ENGINEERING & MAINTENANCE

Widebody freighter conversions

Badly hit by the global recession, the widebody freighter conversion market has been through a troubling few years and until the economy recovers the outlook remains poor. Nevertheless, there have been some interesting developments, including a new programme launch and a new freighter concept. *Jason Holland* reports.

Before the global financial crisis took hold, an upturn in the fortunes of the widebody freighter conversion market had been widely expected. But the air cargo industry was badly affected by the global recession, and the overall condition of the widebody market is "still gloomy", according to Jacob Netz, ACMG (Air Cargo Management Group) senior consultant, and former IAI director of analysis & strategy freighter conversions.

One of the reasons for this is that demand for air cargo has necessarily reduced. Netz, who in this article expresses his own opinion and not necessarily that of ACMG, points to the negative results that many carriers are reporting. Indeed, in the last two years alone, Netz says there has been a long list of "failed carriers" operating widebody freighters. Russian airline Volga-Dnepr/AirBridge also took over struggling Air Cargo Germany, in another sign of prevailing industry weakness.

The restructuring of FedEx Express was a further blow for the market, as the company is accelerating the retirement of 24 older widebody freighters — eighteen A310-200Fs and six MD-10-10Fs. And FedEx has since stated that additional widebody retirements are scheduled for 2013.

In addition to the weak economy, Netz thinks we might see some other threats to the widebody freighter conversion market. High fuel prices may result in the shift of some freight from the air to the ocean. Overcapacity, caused by the increase in belly freight capability of the current and next generations of widebody passenger aircraft, will reduce the demand for dedicated freighters. Meanwhile, new freighters will be in a better position to cope with CO_2 emission standards than converted pax aircraft, and thus may prove more desirable. In addition, the security and cargo screening issue is another concern to be dealt with, Netz states.

Far from an upturn in the market, the past few years have been a period of strife.

Signs of recovery?

There is a direct relationship between the strength of the economy and air cargo activity. "While history tells us that recessions tend to be followed by periods of significant economic growth with demand for air freight, the questions are, when will the economy recover? Will it be a slow recovery? Or a fast recovery?" asks Netz.

Jacqueline Jiang, executive general manager of HAECO subsidiary TAECO, succinctly explains

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Air China Cargo is one customer for the 747-400 Boeing Converted Freighter (BCF).

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—Jacob Netz, senior consultant, ACMG

the current situation in the freighter market: "The worldwide economic/manufacturing business, and fuel prices, are the key elements affecting the widebody conversion market. With the current global economic downturn and thus the slow down on the freighter business, the market demand for widebody conversion is weaker compared with narrowbody conversion demand. The market for narrowbody aircraft conversion remains stable."

But she says the company is "confident that demand for widebody aircraft will return once the economy shows the signal of recovery".

Depending on the rate of recovery, we are likely to see freighters that have been in storage returned to service in the first place, rather than a plethora of new conversions. It has been mainly 747-400s and MD-11s that have had the dust covers thrown over them during the recession.

In the mid-widebody segment, Netz estimates that the ratio between production freighters and passenger-to-freighter conversions currently stands at 50-50. In the large-widebody segment, the ratio is more like 70 per cent production freighters versus 30 per cent passenger-to-freighter conversions. "Freighters joined the fleets to replace retired freighters and to meet the growth," he says. "Assuming growth in demand of four per cent per year, I estimate the potential mid-widebody annual conversions [to be] within a range of 12-25 (covering 767-300, A300-600, and A330-200/-300 aircraft). The potential large-widebody annual conversions range within five-10 (covering 747-400 and maybe 777 aircraft)."

Netz says the existing widebody conversion programmes are the A310, A300-600, 767-200/-300, 747-400, and MD-11; all of which he sees having a large potential market, except the MD-11, which faces a feedstock barrier as only a few suitable aircraft remain. There are four main players in the widebody conversions market.

