as well as passengers. There are six active and parked 757-200s in a combi configuration. The main focus of this analysis will be full freighter conversions.

Precision Conversions and ST Aerospace are currently the only two firms marketing 757-200 freighter conversions: full-freight and combi modifications. They also offer maintenance capability, so that aircraft can undergo heavy checks to optimise downtime during the conversion process.

Precision Conversions

Precision Conversions offers a full freight conversion for the 757-200 that provides 15 main deck positions for 88-inch (length) X 125-inch (width) unit load devices (ULDs) or pallets. Aircraft that undergo this conversion are given the designation 757-200PCF.

A 757-200PCF can also accommodate 13 longer 96-inch x 125-inch ULDs or pallets.

With 15 88-inch x 125-inch ULDs, the 757-200PCF could provide a main deck containerised freight volume of about 6,600 cubic feet (cu ft). The 757-200 has a lower deck bulk freight volume of 1,790 cu ft. The 757-200PCF could therefore offer a total cargo volume of 8,390 cu ft in the 15-position configuration.

Precision Conversions has already converted 41 aircraft to a full freight configuration. Its target turnaround time for a 757-200PCF conversion is 120 days or less. The published conversion cost is $4.65 million.

Precision offers a number of proprietary maximum zero fuel weight (MZFW) upgrades to increase a 757's potential payload capability. These were developed in association with Leth Associates. The level of upgrade depends on the L/N of the aircraft being converted.

The additional cost incurred by these proprietary weight upgrades is about $32 per lb. Precision can offer a maximum upgrade of 8,000lbs for the MZFW, on top of an original equipment manufacturer (OEM) MZFW upgrade for certain L/Ns. This would add $256,000 to the standard conversion price.

Precision does not carry out the OEM MZFW upgrades as part of its conversion service. The OEM MZFW increase is required if operators want to achieve the highest possible payload specification for a 757-200PCF, by using Precision's 8,000lbs proprietary upgrade. OEM MZFW upgrades are available from Boeing and will add extra cost.

The highest gross structural payload offered by a Precision-converted aircraft is about 80,000lbs, for aircraft from L/N 210 and above with RB211 engines *(see table, page 62)*.

The highest gross structural payload offered by a Precision-converted 757-200 powered by PW2000 engines would be about 78,000lbs. This would also be for aircraft from L/N 210 and above.

Precision is currently the only converter with the relevant approval to convert winglet-equipped 757-200s. At

A converted 757-200PCF has a total cargo volume of about 8,390 cubic feet.

this time Precision does not offer proprietary MZFW upgrades beyond standard or modified OEM limits for winglet-equipped aircraft. It expects to gain approval in 2014 to provide the same MZFW upgrade options for winglet-equipped aircraft from L/N 210 and above, that it currently offers for those aircraft without winglets.

ST Aerospace

ST Aerospace provides the option for 14 and 14½-position full freight conversions of 757-200s. The converted aircraft are designated 757-200 Special Freighter (SF).

ST Aerospace is targeting STC approval for a 15-position 757-200SF conversion in the third quarter of 2014. It has already secured a contract for five aircraft in this configuration from SF Airlines.

Like the 757-200PCF, the -200SF can accommodate 88-inch x 125-inch pallets or ULDs.

The 15 position-configured -200SF would offer about the same cargo volume as the -200PCF.

ST Aerospace has converted more than 100 757-200s so far, more than 75 of which are for FedEx. The target turnaround time for conversion is 100 days, depending on the extent of any additional services such as heavy maintenance checks. The cost for a basic conversion would be about $5 million for the 15-position configuration.

ST Aerospace does not provide any proprietary MZFW upgrades on top of those offered by the OEM.

ST Aerospace also does not currently offer conversion for winglet-equipped aircraft, but expects to receive approval to convert aircraft with winglets by the third quarter of 2014.

Airframe selection

There are a number of factors that might influence the suitability of existing passenger-configured 757-200s for conversion to freighters, including: the aircraft's L/N; its accumulated FCs, whether or not it has winglets installed, the engine type, fleet commonality, and maintenance considerations.

Aircraft L/N

There is a distinct split in terms of capability between earlier 757 airframes and later aircraft.

