

AEI close to STC for MD-80 p-to-f conversion & launches CRJ freighter modification

AEI has completed flight testing its freighter-modified MD-80, and the STC should be issued before the end of 2012. It has also just launched a programme for a freighter modification for the CRJ-100/-200.

Aeronautical Engineers Inc (AEI) has completed the final Federal Aviation Administration (FAA) flight test for its MD-80SF passenger-to-freighter conversion programme. Robert Convey, vice president sales and marketing at AEI, says that the company hopes to receive its supplemental type certificate (STC) by the end of November 2012. Work on the first production aircraft, destined for USA Jet, will start soon afterwards. "Conversion time is expected to be 75 days," says Convey. "We will do two nose-to-tail conversions, one after the other, before moving to three production lines." The conversion price for the MD80 will be \$2.35 million per aircraft, and AEI says that it has close to 20 firm orders for the type. The prototype aircraft will be delivered to launch customer Events Air Cargo.

The conversion programme will cover the MD-81, MD-82, MD-83 and MD-88 variants. In total there are 779 of these types in passenger configuration, including 546 active aircraft. About 70% of these aircraft are located in the US. The AEI MD-80SF programme will not include the shorter-fuselage MD-87.

The converted freighters will be fitted with an 85-inch X 136-inch main deck cargo door, and be capable of accommodating 12 88-inch X 108-inch X 78-inch containers or netted pallets. This will provide 4,536 cubic feet (cu ft) of

volume. Alternatively it will be possible to accommodate eight 125-inch X 88-inch or 125-inch X 96-inch longitudinally-oriented unit load devices (ULDs), although there are currently no containers available with the profile to match the MD-80's fuselage. Subsequently an eight-position configuration would need to use netted pallets for the first few years of operation while the correct ULDs are manufactured.

Convey believes that the MD-80 family has attributes that make it a prime contender for the converted freighter market. "They are robust airplanes with a low market value. I think that we will convert over 200 and eclipse the number of 727 freighters we processed."

The MD-80 has several economic advantages over the alternative 737-300/-400. The first is that a serviceable MD-80 can be acquired for \$1.0-1.5 million, with the airframe and both engines in an approximate half-life condition. Some older aircraft could be acquired for less than \$1 million. The large number of aircraft already retired means that there is a glut of components, engines and engine parts available on the aftermarket.

With the list price for conversion taken into consideration, a MD-80 freighter could be put into service for less than \$4 million.

The MD-80's JT8D-200 engines also have shop visit reserves that are about

\$80 per engine flight hour lower than those of the CFM56-3. With the large number of parts and engines on the market, it would be possible for operators to minimise engine management and maintenance costs. The MD-80 and 737-300/-400 have similar reserves for base maintenance, however. The MD-80 has a durable airframe, so it should have a long operational life ahead of it.

The MD-80's main disadvantage is that its fuel burn is about 15% higher than the 737-400's.

Dugan Kinetics EP-80

The passenger-to-freighter conversion is not the only MD-80 series modification on the market that might potentially extend the type's lifespan. Dugan Kinetics has developed a modified thrust reverser for the aircraft, the EP-80. This offers a new in-flight thrust reverser stow position. The thrust reverser then acts as an ejector during flight providing additional thrust. "The new leading edge of the ejector door is the most prominent contributor to suction efficiency," says John Dugan, manager at Dugan Kinetics. "The inlet and exit nozzles were permanently adjusted to provide the ideal mass flowpath that could be achieved without having to redesign the reverser doors.

"Take-off, climb and hold are the



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The MD-80 has many attributes that make it attractive for conversion to freighter. These include a low market value, and low and stable base airframe and engine maintenance reserves.

stages of flight when the ejector is highly efficient,” continues Dugan. With no additional weight penalty, Dugan estimates that this could result in a total flight fuel saving of 5-10%. Dugan also claims that the performance enhancement could extend engine life, as operators will have the option to use reduced engine pressure ratio (EPR) or throttle settings in order to achieve the necessary thrust levels. “The EP-80 is offered as an exchange for OEM thrust reversers, and can also be field-installed on-wing,” says Dugan. “You will need a minimum of six man-hours (MH) to perform a field replacement,” he adds. The EP-80 is certified by the European Aviation Safety Agency (EASA) and FAA for all MD-80 family models.

CRJ-200LCD

In addition to developing a passenger-to-freighter conversion programme for the MD-80, AEI has announced plans to explore market interest in a large cargo door (LCD) passenger-to-freighter conversion programme for the Bombardier CRJ-100 and -200 family under an agreement with Bombardier Aerospace.

Convey says that although the CRJ-200LCD programme has yet to be formally launched, he expects this to happen in the near future. “We would like to start the prototype process in January 2013 and have a product ready to go by the first quarter of 2015.”

Convey adds that the programme would be initiated on a speculative basis without an official launch customer, but is not concerned about demand. “Within six or seven hours of the press release about this concept going out I had received over 100 positive responses from operators, leasing companies and investors. It was at this point that we decided to commit to the programme,” adds Convey. AEI estimates that it will have more than 30 firm orders for the freighter by the time the programme is officially launched.

CRJ-100s and -200s meet various criteria that AEI consider vital for a freighter conversion programme to be cost effective. “The combination you need is a type that has been produced in large numbers, with low airframe value,



so that essentially the aircraft is only worth as much as its engines,” says Convey. “You then need to consider how much the aircraft can hold and how far it can fly.”

There are 816 CRJ-100 and -200 aircraft in passenger configuration on a global scale, with 659 listed as active. The majority operate in the US. The CRJ-100 or -200LCD freighter would have a maximum payload of 6.7 tons and a cabin volume of 1,864 cu ft. There will be an eight-position 60-inch X 83-inch X 66-inch ULD option providing a usage volume of 1,430 cu ft. The aircraft would be fitted with a 94-inch X 77-inch cargo door, and the target conversion price is \$1.5 million per aircraft.

CRJ-200PF

An alternative approach to CRJ-100 and -200 freight conversions is already on the market. Designed by Cascade Aerospace in Canada, the CRJ-200PF package freighter (PF) kit contains parts, modification instructions, technical publications and airworthiness certification required to implement third-party conversion of CRJ-100 or CRJ-200 aircraft from passenger to Class E PF configuration. This conversion provides a freighter without a large cargo door, so that freight is loaded on mail bags and other loose items.

Excluding the removal of interior fittings, this modification is designed to require about 2,500MH to complete. The resulting freighter has a maximum payload of 6.8 tons and a volume of

1,765 cu ft. Since the PF kit was first offered in 2007, eight have been sold, with five currently installed. Cascade Aerospace says that there is no requirement to be specially licensed to carry out the conversion.

Market potential

“We have always thought that there is a strong market opportunity for CRJ-100 and -200 freighters,” says Delio Petohleb, director of sales, asset management group, Bombardier Commercial Aircraft. “We see the PF and LCD variants as complementary programmes. The PF is a cost-effective solution for those who have time to load packages by hand. The LCD conversion, with its ability to carry custom-built ULDs, would offer quicker turnarounds and interlining opportunities,” adds Petohleb.

Potential competition for CRJ-100 and -200 cargo conversions might come from existing, large turboprop freighters, such as the BAE ATP, ATR72 and Convair C540. Petohleb sees the Bombardier aircraft more as filling a niche between existing narrowbody jets and large turboprops. “CRJ-100 and -200 freighters can operate longer stage lengths more quickly than older generation current turboprop freighters. They could be suitable for longer, thinner routes that have never been served before.” **AC**

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