For Boeing aircraft, one is of course Boeing itself, with its 767-300BCF, 747-400BCF and MD11BCF programmes, while the other is IAI Bedek, with its 767-200BDSF, 767-300BDSF and 747-400BDSF programmes. For Airbus aircraft, one relatively minor player is B/E Aerospace - Flight Structures (FSI) with its A300-600 programme. FSI converted one aircraft in China in conjunction with GAMECO, and the second

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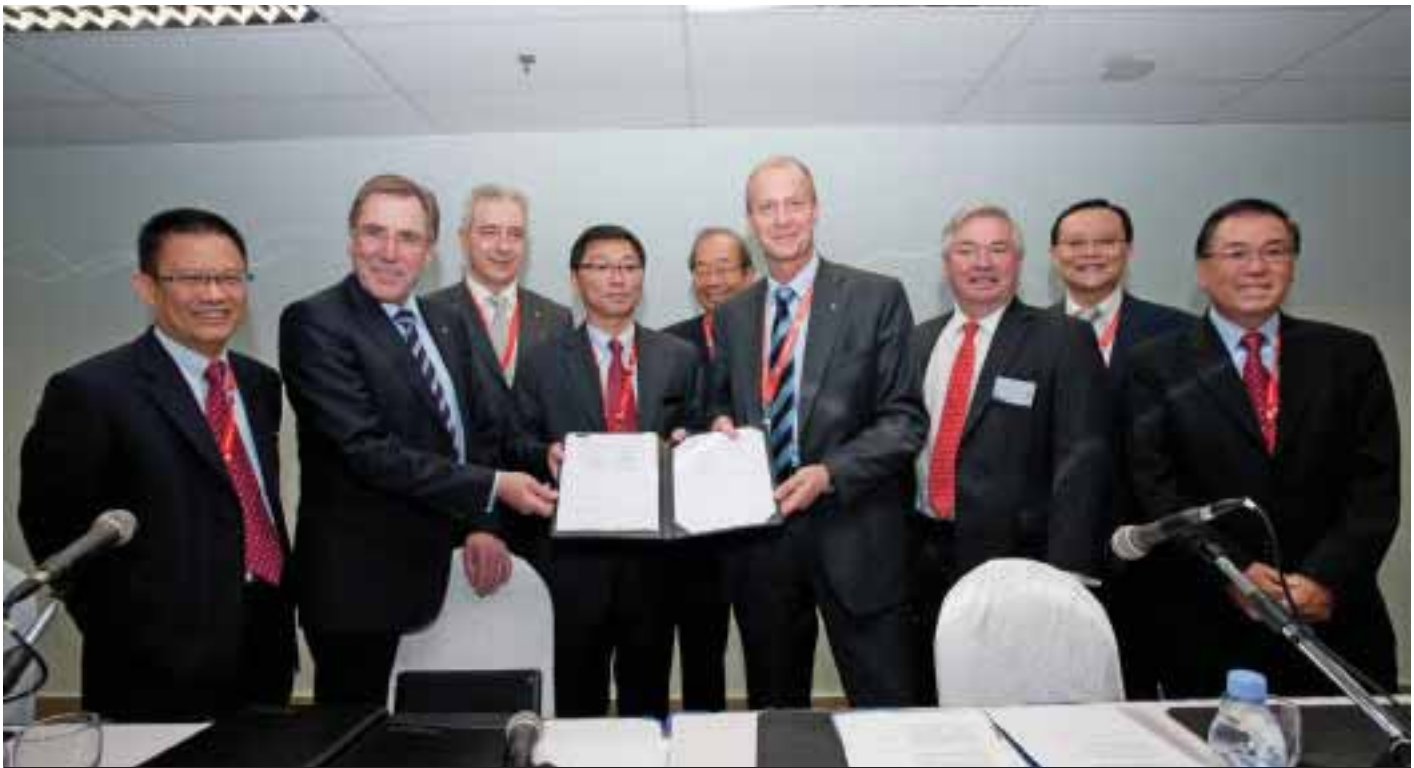

The February 2012 A330 P2F conversion programme MoU was signed by Chang Cheow Teck, president of ST Aerospace; Tom Enders, president and CEO of Airbus and Andreas Sperl, CEO of EADS EFW; in the presence of Stanislaw Tillich, Prime Minister of German's Federal State of Saxony.