"Aircraft below L/N 125 are limited to a maximum take-off weight (MTOW) of 240,000lbs," explains Brian McCarthy, vice president marketing and sales at Precision Conversions. All aircraft from L/N 125 and above have the option of MTOWs up to 255,500lbs, provided they have suitable landing gear fuse pins, wheels and tyres.

There is a split in terms of the MZFW and gross structural payload that can be offered between 757-200s up to L/N 209 and those from L/N 210 and above. L/N 210 was manufactured in 1988 and delivered in 1989.

"Those aircraft up to L/N 209 are frozen by the OEM with a maximum landing weight (MLW) of 198,000lbs and an MZFW of 184,000lbs," explains McCarthy. "Only Precision, together with Leth Associates, can offer an MZFW upgrade for these aircraft." This upgrade increases the MZFW of both RB211-535- and PW2000-equipped 757s within this L/N range to 188,000lbs *(see table, page 62)*. The upgrade is only valid for aircraft without winglets.

The operating empty weight (OEW) of a 757-200PCF without winglets and for airframes up to L/N 209 is about 116,300lbs for RB211-535-powered and 115,950lbs for PW2000-powered aircraft *(see table, page 62)*. If the Precision Conversions MZFW upgrade to 188,000lbs is applied, the highest achievable gross structural payload is 71,700lbs for RB211-535 and 72,050lbs for PW2000-powered aircraft *(see table, page 62)*.

Aircraft from L/N 210 and above have a standard maximum landing weight (MLW) of 198,000lbs and MZFW of 184,000lbs. The OEM offers optional MLW increases to 210,000lbs for aircraft with both engine families. The OEM also offers optional MZFW increases to 188,000lbs for RB211-535, and 186,000lbs for PW2000-powered aircraft with an MTOW of 250,000lbs.

Precision Conversions offers further 8,000lb MZFW upgrades leading to a potential MZFW of 196,000lbs for RB211-535-equipped and 194,000lbs for PW2000-equipped 757-200PCFs in this L/N range. The 8,000lbs Precision upgrade is not currently available for aircraft with winglets or those with an MTOW of 255,500lbs.

"Cargo operators generally prioritise payload over range," says McCarthy. "The OEM limits MZFW to 186,000lbs for 757s with an MTOW of 255,500lbs. Essentially the OEM trades payload for fuel with these variants. The 757s with an MTOW of 250,000lbs are the best freighter candidates in terms of optimising payload. Our weight upgrades do not apply to the 255,000lbs aircraft that Precision has downgraded to an MTOW of 250,000lbs. It is rare that we find any operators interested in the small additional range capability of a 255,500lbs aircraft at the expense of payload."

Along with an MTOW of 250,000lbs, McCarthy says aircraft with an MLW of 210,000lbs are better freighter candidates from a reserve fuel perspective.

The OEW of a 757-200PCF with an MTOW of 250,000lbs, without winglets and for airframes from L/N 210 and above, is 116,000lbs for RB211-535-powered, and 115,650lbs for PW2000-powered aircraft. If the 8,000lbs MZFW upgrade is applied, the highest achievable gross structural payload is 80,000lbs for

WEIGHT SPECIFICATION OPTIONS FOR PRECISION CONVERSIONS 757-200PCFS

Aircraft Type	757-200PCF RR/PW (Standard)	757-200PCF RR/PW (Precision upgrade)	757-200PCF RR/PW (Standard)	757-200PCF RR/PW (OEM upgrade)	757-200PCF RR/PW (Precision upgrade)
No Winglets					
L/N	Up to 209	Up to 209	From 210	From 210	From 210
MZFW (lbs)	184,000lbs	188,000lbs	184,000lbs	188,000/186,000	196,000/194,000
OEW (lbs)	116,300/115,950	116,300/115,950	116,000/115,650	116,000/115,650	116,000/115,650
Gross structural payload (lbs)	67,700/68,050	71,700/72,050	68,000/68,350	72,000/70,350	80,000/78,350

