



A change is gonna come: A340 P2F conversion

Mary-Anne Baldwin investigates the introduction of a low-cost A340 passenger to freighter conversion programme, its revolutionary designs and the market for A340 conversions.

According to IBA, residual values for the A340 have been disappointing. A number of A340-300s are approaching the end of their leases, meaning there will be feedstock available for freighter conversion – but without a conversion programme, values will depreciate further.

Industry belief is that the OEM is not eager to provide a conversion programme. Not only would it cost large sums in R&D and take resources from more pressing programmes, but it could also reduce the value of a clean sheet freighter. According to Jonathan McDonald, senior analyst at IBA, it would cost Airbus many millions of dollars and many years to build a passenger to freighter (P2F) programme for the A340, meaning the cost to convert a single A340-300 would stand at around \$15m, IBA estimates.

LCF Conversions in conjunction with their design and certification team, ACE Corp, of Seattle, now offer a far cheaper alternative at \$6-8m, and it comes with a twist. Instead of cutting a cargo door into the main deck fuselage of a passenger aircraft, this revolutionary design uses the cargo doors already installed in the lower deck forward and aft holds of A340 aircraft. This avoids significant invasive renovation, including the need to strengthen the main deck cargo floor.

The new conversion programme is backed by investors, the Eolia Group. The concept was conceived by Seattle-based

ACE Corp, which started work on the LCF conversion process in 2005 when it realised that future third generation wide-bodied passenger aircraft would require more practical (economic) conversion solutions. The ACE Corp team has previously worked on the A300-B4, 747-400, 737-300 and 737-400 conversion programmes.

While the LCF programme currently focuses on the A340-300, this type of conversion also suits the A340-200, -500, and -600 variants, the 777, and the A330 – all platforms in the 60-90 tonne market.

Regarding the 777, LCF Conversion's programme manager, Kevin Parker, explains; "[It] remains in high demand as a pax platform, the market for conversion is not yet ripe and it needs to be remembered that there is significant residual value remaining in the engines which, will challenge the conversion economics for a long time (meaning in many circumstances it would be preferable to break up the aircraft than to convert it). The cost to convert a 777 to an LCF freighter will be under \$10m but with market prices for a 777-200 averaging \$27.3m, the market will have to wait for values to drop before conversions take place. The A340-600 is also prime for conversion once values have dropped."

The A340-200 and A340-300 went into production almost 20 years ago (in early 1993) and stopped production in 2009. In that time, it sold around 219 A340-300s. Boeing



however, sold over 500 777-200ERs, McDonald notes in his recent report on A340 values. "In the case of the A340 models, IBA slashed values long before official production closure because of the market. Even Airbus, which six to eight years ago would wax lyrical about the A340 at industry conferences, have gone quiet on the model," he says.

"The first A340-300 part out transaction occurred around 2007, though when the aircraft was physically torn down is difficult to determine," the analyst says. According to IBA, the part-out value for the aircraft (MSN 16) was around \$27m – significantly less than the approximate \$95m it was sold for 14 years earlier. IBA did not know the value of the engines at the time and McDonald noted that the aircraft had been in an accident while landing at Heathrow airport. It then came off lease with Virgin and was sold to BWIA, a cash-strapped airline, so one can assume the market value was low even then.

McDonald notes that values for the aircraft type then continued to fall at a rate faster than expected. He says: "By late 2007, we had gathered together a reasonable number of A340-200/300 related transactions, and despite differing circumstances across the deals, they all pointed at values within a reasonably tight band, i.e. \$20-40m. And that was before the credit crunch hit. If we're honest these kinds of values were well below what we had been forecasting some years before, so we had to take a serious step back and think about an action plan. The simple solution was to haircut our A340-200/300 current market values while adopting a more aggressive depreciation curve on our future base values."

The A340-500/600

Looking at today's market value for the A340-500 and -600 as a percentage of the aircraft's new market value, IBA calculates that both show markedly greater depreciation rates than Boeing's equivalent 777 variant. "Regardless of whether the A340-500/600 was in production or not, demand for new examples simply dried up after around 2007. In contrast, Boeing has continued to rake in lots of orders for the 777-300ER," McDonald notes.