What does it take to convert a passenger aircraft into a freighter?

THE CONVERSION PROCESS is a time consuming affair. First, the aircraft's interior is stripped to the bare airframe structure and all structural and system components that are no longer needed, such as seats or floor structures, are removed. A large section of the fuselage is then removed for the installation of the main deck cargo door. This is not limited to the door aperture but requires cutting open a much larger area of the fuselage to accommodate reinforced frame shells around the door opening.

The complete main deck floor structure, including crossbeams, is replaced with a reinforced construction to withstand cargo loads that can exceed six tonnes (13,000lb) per container. This also involves exchanging the original fuselage frames in the lower lobe, which support the crossbeams via vertical struts.

Once the new airframe structure is complete, the cargo loading system is installed on the main deck. Windows are plugged and passenger doors de-activated. After the fuselage is insulated again, new ducting for the air conditioning, cargo liners and the electrical system are fitted, including a fire detection and protection system. A courier area is installed behind the cockpit, which may be separated from the cargo section by a barrier wall or safety net and smoke curtain. Finally, the cockpit equipment and avionics are re-installed.

Some of the main challenges involved in a conversion programme include modifying the aircraft without adding excessive weight that would compromise its payload and range capabilities; distributing any additional structural weight as evenly as possible to maintain the centre of gravity within an optimal range and to ensure that the aircraft can assume the most favourable attitude in flight; and achieving a high degree of standardisation which will appeal to the broadest range of customers. Any customisation at a later time will increase costs and will have to be paid by the customer as an additional expense.

A300-600 is under on-going conversion in Turkey, in co-operation with MNG.

But most Airbus aircraft are converted by EADS EFW (Elbe Flugzeugwerke), which is the "centre of competence" for the conversion of Airbus passenger aircraft into freighters within Airbus parent company EADS. Since 1996, A300 and A310 aircraft have been converted into freighters at EFW in accordance with a concept developed by the former DaimlerChrysler Aerospace Airbus, now Airbus Deutschland.

A330 P2F programme

EADS EFW has recently launched plans for an A330 P2F cargo conversion programme, in which it is collaborating with Airbus and ST Aerospace. ST Aerospace will lead the A330P2F engineering development, working with Airbus and EADS EFW who will subsequently be responsible as programme lead during the industrial phase. Most of the conversions will take place at EADS EFW facilities in Dresden, Germany, with the potential for additional capacity at ST Aerospace.

The A330P2F programme includes both the A330-200 and the larger A330-300. The companies say that the A330-300P2F programme will be particularly suitable for integrators and express carriers "thanks to its high volumetric payload capability with lower-density cargo". Meanwhile, the A330-200P2F will be optimised for "higher-density freight and longer range performance".

Entry-into-service for the first A330-300P2F is targeted for 2016. According to EADS, the A330P2F programme "will also enhance and sustain A330 family residual values by extending the economic lives of A330 airframes. The A330 family already includes the newbuilt A330-200F, but not yet an A330-300F."

"The strong demand from airlines for a programme to convert used A330s from passenger configuration into an attractive freighter is clear," says Tom Williams, EVP of programmes at Airbus. "Together with ST Aerospace and our sister company EADS EFW we have the perfect partnership to bring efficiency, reliability and profitability to our operators."

Netz also believes the three companies can be a "winning team" with this offering. "The converted A330-200 may attract airlines which operate the A330-200F, [but] the A330-200 will not appeal to the integrators," he says. "The converted A330-300 will make a good freighter and will have its market."

Airbus' latest global cargo aircraft market forecast provides some insight into the thinking behind the project. The manufacturer sees demand for a total of 2,731 cargo aircraft over the next 20 years, with 834 new build aircraft and 1,897 conversions. Moreover, Airbus says a large amount of this demand will come in the mid-size freighter market — a total of 1,327 units, with about 900 conversions. In addition, 570 aircraft will be replaced in the mid-size market, according to the company.

