

Market forecasts predicted conversion of up to 800 turboprop freighters over 10 years. The turboprop freighter fleet has changed little in two years, and most regional freight carriers show few signs of making plans to upgrade their aircraft. A few conversion programmes have got under way.

Developments in the turboprop freighter market

The market for turboprop freighters has already been examined by this publication (see *Can turboprop freight conversions prevent a glut of used passenger aircraft*, *Aircraft Commerce*, April/May 2001, page 36). It was expected that growth in small package traffic would stimulate the conversion of about 850 aircraft in the next 10 years. Two years on we analyse the fleet changes that have taken place among the larger turboprop freighter operators, and conclude that the market is growing, but slower than predicted.

North America

Many North American regional freight operators have single-type fleets of older generation aircraft, and have made no plans for their replacement. For example, Air Cargo Carriers remains a dedicated Shorts 330 and 360 operator.

Airnow continues to operate 14 Embraer Bandeirantes, and Kelowna Flightcraft remains the world's Convair specialist with a fleet of 11. Phoenix Air continues to operate a fleet of converted Gulfstream I turboprops, and Zantop International Airlines owns a fleet of 13 Lockheed Electra freighters, although only three are operational.

Some operators have added modern aircraft to their fleets. With the exception of FedEx, these are smaller 2-4 tonne aircraft. Alpine Air's single-type fleet of 17 Beech 99s has been supplemented by 15 Beech 1900Cs.

Ameriflight introduced three Embraer Brasilias at the end of 2000 to complement its 50 Beech 99s, 11 Beech 1900Cs and 40 Fairchild Merlin/Metros (see table, page 42). The Brasilia fleet was expected to expand, but in these three are the only examples in service. Ameriflight's other fleets has remained largely

unchanged, the only additions being two Beech 99s acquired from Raytheon Aircraft. Similarly, Corporate Air was taking delivery of five Embraer Brasilias in 2001, but no more have been added. The Brasilias replaced two Beech 1900Cs and two Fairchild Metros, but otherwise the only change to the fleet has been the addition of two more Beech 99s.

Much of this lack of activity can be blamed on the overall state of the economy.

The only exception is FedEx, which owns 32 F.27s operated by Empire Airlines and Mountain Air Cargo. The replacement of these aircraft has been under consideration for a number of years, with FedEx announcing a decision in favour of the ATR42. FedEx is buying eight from Continental Airlines. This is likely to be the forerunner of a larger order as the F.27s are retired.

Europe

The European operators have a bias for aircraft in the 4-6 tonne category. The exception is Atlantic Airlines in the UK, which is a specialist operator of the 15-tonne Lockheed Electra. The airline has added two more, which increases its fleet to 11, of which seven are currently active. The 'new' additions were originally built in 1959 and 1961.

BAC Express has increased the size of its Shorts 360 fleet from seven to 13 examples, with one additional aircraft leased from sister company BAC Leasing, one from AeroCentury, one from Aerocondor and three from Lynrise (two former Farnair Germany freighters and one ex-Loganair passenger aircraft). The F.27 fleet has increased from three to four by the return of one aircraft leased to Channel Express. The airline had been looking to add BAE ATPs, but the events of September 11th stalled these plans.

Channel Express has retired two of its three Lockheed Electras and returned a fourth leased aircraft to Atlantic Airways, since the airline has introduced 737-300QCs. The F.27 fleet is reduced by one aircraft. Most recently the airline has been wet leasing a Brasilia from Air Omega.

Emerald Airways has acquired smaller operator Streamline Aviation. In 2001 Emerald had a fleet of 14 HS.748s and Streamline had two Shorts 330s and three Shorts 360s. Emerald subsequently acquired two Shorts 360s of its own prior to the acquisition of Streamline, which also added four more Shorts 360s to its fleet. The combined fleet is now 14 HS.748s, two Shorts 330s and nine Shorts 360s (see table, page 42). The additional Shorts 360s were previously operated by passenger airlines Aer Arann, British European and Swedeways.

The Farnair Group operated through four airline companies in Switzerland, Germany, the Netherlands and Hungary. The German operation has ceased. The fleet comprised 12 F.27s and 11 Shorts 360s.

