The 767 fleet is fragmented into many variants, but the passenger models of the 767-300ER are numerous and remain popular with their original operators. This has kept supplies tight, and values and lease rates firm. It will be several years before large numbers are available to convert to freighter.

The used market potential of 767s

The majority of the 767 fleet has reached maturity. There are 745 active and parked passenger-configured 767-200s and -300s. Many 767s are reaching the point when they would normally be retired by their original operators, and either transferred to smaller secondary airlines or converted to freighters, but the delay in the arrival of the 787, the main replacement for the 767, and the overall industry shortage of widebodies, has given the 767 a temporary reprieve. Despite their age, most 767s are still popular with their first-tier passenger operators, who are hanging on to their fleets, and show no signs of retiring them. Air Canada, for example, has delayed 767 retirements, some of which have even undergone interior refurbishment programmes.

The 767 is in many ways in a class of its own, and its flexibility and usefulness have prevented most aircraft from being retired. A small number of 767s, however, have already been converted to freighters. Further A330-200 deliveries and the 787's eventual entry into service will lead to a steady trickle of 767 retirements. It is estimated that at least 75 787s would have been delivered by now had the aircraft met its original service entry date.

Some 767 owners, lessors and operators may be close to having to make a choice about the future of their aircraft. They will need to consider both the financial and potential market aspects when deciding whether to retain it in operation, re-lease or sell into the secondary passenger market, or invest in a passenger-to-freighter (PTF) conversion.

The deciding factor between selling or leasing into a secondary passenger role, and converting to freighter is the relative difference in values and lease rates of used passenger and freighter variants.

Fleet profile

There are 745 active and parked passenger-configured 767-200s and -300s, split between 660 active aircraft (71 767-200s and 589 -300s) and 85 parked aircraft. Parked aircraft are split between 53 767-200s and 32 767-300s. There are 124 767-200s and 621 767-300s *(see table, page 8)*.

The 767 fleet can be further broken down by engine option, and individual model.

An additional sub-division is the presence of winglets, which are a modification to the original aircraft that could make it unsuitable for freighter conversion due to the structural changes made when the winglets were fitted, as is the case with the 757. Winglets are a popular modification, however, because they reduce fuel burn.There are 110 767s that have been modified with the Aviation Partners Boeing winglet programme. All of these are 767-300 series models.

767-200

The 124 passenger-configured 767-200s comprise 71 active and 53 parked aircraft. The 124 aircraft are also divided between 27 767-200s and 97 767-200ERs.

Over the past five years, the active passenger 767-200 fleet has gone from 110 aircraft to the current 71, of which 60 are -200ER variants, which is the most desirable model. None of the aircraft are fitted with winglets and most are over 20 years old.

The oldest 767-200ER is more than 25 years old, while the youngest is approaching its fourth birthday. The CF6-80A and -80C2 are the most popular engines. The -80A powers 18 active passenger aircraft, while the -80C2 powers 26. This group includes large numbers of aircraft operated by American Airlines, Continental Airlines, and USAirways. Most of the American and USAirways aircraft are 22-25 years old, although they all have a small number of accumulated flight cycles (FC). The 10 Continental aircraft are a late production batch, at 9-11 years old.

A further 27 aircraft, operated by a few airlines outside North America and Europe, are equipped with PW4000-94 and JT9D-7R4 engines.

Despite the 767-200ER's range, there is now little interest in the aircraft either from passenger operators or freight airlines. While a small number have already been converted, interest from cargo airlines has been minimal.

The fleet of parked 767-200EMs and -200ERs is from a mix of previous operators. One group of aircraft was operated by Air Canada.

767-300

The 621 passenger-configured 767-300s comprise 589 active and 32 parked aircraft. The 621 aircraft are also split between 98 -300s and 523 -300ERs.