Aircraft Type	757-200PCF RR/PW (Standard)	757-200PCF RR/PW (Standard)	757-200PCF RR/PW (OEM upgrade)
Winglets			
L/N	Up to 209	From 210	From 210
MZFW (lbs)	185,320	185,320	189,320/187,320
OEW (lbs)	117,620/117,270	117,320/116,970	117,320/116,970
Gross structural payload (lbs)	67,700/68,050	68,000/68,350	72,000/70,350

Notes
1). Winglets add 1,320lbs to MZFW and OEW.
2). Weight data correct for FAA certification - there is a minimal variation in EASA certified weights for aircraft below L/N 209.
3). MTOW/MLW restrictions apply to certain MZFWs.
4). OEW will vary by individual aircraft and according to whether the 757 has ETOPs certification, its door configuration and engine type.
5). OEWs used are designed to offer idea of potential average OEW.
6). OEWs used for aircraft up to L/N 209 are based on later build aircraft in this range.

RB211-535-equipped, and 78,350lbs for PW2000-equipped 757-200PCFs *(see table, this page)*.

"It is unlikely that we will convert another aircraft below L/N 210," says McCarthy. "The main reasons for this are the excessive cycles the older aircraft have accumulated, the attraction of extra payload offered by aircraft from L/N 210 and above, and the greater availability of financing for these younger aircraft."

It is possible that 757-200s up to L/N 209 may appeal to some integrator operators that are more concerned with volume than payload, as long as the aircraft's accumulated FC are within an acceptable range for conversion.

Aircraft FC

"We are seeing average accumulated utilisation of 23,000FC on incoming passenger 757s for conversion," says Dr Yip Yuen Cheong, executive vice president, Aerospace Engineering & Manufacturing, ST Aerospace.

Aircraft with less than 30,000FC are likely to be the most appealing conversion candidates.

"We do not see many conversions of aircraft that have accumulated more than 30,000FC," says McCarthy. The main reasons for this are financing, and subsequent maintenance costs when the aircraft is in operation as a freighter.

"The window for obtaining financing for cargo aircraft has shrunk," explains McCarthy. "Obtaining finance for older aircraft has become more problematic. Investors favour aircraft that maintain higher residual values and offer a longer useful life. Age restrictions could limit the market for older aircraft in parts of the world like China and India. Most investors prefer younger aircraft at lower risk from age restrictions, and there is usually a direct correlation between calendar age and the number of accumulated FC."

Most 757-200s with fewer than 30,000FC are more likely to be within the acceptable age range for investors.

Aircraft with less than 30,000FCs would also offer many years' service before a maintenance-critical 50,000FC threshold is reached. The 757's maintenance planning document (MPD) contains a group of 301 structural inspection tasks with an initial interval of 50,000FC *(see Assessing the 757's ageing maintenance requirements, Aircraft Commerce, February/March 2012, page 35)*. The extent of these inspections and the level of access required, could represent a retirement watershed for aircraft reaching this FC threshold.

"It would be economically unfeasible to maintain an aircraft much beyond the 50,000FC limit," reasons McCarthy.

"The 757-200's design service goal is 50,000FC," adds Dr Yip.

Most 757 freighters would operate no more than two or three cycles a day, five or six days a week. Based on this level of utilisation they would be unlikely to exceed 1,000FC per year. Aircraft with less than 30,000 accumulated FC would therefore be able to operate for at least 20 years post-conversion before reaching the potential retirement limit of 50,000FC.

"Investors probably would not put money into an aircraft that only had 12,000-15,000 FC useful life remaining," claims McCarthy. Airframes with fewer than 30,000FC would be able to operate at least 20,000FCs before reaching the 50,000FC limit when operating at typical rates of utilisation.

Winglets

Winglets have been fitted to a large number of passenger-configured 757s using the Aviation Partners Boeing (APB) modification.

Winglets can currently be installed on 757-200s from L/N 125 and above, with the exception of L/N 182.

Precision Conversions is currently the only provider of freighter conversions for winglet-equipped 757-200s.

"There are a number of potential benefits to installing winglets on the 757," says McCarthy. "These include a reduction in fuel burn and increased lift, which improves take-off performance in hot and high environments."