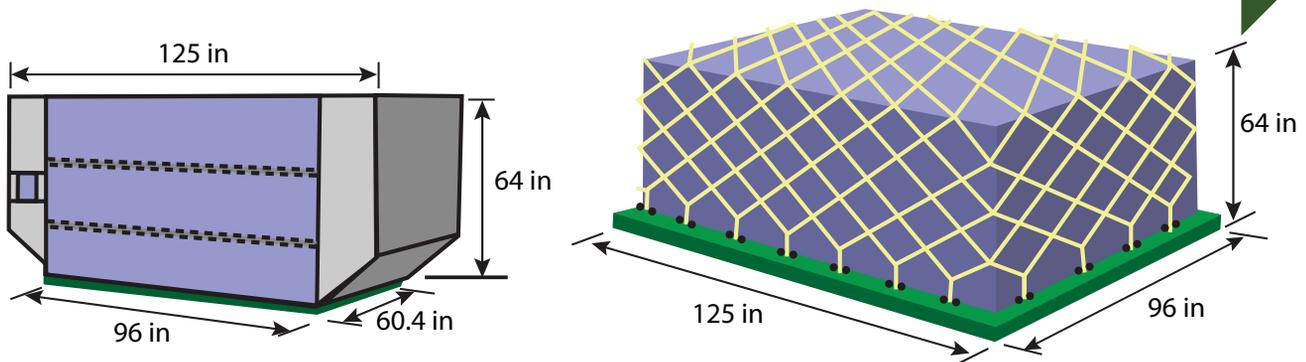
According to him, the 777-200LR/300ER series still offers better remarketing opportunity than the A340-500/600 series as there are 13 more airlines with the aircraft and there are more on order. Airbus delivered just over 133 A340-500s and -600s yet Boeing has so far delivered around 380 777-200LR and -300ERs and has an order backlog for around 337 more.

"We don't expect Airbus to launch a P2F for the A340-500/600 yet, but unless Airbus eventually gets a P2F programme up and running, we really find it quite nerve-wracking as to what placement opportunities will arise once the A340-500/600 passenger fleets eventually get replaced by newer Airbus and Boeing equipment. We're not saying you won't be able to place an A340-500/600 in the future without a P2F programme, but we are saying re-marketability will be more restricted; that's a given."

If the secondary market for the A340-500/600 were to follow a similar path to the -200 and -300, the first of which were parted-out at 18-years-old, values for the -500 and -600 would be extremely restricted. IBA calculates that the value of parts for the A340-500 and -600s may come down to about \$20m by 2020 – the majority of which would be held in engines. Without engines, the aircraft could be worth as little as a 'few million'.

"Of course such a scenario assumes weak demand in the passenger sector and no P2F [programme] to fall back on; similar to what we are seeing with A340-300s today," McDonald says. "A340-500/600s generally perform ideal long sectors, meaning low cycle accumulation on the aircraft. That means there will be plenty of nice, unstressed, and potentially cheap aircraft out there with ample life left in them... We can't help but think someone will be missing a trick here if an A340-500/600 P2F [programme] is allowed to slip by the wayside, OEM or not."

The LCF Conversion: Explained



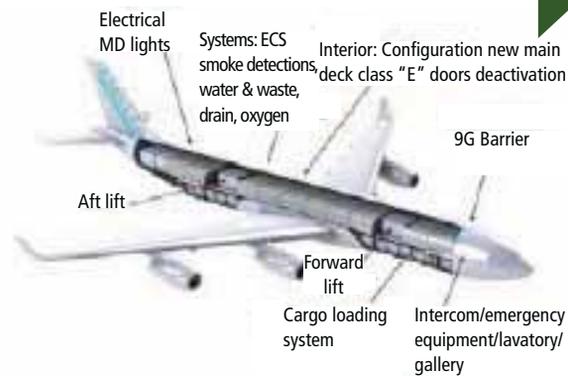
A complete freighter conversion capable of carrying freight loaded on conventional pallets and containers on the lower and main decks. All cargo that can be accommodated on the lower deck can be accommodated on the main deck.

Utilising the freight doors



The LCF conversion utilises the existing cargo doors installed to load and offload cargo.

Utilising the freight doors



Knowing the market is soft, airlines such as Air France (which is an A340-300 operator with aircraft close to the end of lease) could push for heavily discounted lease rates as the owner's only other option would be to part out the aircraft, notes McDonald.

The A340 LCF programme

The programme is marketed as a low-cost conversion, hence the acronym 'LCF'; it costs roughly a third of traditional P2F conversions. Costs are kept low due to the minimal structural changes required, there is no unnecessary removal of parts and no changes to the systems network, which would require access to software changes from the OEMs at a considerable cost.

Due to the more practical loading configuration of the main deck, there is no need to modify the nose or reinstall nose landing gear.

Because of the minimal changes associated with the LCF conversion, the aircraft can also be converted back to a passenger aircraft should the owner find need for it.

Once converted, cargo is moved between the lower and main decks by a system of lifts. The lifts then become a load-bearing part of the airframe during flight. The cargo loading system (CLS) will take the most conventional UDL pallets and containers and in this

regard LCF are working with Ankra to develop light and practical CLS solutions.

The company has created a programme that charts loading times for the converted freighter using a typical integrator and general cargo operating environments. Using this programme, it predicts that loading and unloading an A340-300 LCF would take approximately 75 minutes. A 777 could be loaded and unloaded within 90 minutes, all in line with standard Industry turnaround times.