The active passenger 767-300 fleet is divided into four groups of aircraft powered by JT9D, PW4000-94, CF6-80A and CF6-80C2 engines. The 767-300 was designed for high-density, high-frequency operations. Most were built in the mid- and late 1980s, and the majority of the fleet has accumulated a high number of FCs at 25,000FC or more. Only the 12 younger PW4000-powered aircraft currently operated by Delta Airlines, Air China and Shanghai Airlines have relatively low total FCs.

There are also 10 parked 767-300s. Most of these are Delta aircraft that are more than 20 years old and have

767-200/-300 FLEET BY MODEL

	767-200		767-300		Total
	Active	Parked	Active	Parked	
Passenger					
-Std model	4	23	88	10	125
-EM	7	15	1	-	23
-ER	60	15	500	22	597
Sub-total	**71**	**53**	**589**	**32**	
Passenger Total		**124**		**621**	**745**
Freighters					
-Std model	7	4-	-	-	11
-BDSF	4	-	2	-	6
-BCF	-	-	6		6
-SF	35	1	-	-	36
-EM	5	-	-	-	5
-ERF	4	-	59	-	63
Sub-total	**55**	**5**	**67**	**-**	
Freighter Total		**60**		**67**	**127**
Fleet Total		**184**		**688**	**872**

767-200/-300 FLEET BY ENGINE

	767-200		767-300		Total
	Active	Parked	Active	Parked	
Passenger					
CF6-80A	18	8	16	8	50
CF6-80C2	26	5	352	13	396
JT9D-7R4	16	38	9	2	65
PW4000-94	11	2	181	9	203
RB211-524	-	-	31	-	31
Sub-total	**71**	**53**	**589**	**32**	
Passenger Total		**124**		**621**	**745**
Freighters					
CF6-80A	42	5	66	-	113
CF6-80C2	8	-	-	-	8
JT9D-7R4	5	-	-	-	5
PW4000-94	-	-	1	-	1
Sub-total	**55**	**5**	**67**	**-**	
Freighter Total		**60**		**67**	**127**
Fleet Total		**184**		**688**	**872**

accumulated 25,000-37,000FCs.

The active 767-300ER fleet totals 500 aircraft. The first aircraft entered service in 1988, making the oldest one 23 years old. The 500 aircraft are split as follows: 300 aircraft equipped with CF6-80C2 engines; 169 with PW4000-94 engines; and 31 with RB211-524 engines. The RB211-524 is a heavy engine, so the RB211-524-powered 767-300ER is not a sought-after aircraft.

The 767-300ER with the other two engine types has proved popular in the aftermarket, and all aircraft are traded or leased within a short period of becoming available. The 469 aircraft equipped with CF6-80C2 and PW4000-94 engines are popular in the used market.

Analysis of the 300 CF6-80C2-powered aircraft in the fleet shows that they have all accumulated less than 20,000FCs. Moreover, 247 of the fleet have accumulated less than 16,000FCs, and 126 aircraft are 15-23 years old. Most have totalled less than 20,000FCs.

This younger batch of 126 aircraft is operated by Air Canada, American, Delta, LAN, LOT Polish, Qantas and Thomson. Many are owned by the lessors ILFC, GECAS and Aviation Capital.

Of the younger group of aircraft, 22 have been fitted with winglets. These are aircraft operated by Air New Zealand, American Airlines, Delta, LAN, Thomson Airways and Thomas Cook. Another 43 younger aircraft also have winglets.

Analysis of the 169 PW4000-powered aircraft shows that 94 of them are 15-23 years old, and all have accumulated less than 20,000FCs. Moreover, many only have a total of 7,000-12,000FCs. The operators of the aircraft in this age group are Air Canada, Austrian, Delta, Condor, El Al, Hawaiian, Martinair, Transaero and United.

There is therefore a group of 220 aircraft that are 15-23 years old, but have accumulated relatively few FCs. This group of 767-300ERs is the most likely to be retired first by their current operators. They are attractive aircraft because of their high gross weight, fuel capacity and range capability, engine types, and low accumulated FCs.