The reduction in fuel burn is most significant at cruise and at higher altitudes. For passenger-configured 757-200s, fuel burn reduction can be more

Precision Conversions offers proprietary MZFW upgrades for certain 757-200s.

than 4% on longer sectors, but about 2% on shorter 500nm sectors. Winglets may therefore offer more benefits to freight operators that fly longer sectors.

The APB winglets for 757-200s add about 1,320lbs to the aircraft's OEW. To avoid affecting payload the APB modification raises the aircraft's MZFW by the same amount.

Precision does not currently have approval to offer its proprietary MZFW upgrades for winglet-equipped aircraft. For aircraft from L/N 210 and above, Precision plans to gain approval in 2014 to offer the same 8,000lbs upgrades that are currently available for aircraft without winglets.

For winglet-equipped 757-200PCFs up to L/N 209, the only MZFW option is 185,320lbs, for both RB211-535 and PW2000-powered aircraft *(see table, page 62)*. This is the result of upgrading the standard MZFW by 1,320lbs to offset the weight of the winglets.

The OEW for 757-200PCFs with winglets up to L/N 209 is 117,620lbs for RB211-535, and 117,270lbs for PW2000-powered aircraft. This would provide gross structural payloads of 67,700lbs and 68,050lbs respectively.

For winglet-equipped 757-200PCFs from L/N 210 and above, the standard MZFW option is 185,320lbs for both RB211-535- and PW2000-powered aircraft. The OEM MZFW upgrades to take MZFW up to 188,000lbs for RB211-535-powered, and up to 186,000lbs for PW2000-equipped aircraft are also available. These are higher at 189,320lbs and 187,320lbs with winglets installed.

The OEW for 757-200PCFs with winglets from L/N 210 and above is 117,320lbs for RB211-535-powered, and 116,970lbs for PW2000-powered aircraft. With the maximum permissible MZFW upgrades, the highest achievable gross structural payload is 72,000lbs for RB211-535-equipped and 70,350lbs for PW2000-equipped aircraft.

Although they offer fuel burn improvements, winglet-equipped aircraft would currently suffer from lower potential gross structural payloads than those without winglets. This will largely be addressed when Precision Conversions gains approval for its 8,000lb MZFW upgrades for winglet-equipped aircraft from L/N 210 and above. Winglets are therefore unlikely to be a chief consideration when selecting 757s for conversion.

Engines

The active and parked fleet of passenger-configured 757-200s is split almost equally between those equipped with PW2000 series (319) and RB211-535 series (336) engines.

There are several model variants within each engine family.

The PW2000-powered fleet consists of 246 aircraft with PW2037s and 73 with PW2040s. The RB211-535-powered fleet includes 153 aircraft with RB211-535E4s, and 183 with RB211-535E4-Bs.

Aircraft with PW2000 engines will need to have an engine mount replacement modification before they can operate as converted freighters. "This is to ensure they stay within flutter or aerodynamic instability margins," explains McCarthy. "When we convert an aircraft to a freighter we strengthen and stiffen the fuselage to increase payload capability. A stiffer fuselage can amplify the extent to which the engines oscillate, and the soft mounts currently fitted to passenger-configured 757-200s with PW2000 engines are not sufficient to maintain acceptable flutter margins. The cost of this modification could add up to $250,000."

Even with this modification, based on the pre-stated value assumptions for early 1990s vintage 757-200s, the cost to acquire a PW2000-powered aircraft would not exceed that of an example fitted with RB211-535s.

Engine shop visits are also important considerations for potential 757 freighter operators.

"The PW2037 and PW2040 have lower shop-visit costs than the RB211-535E4/E4-B, but the RR engines will probably spend longer time on wing," claims Chris Pelly, senior vice president commercial at Total Engine Support.

"The shop-visit requirements for PW2000 engines generally alternate between a core performance restoration and overhaul," explains Pelly. "The RB211-535E4/E4-B engines typically require a performance restoration to all modules at every shop visit. Depending on the thrust rating and level of utilisation, the cost for a core performance restoration for a PW2000 engine could be $2.2 million. A full shop visit would cost about $2.8 million. This compares to $3.2-3.5 million for the RB211-535E4/E4-B, although some shops are now offering a fixed price of $3 million for the RB211. At such a low price, it is important to be aware of any exclusions and exceptions.