A 9G barrier is installed to stop cargo shifting during flight and a third floor (Upper Lobe) can be installed above the main deck of the 777 with loading access via lifts embedded into the 9G barrier to lift the cargo from the main deck to the Upper Lobe. This option maximises the volume available in the 777 fuselage and is offered as an option to the standard GMF (General Market Freighter) layout (there is a 3 tonne payload advantage with the GMF configuration)

The converted freighter is capable of taking all pallets and containers that are loaded into the lower holds – this includes the industry standard 96" x 125" pallets on the main deck; The A340-300 LCF platform offers freighter capabilities of up to 60 tonnes revenue payload carried up to 5,400nm. With a volume capacity of 15,000cu ft, the A340-300 LCF compares well against competing freighters offering only two per cent less volume than with the A330-200F.

Jonathan McDonald, senior analyst, IBA

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A limitation to the design is that cargo loaded to the main deck is limited to a height of 64" (the height of the lower deck cargo doors) and a floor running load limitation of 63lb/in. However, Eolia explains that the aircraft can still carry over 40 tonnes of cargo on the main deck. The lower hold can accommodate loads of up to 116lbs/in, or 39 tonnes in total. Together, these loading limits exceed the certified allowances demonstrating the inherent cargo capability already built into the passenger airframes of the 3rd generation medium wide-bodied (MWB) fleets.

McDonald says: "Research indicates that even if Airbus did a full on OEM P2F conversion [programme] with a main deck cargo door for A340-300, the resultant payload would be close to 65 tonnes. Therefore the OEM solution would only offer a slight payload advantage over the LCF non-OEM solution but at a much higher cost. Their research also suggests that the only real practical benefit of an OEM solution would be extra flexibility in loading oversized or very heavy cargo."

Costs to convert

Aircraft	Market value	Conversion cost	Est. total cost
A340-312	\$14.8m	\$6.5m	\$21.3m
A340-313	\$21m	\$6.5m	\$27.5m
A340-541	\$36.7m	\$6.5m	\$43.2m
A340-642	\$36.3m	\$6.5m	\$42.8m
A340-643	\$38.4m	\$6.5m	\$44.9m

Aircraft	Payload	Range
A340-313	66.7	5,400nm
A340-213	58.9	6,100nm

Source: LCF Conversion.

Costs to convert

As IBA notes, values for A340 have declined significantly. Parker suggests the market value for an A330-312 is around \$10 - \$15m. With conversion costs at around \$6.5m, the total cost for an A340-312 or -300 converted freighter would be \$20m. The most expensive A340 LCF would be an A340-643 at a market cost of \$38.4m and total cost once converted of \$44.9m (See table).

The A340-300 LCF programme will be certified on the European Aviation Safety Agency (EASA) and supplemental type certificates (STC) from the Federal Aviation

Administration (FAA). Once a launch customer is secured LCF estimate that they are 12 months to certification. Once the programme is established, the turnaround time (TAT) will be six weeks. There are over 20 A340s currently parked or for sale and the company has already seen interest from airlines in Turkey and China.

Competition

Model	Market value new	Market value new (Aug 11)	% value
2004-built A340-600	\$135,000,000	\$66,290,000	49.10%
2006-built A340-500	\$118,000,000	\$70,500,000	59.75%
2004-built A330-200	\$87,500,000	\$58,500,000	66.86%
2004-built A330-300	\$96,000,000	\$64,000,000	66.67%
2006-built A330-200	\$91,600,000	\$67,000,000	73.14%
2006-built A330-300	\$99,600,000	\$72,600,000	72.89%

Source: IBA.

Competition and routes

Parker notes that the low cost of the conversion means airlines do not have to achieve a high annual utilisation rate – they can use the aircraft to test new cargo routes without much risk. Parker lists possible routes as Istanbul as the Far East and Japan. The LCF works particularly well on routes where there is a directional imbalance cargo.

Airlines flying a competing MWB freighter will often need high utilisation rates to cover the substantial capital cost of the aircraft, this may be a concern to airlines particularly during poor market conditions. Such high costs also restrict niche or small operators.

An additional advantage of the LCF conversion is that there is no need for additional specialised ground support facilities at airports, meaning the on-ramp costs of the A340-300 LCF are significantly lower, says Parker. Airlines can benefit from being able to operate low-frequency routes and those flying high-frequency routes could gain a higher profit.

"The A340-300 LCF conversion is well placed to exploit the emerging demand for non-stop point-to-point cargo operations over intercontinental distances. In particular, it is an economical, low-risk freighter candidate for both integrators and those airlines offering their own in-house express product who are seeking to expand their premium 'next day' product offering into new, long-haul markets," says Parker.

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