From the older group of 94 aircraft, 15 have winglets. These are operated by Austrian, Condor and Delta. There are also another 17 younger aircraft that have winglets. These are operated by the same carriers, as well as Hawaiian and LAN.

The fleet of parked 32 767-300s is a mix of 10 -300s with JT9D and CF6-80A engines, plus 22 -300ERs. Most of the -300s are Delta aircraft with a high number of total FCs. The 22 -300ERs are a mix of older aircraft, some owned by lessors. A few aircraft are awaiting conversion to freighter. Many are at least 20 years old.

Freighter fleet

There are 127 freighter-configured 767s. These are split into three groups: 55 active 767-200s; five parked 767-200s; and 67 active 767-300s.

The 55 active 767-200s are split between a mixture of various 767-200Fs and four 767-200ERFs. The 51 767-200Fs include 32 operated by ABX Air and 11 operated by Star Air.

The ABX Air aircraft were first converted using the unique Airborne Express (ABX) passenger-to-freighter (PTF) modification, which involved no installation of a large cargo door. Containers were therefore loaded through the original passenger door. Many of these aircraft have since been converted to full freighter configuration by Bedek.

The 11 Star Air aircraft are conventional freighters, and are owned by GECAS. The four 767-200ERFs are converted aircraft operated by Tampa, Colombia.

Four of the five parked 767-200Fs are ABX Air aircraft, with the unique freighter modification. These are awaiting conversion with a conventional freight door.

The 67 active 767-300s include six 767-300Fs operated by ANA. These were passenger aircraft converted with Boeing's modification, and operated by ANA Cargo.

Another two aircraft are 767-300BDSF models, that were converted with the Bedek Aviation modification.

The remaining 59 are factory freighters. Many are operated in a group of airlines associated with LAN Cargo. Others are operated by DHL and ANA Cargo. UPS has the largest fleet, with 39.

There are 469 PW4000-94- and CF6-80C2-powered passenger-configured 767-300ERs in active service. Many of these are in operation with major airlines in medium- or large-sized fleets. These aircraft are good freighter conversion candidates, but it will be several years before aircraft become available in reasonable numbers.

Aircraft availability

Delays with the 787 and later deliveries of the A350 mean that it will be several years before the 767-300ER starts to be retired in significant numbers.

Parked aircraft vary in configuration. The length of time that they have been parked means that they may be in poor maintenance condition, and so not the most attractive of used machines.

As described, there are 220 767-300ERs aged 15-23 years old, which are equipped with CF6-80C2 and PW4000-94 engines. These are the most attractive aircraft that potential secondary users may be interested in.

There is little or no interest in the 767-200. Chris Damianos, executive vice president of specialist markets at GECAS, expects few, if any, -200s to be converted, and that most freighter modifications will be for -300s. However, he feels that most -300s will remain in passenger configuration, since there is still a demand for them. GECAS may consider opportunistically converting some, but this is not a priority due to sustained demand for passenger aircraft.

The indications are that the larger 767-300ER operators will continue to operate their fleets. In addition to the delay in the 787 programme, which means that 75 or more aircraft should have been delivered by now, there was already a shortage of widebodies in late 2007, and numbers of available widebodies barely increased during the downturn in 2008-2010. Few 767-300ERs can therefore be expected to be retired in the short term.

One possible trigger for an increase in 767-300ER supply is deliveries of A330-200s. There is a small chance that fleet consolidation among US majors may release a few aircraft, but this is more likely to be 767-200s and other types. American, for example, reduced its 767 fleet by 16.

All Nippon Airways (ANA) has converted six 767-300ERs to freighters, and has ordered 55 787s which will be delivered from 2011 onwards. It is probable that ANA's remaining 19 767-300ERs could remain with ANA as converted freighters, or that some may become available to other operators.

Damianos believes that both sale and lease values hold up for the 767 and nothing is likely to affect that, other than accepted depreciation. He says that the 767 is still an efficient aircraft, and even when major airlines retire it, it will still remain popular, so values and lease rates will remain firm.