"There is a reduced temperature configuration (RTC) modification for the PW2000 engines, that reduces exhaust gas temperature (EGT) by about 10 degrees," continues Pelly. "Engines that have not had the modification will have a mean time between removal (MTBR) of 3,700FC, compared to 5,000FC for those that have been modified. This compares to an MTBR of about 6,500FC for the RB211-535E4/E4-B."

According to Pelly, one of the major maintenance, repair & overhaul (MRO) organisations for the PW2000 is Delta TechOps, which is independent of the OEM. "There are only four engine shops for the RB211, only two of which, Iberia and Ameco, are truly independent. The largest shop offering PW2000 capability is airline-affiliated," adds Pelly. "The independence of the shops for the PW2000 means there is more

Aircraft from L/N 210 and above and with less than 30,000FC are considered the best candidates for conversion.

competition, which drives down prices for spare parts. RR has historically kept close control of aftermarket servicing for its engine, but RR is loosening its grip as the RB211 has become a mature product. More serviceable and used material has entered the market for RB211s in recent years, as the passenger fleet is withdrawn from service."

Some operators might prefer the PW2000's lower shop-visit costs. Others might be influenced by the RB211's longer removal intervals.

It is possible that the opportunity for fleet commonality will take priority over the aircraft's particular engine type during the fleet selection process.

Fleet commonality

Apart from focusing on aircraft from L/N 210 and above, and those that have accumulated less than 30,000FC, for many operators the most important selection criterion will be the potential for fleet commonality.

"Operators that plan to convert multiple aircraft will want reassurance that they can take standardised sister ships and continue building a fleet with similar aircraft," says McCarthy. "That is aircraft that have been operated by the same carrier and will have the same engines, modifications and parts, and will have been flown or maintained by personnel with standardised training.

"The ability to build a fleet of standardised sister ships can be huge in terms of operating cost and is a defining moment in the fleet selection process," adds McCarthy. "The availability of a standard block of aircraft from a legacy carrier would probably be a more important consideration than the specific engine model they are fitted with or even age considerations."

A large number of the active and parked passenger-configured 757-200s are in service with just three operators. "This offers significant potential for operators to acquire standardised fleets of converted freighters that allow them to transition or grow their fleet at a healthy pace," adds McCarthy.

Maintenance considerations

The aircraft's maintenance condition is an important consideration when choosing airframes for conversion.

The 757's maintenance planning document (MPD) has evolved so that tasks are assigned interval criteria rather than to particular blocks or groups *(see Assessing the 757's ageing maintenance requirements, Aircraft Commerce, February/March 2012, page 34)*. This allows airlines to group tasks to suit their specific operation. In practice, large numbers of tasks have the same intervals, and the intervals are multiples of each other, so many operators still group tasks into block checks.

The 757 has generally had a base check interval of 18 months, with four checks per cycle. This leads to a calendar interval of six years per base check cycle, although some operators are likely to complete this about every five years.

There are two main groups of C check tasks: the system tasks with FH intervals (1C, 2C, 3C, 4C, 6C and 8C tasks); and structural tasks with FC intervals (S1C, S2C, S3C, S4C and S8C tasks).

System and structural tasks can be grouped together throughout the base check cycle, but the FH to FC ratio determines how these two groups come in phase with each other. Ideally the 4C and S4C tasks come due every fourth base check, which may be referred to as a 'D' check using traditional terminology. This involves the heaviest inspections.

The 8C and S8C tasks come due every eighth base check, or every second D check. This is now often referred to by some as the C8-S8C check for the 757-200.

Aircraft that are converted to freighter are normally 15-20 years old. Airframes in this age range would be in their third or fourth base check cycles.

When selecting aircraft for conversion it could be advantageous to look for one that is approaching the second eighth heavy check, or the second C8-S8C check, at the end of its second base check cycle. It would thus be approaching 20 years of age. The next best aircraft would be one approaching the twelfth check, a check with the next 4C and S4C check after its first C8-S8C check. It would be approaching 15-16 years of age.

The aircraft could then undergo the major check, while being converted to optimise the levels of access and downtime required. The aircraft should then be free of major inspections for another five or six years.