The company has been re-launched as an independent operation with two of the old fleet Shorts 360s under its former title, Express Airways. All 12 F.27s remain in service with the group's remaining three operators, but the ATR42/72 has been selected as its eventual replacement.

Farnair Europe was the launch customer for the full freighter conversion programme for the ATR42. The large freight door installation was subsequently cancelled. Farnair subsequently became the launch customer for the ATR72 full freighter, which is the sole example of an ATR with a large door installed.

Swiftair operates nine Convair 580s for DHL, but three Embraer Brasilias are on the market. The Metro/Merlin fleet has been reduced from eight to four.



WDL Aviation operates 12 of the 16 E.27s operated two years ago.

West Air Sweden had three ATP freighters in 2001, and eight more aircraft have been converted to freighters. Seven are equipped with class E interiors, and one has the large cargo door. The HS.748 fleet has been reduced from 11 to nine. Westair has also purchased French Air Provence and its two HS.748s.

Market developments-2t

The Fairchild Metro remains the most popular small freighter, but there has been an increase in number of Beech 1900s. Raytheon has taken older Beech 1900s in exchange for new production 1900Ds. With over 100 Beech 99s in service as freighters, Raytheon has an opportunity to place its stockpile of redundant 1900s in the freight role.

Market developments-4t

The Embraer Brasilia is leading the market among the latest generation of turboprop freighters. BAE Systems, de Havilland Canada and Fairchild Dornier have failed to launch programmes for the Jetstream 41, Dash 8 and Dornier 328. Saab has a conversion programme for the Saab 340, but does yet have a launch customer.

There are two Embraer Brasilia conversion programmes on offer. The first is by Worldwide Aircraft Services, USA. This was originally sponsored by Bombardier to assist in the disposal of the many Brasilias it had taken in trade.

The second is the official Embraer conversion sponsored by the International Airline Support Group (IASG).

Snow Aviation has also recently commenced a third for the Saab 340, which will install a large freight door in the rear fuselage.

In 2001 there were 18 Brasilia freighters either in operation or on firm order. In the US, operators comprised Ameriflight (3), Corporate Air (5) and North South Airways (3). Elsewhere operators were restricted to Spanish operators Ibertrans (2) and Swiftair (5).

Expansion of the Brasilia fleet has been limited to Air Omega. The three North South Airways aircraft, one of the Corporate Air aircraft, three of the Swiftair fleet and two additional Bombardier-owned aircraft, converted speculatively, are all on the market.

Even IASG, one of the main proponents of the Brasilia for the freight role, has lost its enthusiasm. The company expanded into aircraft leasing. Despite the availability of the freighter supplemental type certificate (STC) from Worldwide Aircraft Services, IASG sponsored the development of a freighter modification with Embraer. Development was undertaken using one of IASG's aircraft and an order for 10 modification kits, plus options on 10 more, launched the programme. IASG acquired Diamond Aviation (subsequently renamed North South Airways) to operate them. Ultimately the fleet grew to a total of six Brasilias, but they are all on the market.

The slow pace of operators taking up these aircraft is hardly because of a lack of aircraft availability. Comair and Continental Express in the US have retired the type, while Atlantic Southeast Airlines has started to. The current status of these larger fleets can be seen (*see table, page 42*). In answering our previous article's question 'Can

FedEx has acquired eight ex-Continental Express ATR42s. This is one of few major acquisitions of turboprops for freighter conversion in the past two years. Aeronavali still predicts 300-400 ATRs will be converted over a 20-year period.

turboprop freight conversions prevent a glut of used passenger aircraft?' The answer is clearly no, since the number of Brasilias converted into freighters is four times less than the number withdrawn from use.

The closest competitor to the Brasilia is the Saab 340, but Saab is still searching for a launch customer. One reason behind Saab's failure to penetrate the freighter market is its success in the passenger market. Until recently few Saab 340s were available, allowing the Brasilia to gain an advantage. Saab Aircraft Leasing still predicts a market for the conversion of 3-5 aircraft a year, even without a commitment from a major operator such as FedEx.

The Shorts 360 continues to thrive. As well as the expansion of the fleets of BAC Express and Emerald in the UK, Puerto Rican operator Roblex has built up a fleet of five aircraft since 2000.