Values & lease rates

The A330-200, 787, and to a lesser degree the A350, will replace 767s. The 787 delays have sustained demand for 767s from passenger carriers. Values and lease rates have therefore held firm, contrary to original expectations three or four years ago.

"The 757 and 767 tend to shadow each other," says Karl Brunjes, managing director of RPK Capitol. "This is due to a certain amount of commonality in parts and crew. Although 767 values have dropped by as much as 20-30% over the past few years, both purchase values and lease rates are now beginning to harden. However, large rises will not be seen."

Conversion to freighter, on a larger scale, is only likely when market values have fallen enough, and they are still too high for most potential investors. Then the conversion cost and overall cost of producing a service-ready freighter can be weighed against potential lease rates. Lease rates have to be equal to a lease rate factor of 1.5% of the overall cost of preparing the aircraft for service. Lease rates therefore cap the amount that most investors are willing to pay for a used aircraft.

Avitas values a 1989-built 767-200 at about $5.4 million at current market values. The youngest version (1994) is more expensive at $8.5 million.

A 1989-built 767-200ER is currently valued at $8.9 million, with its value forecast to drop to $5.0 million by 2016.

A 1989-built 767-300 is currently valued at $10.2 million, which is expected to drop to $5.9 million by 2016.

The final model, the 767-300ER, is currently marketed at $10.3 million for a 1989 version, one of the oldest examples. This is also expected to drop by 2015-16.

"Interest in the 767-200 has fallen off compared to the -300," says Brunjes. "Leasing an older aircraft can also be harder than it used to be. Many of the traditional areas for leasing older aircraft, such as Africa, now have regulations on the maximum age of aircraft used there. This can have a negative impact on aircraft values. Many are now worth half of what they had been predicted to be."

Market lease rates for a passenger-configured 767-200ER are $150,000 per month. This compares to $280,000 for a 1989-build 767-300ER, and up to $400,000 for a 2000-build version.

Secondary passenger market

While much of the 767 fleet is reaching maturity, there are still a number that will continue as passenger aircraft for several more lease terms. Lessors will naturally keep aircraft in a passenger configuration while values and lease rates remain high due to sustained demand. Demand for aircraft remains high, so values and lease rates are strong enough to make it still too early for lessors and owners to consider freight conversion at this stage.

In terms of passenger-configured aircraft, lessors will typically aim to invest 10-15% of equity. In the case of a 1990s-build 767-300ER with a value and refurbishment cost of about $20 million, an investor may be required to invest $4

PAYLOAD SPECIFICATIONS OF CURRENT 767-200/-200ER/-300ER AND UNDER DEVELOPMENT 767-300 STANDARD PASSENGER-TO-FREIGHTER MODIFICATIONS

Aircraft type	767-200/-200ER IAI Bedek	767-300 Boeing	767-300 Bedek -9g net	767-300ER Boeing/ ST Aerospace	767-300ER Bedek -9g Barrier	767-300 Wagner Aeronautical
				max. weight	max. weight	
MTOW lbs	351,000	351,100	351,100	412,000	412,000	345,000-360,000
MZFW lbs	266,000	278,000	278,000	309,000	309,000	278,000
OEW lbs	164,400	179,400	179,000	183,620	183,500	171,000-174,000
Gross structural payload lbs	101,600	98,600	99,000	125,380	125,500	99,000
Maindeck:						
ULD pallets:	19x88/125	24x88/125	23x88/125	24x88/125	24x88/125	23x88/125
ULD volume-cu.ft.:	9,386	11,708	11,214	11,708	11,708	11,214
Lowerdeck:						
ULD containers & pallets	22xLD-2	4x96/125 and 14xLD-2 or 30XLD-2	4x96/125 and 14xLD-2 or 30XLD-2	4x96/125 and 14xLD-2 or 30xLD-2	4x96/125 and 14xLD-2 or 30xLD-2	4x96/125 and 14xLD-2 or 30xLD-2
ULD volume-cu.ft.	2,728	3,720	3,720	3,720	3,720	3,720
Total volume-cu ft	12,114	15,428	14,934	15,428	15,428	14,934
ULD tare weight-lbs	9,026	11,370	11,130	11,370	11,370	11,130
Net structural payload-lbs	92,574	87,230	87,870	114,010	114,130	87,870
Maximum packing density lbs/cu ft	7.64	5.65	5.88	7.39	7.40	5.88