"We often see a typical lease term of six years following conversion of a 757-200PCF together with a major maintenance event, such as the C8-S8C check," says McCarthy.

McCarthy estimates that the cost of putting a 757 through a heavy or C8-S8C check is $1.2-1.4 million, excluding landing gear and auxiliary power unit (APU) requirements. This would also depend on calendar age and accumulated FC. "Lesser C-checks will be significantly cheaper if they do not involve structural inspections," adds McCarthy.

Another consideration when selecting aircraft for conversion is whether there are any outstanding airworthiness directives (ADs) or service bulletins (SBs) for the 757 at the time of conversion. These could result in significant downtime and costs. In some cases the costs involved could represent a retirement watershed for an aircraft.

There are relatively few major ADs and SBs outstanding for the 757.

There is an engine pylon, or strut improvement, modification which needs to be completed by the time a 757 reaches 20 years of age or 37,500FC,

PASSENGER-CONFIGURED 757S WITH LESS THAN 30,000FC

Aircraft L/N Range	PW2000 Engines	RB211-535 Engines	Total
Aircraft up to L/N 209			
Active (no winglets)	0	6	6
Parked (no winglets)	0	0	0
Total without winglets	0	6	6
Active (winglets)	0	2	2
Parked (winglets)	0	0	0
Total with winglets	0	2	2
Active total	0	8	8
Parked total	0	0	0
Total	**0**	**8**	**8**
Aircraft from L/N 210 and above			
Active (no winglets)	117	66	183
Parked (no winglets)	14	13	27
Total without winglets	131	79	210
Active (winglets)	71	207	278
Parked (winglets)	7	25	32
Total with winglets	78	232	310
Active total	188	273	461
Parked total	21	38	59
Total	**209**	**311**	**520**
All L/Ns			
Active	188	281	469
Parked	21	38	59
Total	**209**	**319**	**528**

Notes:
1). Numbers exclude 19 aircraft parked by Fedex

whichever comes first. It is a separate issue to the engine mount modification required for PW2000 powered aircraft.

The corresponding AD numbers are AD 2004-12-07, which includes SB 757-54-0035 for RB211-535-powered aircraft and AD 2013-10-02, which includes SB 757-54-0034 for PW2000-powered aircraft.

The engine pylon modification is required for aircraft up to L/N 735. It involves the removal of the engines and engine struts or pylons which are then re-worked. Operators should allow 2,500-2,800 man-hours (MH) to complete the modification. It might make sense to complete this modification while the aircraft is being converted, to optimise downtime and access requirements. Precision has routinely performed these strut improvements during conversion.

Another AD affecting the 757 is AD 2008-23-09. This incorporates SB 757-25-0295 and requires the replacement of insulation blankets, fabricated with AN-26 cover material, in the aircraft sidewalls. Evidence suggests that an insulation blanket with this cover material can lose its fire-resistant properties over time.

Insulation blankets with AN-26 cover material were only installed on 757s built from 1st July 1981 to 31st December 1988. Aircraft up to and including L/N 210 therefore require the modification, for which 2,500-3,100MH may be required. If any airframes in this L/N range were selected for conversion the process of removing the passenger interior would be likely to expose most of the insulation blankets. It therefore makes sense to carry out the modification during the conversion process of the effective date of the AD.

The insulation blanket AD does not affect aircraft from L/N 211 onwards.

Another AD of note involves a sealant modification in sections of the fuel tanks. AD 2008-23-19 incorporates SB 757-57-0064 and requires a sealant to be applied in the fuel tank over existing fasteners after it has been emptied and cleaned. About 600MH will need to be allocated for this task. AD 2011-05-04 is a subsequent new release of the AD and requires additional fasteners to be re-sealed in the fuel tanks which involves repeat tank access.

Although operators will need to be aware of the downtime and costs associated with the ADs and SBs described here, it is unlikely that any of these modifications will represent a retirement watershed.

Cost considerations

The total purchase, conversion and maintenance costs to put an early 1990s vintage 757-200PCF into service with the highest possible payload specification, could be up to $12.8 million for RB211-535-powered and $12.3 million for PW2000-powered aircraft.