The popularity of the Shorts 360 is demonstrated by the high proportion of aircraft operated in the freight role. Of the 165 aircraft built, only 113 airframes, of which 53 are currently flying, are in freight service. A further seven ex-Farnair Germany Shorts 360s are immediately available and represent competition to the Brasilia and Saab 340.

There are several factors behind the apparent lack of enthusiasm for the new generation aircraft. Against the Shorts 360, the only significant advantage they offer is speed. Compared with the 200 knot cruise speed of a Shorts 360, the Saab 340A can manage 270 knots and the Brasilia over 300 knots.

Unfortunately, speed alone is of little advantage to freight, and freighter utilisation is historically very low. Most freight aircraft fly only one rotation each night, and there is therefore little opportunity to use higher speed to fly multiple rotations and increase utilisation.

Payload capability of the three aircraft is similar at about 4 tonnes, although the Shorts 360 has a greater volume. The Brasilia and Saab 340 have smaller freight doors and higher acquisition and conversion costs. A good Shorts 360 can be acquired for \$750,000-1,000,000 and can be converted into a Class E freighter for about \$50,000. A Brasilia or Saab 340A will cost \$1,500,000 with an additional conversion cost of \$150,000-250,000.

TURBOPROP FREIGHTER FLEET DEVELOPMENTS 2001 TO 2003

Year	2001	2003
North America		
Air Cargo Carriers	25 Shorts 330/360	23 Shorts 330/360
Airnow	14 Embraer 110	14 Embraer 110
Alpine Air	17 Beech 99	18 Beech 99
Ameriflight	46 Beech 99	48 Beech 99
	11 Beech 1900C	11 Beech 1900C
	40 Metro Merlin	40 Metro Merlin
	3 Embraer 120	3 Embraer 120
Corporate Air	2 Shorts 360	2 Shorts 360
	3 Shorts 330	3 Shorts 330
	1 Embraer 120	5 Embraer 120
	5 Metro 1900C	3 Metro 1900C
	2 Metro III	6 Beech 99
	4 Beech 99	
FedEx-Empire & Mountain Cargo	32 F.27	32 F.27
Kelowna Flightcraft	15 CV580	11 CV580
Phoenix Air	14 Gulfstream I	14 Gulfstream I
Zantop Airlines	13 L188	13 L188
Europe		
Atlantic Airlines	8 L188	11 L188
BAC Express	7 Shorts 360	13 Shorts 360
	3 F.27	4 F.27
Channel Express	8 F.27	7 F.27
	4 L188	1 L188
Emerald Airways	14 HS748	14 HS748
		9 Shorts 360
		2 Shorts 330
Farnair	11 Shorts 360	2 ATR42
	12 F.27	1 ATR72
		12 F.27
Swiftair	8 Metro Merlin	4 Metro Merlin
	3 Embraer 120	5 Embraer 120
	9 CV580	9 CV580
WDL Aviation	16 F.27	12 F.27
West Air Sweden	11 HS748	9 HS748
	3 BAE ATP	8 BAE ATP

Market developments-6t

Compared with the market for smaller aircraft, the six-tonne market is far more straightforward to predict, since there is already a large fleet of older generation aircraft in service. The F.27 in particular is the principal type with over 80 in operation, all of which will ultimately require replacement. Despite the F.27's success, a freighter conversion for its successor, the Fokker 50, has only recently been launched by Aircraft Conversions of the Netherlands. Few details are known, but the modification will be based on an existing STC for the F.27, and the company claims Italian F.27 operator Miniliner as launch customer.

As the only other aircraft in the 6-tonne class, and benefiting as it does from both an existing freight door and the support of ATR Asset Management, the ATR42 is slowly dominating the 6-tonne market.

So far operators comprise Farnair Switzerland (2), Rossair (2) Solenta Aviation (4) and Venescar International (3), the latter three operating the aircraft

for DHL. In second place behind the Brasilia among the new generation freighters, the ATR42's selection by FedEx as the replacement for its fleet of ageing F.27s almost certainly guarantees that it will move into first place.

The ATR's success is deserved since it is the only manufacturer fully supporting its freighter programme. This is a direct result of ATR's continued production of new turboprops, since it needs to find new homes for the many older generation aircraft that will be taken in trade.