million of equity. Another $16 million of debt would therefore be required.

It should be possible to secure the debt with a repayment balloon to minimise the lessor's monthly debt repayments. Debt terms have become more stringent in recent years, so used aircraft have become harder to finance.

A five-year lease is likely for a used 767, meaning the aircraft is not too old when its lease expires. At this point the aircraft will be leased for another five years, or it will be sold before the value drops too low, or it will be converted to freighter provided there is sufficient demand for converted aircraft.

Besides values and potential lease rates, lessors and owners have to consider other factors of asset management. The refurbishment of a passenger aircraft could be about $8 million for heavy checks, zero-time engine maintenance and potentially a cabin reconfiguration. Aircraft with heavy checks and engines in a good maintenance status will be preferred and more marketable, although a C check and tidy-up would probably cost $2-3 million.

In return for their investment, lessors will look for monthly lease factors of about 1.5%. Lease rentals could be in the range of $300,000 per month for an aircraft of the described vintage. This will be sufficient to pay the monthly debt repayments with the balloon terms, while still leaving positive cashflow.

Lessors still need to be prudent about such transactions. Residual values need to be sufficient to pay debt balloons, while also leaving a return on equity invested. While 767-300ER values have, to date, held up, new lease contracts would be terminating from 2016 onwards, and coincide with an increased number of A330-200 and 787 deliveries. A possible increase in 767-300ER retirements by this stage could see values decline at an increased rate.

Conversion to freighter

Aircraft of the right age and available at the right market value will be converted if the resulting lease rate the freighter realises is sufficient to cover the total amount invested in the aircraft.

Current market lease rates for 767-300ERFs are hard to pinpoint due to the lack of conversion feedstock and transactions, but are estimated to be $250,000-300,000 per month.

While there are sufficient 767-200s available, there are no good quality 767-300ERs available at the right values.

The expected lease rates mean that the total investment in preparing a freighter for service cannot exceed $17-20 million. Actual cost of conversion and the installation of a cargo loading system could be $11 million, or more. Taking into account some maintenance costs, this maximises the value of the used candidate passenger aircraft for conversion at only about $7 million. Values of 767-300ERs at the right age, quality and maintenance status have clearly yet to reach this level.

These values will be reached in the future when more aircraft are retired. In the meantime, however, the candidate aircraft will have accumulated more FCs and have aged further.

There is also the risk of other freighter programmes displacing interest in the 767-300ER. The A330-300 conversion programme, may have become available by 2015-17, and will have a structural payload of about 133,000lbs. It could therefore pose a threat to 767-300ER conversions.

There are several PTF conversion options for the 767-300ER. A freighter modification programme is also being developed for the 767-300.

Conversions for the 767-300ER are offered by Boeing, as a -300BCF (through its partner ST Aerospace), and by Bedek, as a -300BDSF. Both programmes are similar, with very small differences in the resulting operating empty weight (OEW), and therefore the payload.

The converted 767-300ER's main deck has a number of loading configurations. The main one uses 24 88-inch X 125-inch pallets or A2 containers.

The lower deck can hold 30 LD-2 containers, giving a total volume of 15,428 cubic feet, dependent on the ULD manufacturer. Both conversion programmes result in a net structural payload of just over 114,000lbs for aircraft equipped with PW4000 or CF6-80C2 engines. The higher hull weight of RB211-equipped aircraft means that there is little interest in converting them to freighter. AC