This is based on L/N 210 and above,

The largest source of 757-200 sisterships is American Airlines/US Airways. This is followed by United, and then Delta Air Lines.

with assumed acquisition costs of $6.5 million for RB211-535-powered and $6 million for PW2000-powered aircraft. It assumes an overall conversion fee of just over $4.9 million, taking into account the extra cost of Precision's 8,000lbs MZFW upgrade.

It also assumes a cost of about $1.4 million for a heavy maintenance check.

It does not include the potential cost of required OEM MZFW upgrades.

The overall costs for PW2000-powered aircraft may be higher if the if they have not already had their engine mounts modified.

Suitable airframes

This article has identified that the most important criteria to consider when selecting 757-200s for freight conversion are the aircraft's L/N and the number of FC it has accumulated. Fleet commonality will also influence operators looking to convert multiple aircraft. Other variables, including the aircraft's engine type, and whether or not it has winglets installed, are important, but less likely to be decisive during the selection process.

Aircraft with less than 30,000FC and from L/N 210 and above are considered to be the best candidates for conversion.

At the end of January 2014 there were 547 active and parked 757-200s with less than 30,000FC in a passenger configuration. FedEx has 19 of these aircraft parked and presumably awaiting conversion. Apart from these there are 528 active and parked, passenger-configured aircraft with less than 30,000FC *(see table, page 67)*. Only these airframes will be considered in the remainder of this analysis.

Eight of these aircraft have L/Ns below L/N 210 *(see table, page 67)*. All eight are active and have RB211-535 engines, and two have winglets.

Engine type

This leaves 461 active and 59 parked aircraft with L/Ns from 210 and above. It is this group of aircraft that will have prime consideration for conversion to freighter.

From a commonality or sistership perspective there are several large fleets of 757-200s from L/N 210 and above in operation, with the same engine variants, with a small number of carriers. This is particularly the case with US airlines.

PW2000s power 188 active and 21 parked aircraft from L/N 210 and above. Another 273 active and 38 parked aircraft in this L/N range are powered by RB211-535s.

As a result of the recent merger, the combined American Airlines and US Airways fleet is the largest, with 110 active and 15 parked RR-powered aircraft. All are powered by RB211-535s. The RB211-535E4-B is the dominant variant equipping 109 aircraft, and 16 are powered by the RB211-535E4.

Other airlines with significant fleets include Icelandair with 18 active and one parked RR-powered aircraft, and Thomson Airways with 16 active RR-powered aircraft.

United Airlines has 119 757-200s. These are split between 40 PW2037-powered, 38 PW2040-powered, and 41 RB211-535E4-B-powered. Seven of these 119 aircraft are parked. This mixed fleet is the legacy of the merger between United and Continental, with the latter's 757s being equipped with the RB211-535 engines.

Delta Air Lines has 76 active and one parked PW2037-powered aircraft.

Winglets

There are 278 active and 32 parked aircraft, a total of 310, with L/Ns from 210 and above, equipped with winglets. This compares to 183 active aircraft and 27 parked without winglets, 210 in total, that are L/N 210 and above. All of these have less than 30,000FC.

There is therefore the potential to source a standard fleet of aircraft with or without winglets from those with less than 30,000FC and L/Ns from 210 and above.

The combined American Airlines and US Airways fleet of 125 active and parked aircraft, all of which have had the winglet modification.

There is less standardisation in the other large fleets. United has installed winglets on 59 of its active and parked, leaving 60 without winglets. Delta has modified 48, leaving 28 aircraft without winglets. These two airlines have the largest fleets of active and parked aircraft, 60 and 28, without winglets. Both of these groups are PW-powered.

Icelandair has 17 active and parked aircraft equipped with winglets and Thomson Airways has 14 aircraft with winglets. These two airlines only have three aircraft without winglets.

Summary

Aircraft from L/N 210 and above, and with less than 30,000 FC, are the best 757-200 candidates for freight conversion.

There are more than 500 active and parked, passenger-configured aircraft meeting this specification. Some of these are yet to reach the traditional 15-20 year-old conversion age range.

A large number of 757-200s are in operation with US legacy carriers. This offers future potential for freight operators to convert fleets of standardised sisterships. The largest source aircraft is the combined American Airlines and US Airways fleet. AC