With the new-build A330-200F the only Airbus aircraft in this sector, a A330P2F programme makes logical sense. In time, the converted A330-300 could replace, if only indirectly, current programmes such as the DC-10, and Airbus' own A300 and A310 freighters.

The low cost freighter?

Another speculated candidate for a P2F programme is the A340, given that some lessors have noted that A340s possess poor residual values and thus feedstock would be available. However, Airbus has so far given no firm indication a full-scale P2F programme is on the cards.

Moreover, a number of obstacles remain, not least the sheer cost of building such a programme. Netz sees only a narrow niche for a dedicated freighter, carrying 60-70 tonnes to 5,000nm, for the A340-300. "Most operators on this range prefer larger freighters that can carry higher payloads," he explains. "For the medium widebody freighter, there is a wider niche that does not require the A340-300 long range. The A340-300 high OEW, with the extra two engines, does not have any advantages over freighters such as the A330-300 or 767-300ER. Therefore, considering the conversion cost involved, I don't think that a conventional P2F A340-300 will be attractive to the market."

But there could be an alternative, he notes, that would come at a much cheaper price. LCF Conversions, in conjunction with their design and certification team, ACE Corp, of Seattle, have introduced a new concept to the conversions market – the so-called 'Low Cost Freighter' (LCF).

"The LCF concept loads cargo on conventional pallets and containers (including 96 x 125 inch ULDs) through the existing lower deck cargo doors of widebody aircraft," explains Netz. The cargo is then moved to/from the main deck by two Main Deck LCF Platform Lifts. "The A340-300 can be a model particularly well-suited to the LCF concept. Considering the attractive cost of the aircraft and the conversion of the A340-300 LCF it will be demanded by some operators," he predicts.

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

The success of the LCF idea remains to be seen, but Netz is sure that a traditional P2F programme on any aircraft type would be impossible without aircraft OEM support. "As for the future,

ANA was the launch customer for the 767-300 Boeing Converted Freighter.

An Aeroflot Cargo MD-11 Boeing Converted Freighter.

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in my opinion, the conversion of modern aircraft (such as the A330, 777) is a technological challenge. Without the OEM support it will be almost impossible to overcome or too costly and uneconomical," he explains.

Company developments

Meanwhile, Israel Aerospace Industries (IAI) Bedek Aviation Group, in addition to its successful 767-200BDSF and 747-400BDSF widebody conversion programmes, sees a good market for the 767-300. The company set up a 50-50 joint venture with Mitsui to perform conversions of the aircraft type from passenger to special freighter configuration, called M&B Conversions, located in Ireland.

With more 767-300s in service than any other aircraft in its class, IAI Bedek sees "increasing numbers of 767-300s [being] retired from passenger service, [while] the cargo conversion market will see a steep increase in eligible aircraft". The company has set a conversion target of 80 to 100 aircraft in 10 years. There are currently eight in fleet service, with two more on order and an undisclosed number of options, according to IAI Bedek figures. "The 767-300BDSF conversion, with the same concept and similar design, follows in the footsteps of the successful 767-200 conversion," the company states.

And in Asia, HAECO group is making a name for itself as one of the leading conversion centres in the region. With its STC partners, the company provides freighter conversion services on 747 — as well as 737 and 757 — aircraft. Subsidiary TAECO has successfully delivered about 40 747-400BCFs to Boeing and the manufacturer's customers. "The 747-400BCF is a mature project, both Boeing and the customers are satisfied with the stable quality and on time performance delivered by TAECO," says Jiang.

She adds that some of these customers have contracted TAECO for heavy maintenance and modification work as a result. Looking to the future, Jiang states: "TAECO's experience on 747-400, 757 and 737 cargo conversion will put it in a stronger position for new aircraft type conversion. The candidates for widebody aircraft conversion might be the 777, A330 and 767."

Whatever comes next for the widebody market in general must surely be an improvement on the struggles of recent years.