FedEx's selection of the ATR42 is a repeat of Fokker's placement of the F.27s with FedEx in the first place. Of the total fleet of 32 F.27s, 20 were acquired from Fokker in 1988 which in turn had taken them in trade against new Fokker 50s from SAS and Malaysian Airlines System.

FedEx's selection of the ATR42 was expected, but it was not made without an extensive analysis of all the alternatives, including the BAE ATP and Fokker 50.

An important selection criterion for the F.27 replacement was the availability of large numbers of aircraft for future conversion, and this presumably excluded

the ATP.

FedEx appears to have given up on the idea of containerisation on this class of freighter, since these aircraft will not be fitted, initially at least, with the large freight door. Earlier the ATR42 large freight door conversion was dealt a blow when launch customer Farnair chose to operate the aircraft with a simple E class freight conversion utilising the existing baggage door for loading. Despite this and the FedEx setback, Aeronavali is installing the door on an ATR42.

Confidence in the ATR42's future as the dominant 6-tonne freighter is further demonstrated by the number of conversion programmes on offer. As well as the ATR-sponsored Aeronavali programme, which is available with or without the large freight door, there are two other conversions available. French company Aero Conseil has a STC for a freighter conversion which is used on the Solenta Aviation aircraft, and ExelTech of Canada has partnered with Comtek of the USA to offer a conversion programme.

Market developments-8t

The larger capacity market is between the ATR72 and the BAE Systems ATP. Since our last examination of this market in 2001, large freight doors have been installed on both aircraft but customers are scarce. There are six ATR72s flying in freighter configuration, of which only the Farnair aircraft has the large cargo door.

Four of the remaining aircraft are owned by Europe Airpost (a subsidiary of the French post office) and operated on its behalf by Airlinair. The final aircraft is operated by Air Contractors of Ireland. A seventh conversion was operated by Transasia Airways of Taiwan, but this was lost in an accident in December 2002.

Farnair was the launch customer for the full freighter conversion programme for the ATR72 with an order for a single conversion. At the announcement of its recent re-organisation Farnair announced 'plans to build up a fleet of 20 ATR72s over the next four years'. This appears somewhat optimistic given that the type is still in relatively short supply and therefore expensive.

No further commitments have been made, although Northern Air Cargo of Alaska is rumoured to have ordered two conversions from Aeronavali with options on a further two. If confirmed, these aircraft would commence the replacement of the operator's fleet of 12 1950s vintage Douglas DC-6s.

So far the ATP has only been selected by Westair of Sweden, but this is the largest operator of new generation freight turboprops in Europe, with eight in service. Further expansion of the fleet at a

rate of four aircraft a year is foreseen. Although Westair partnered BAE in the development of the large freight door, it is significant that only one aircraft has had the conversion to date. BAE Systems has recently announced an agreement with British European Aviation Services to offer an alternative freight conversion.

Market forecast

As the manufacturer most committed to the turboprop freighter market, it is not surprising that ATR is also the only one to publish a market forecast. This predicts an annual growth rate of 6.4% worldwide. Based upon an existing fleet of 1,259 aircraft in the 2–12 tonne category, the forecast predicts a requirement for 483 aircraft over the next 10 years. Of this total, 251 are required to meet market growth and 232 are for the replacement of existing aircraft. ATR foresees a market for the conversion of between 10-15 ATR42/72 aircraft per year.

The biggest sources of potential error in this forecast are that retirements will not occur at the rate forecast and operators will keep their aircraft longer. Nearly 30% of the total fleet of 1,259 aircraft are Antonov 24/26/32 turboprops from Eastern Europe. It is unlikely that their operators will be able to replace a large proportion of this fleet with 'expensive' western equipment.

With the ongoing popularity of the Shorts 360, it is likely that rather than being replaced, the type will provide a significant proportion of the growth capacity in the next decade. A further factor is that with turboprop pricing continuing to decline no one wants to jump in too early. This will only further delay the replacement of old aircraft.

Market reality

Since January 2001 a total of 63 turboprop freighters in the 2-12 tonne category have entered service with freight operators (*see table, this page*).

This does not include outstanding commitments, for example FedEx for eight ATR42s, or any of the Antonov turboprops. It also concentrates on the major operators rather than individual aircraft to smaller fleets. Even so this demonstrates an annual increase of about 30 turboprop freighters in the 2–12 tonne category. Considering the difficult conditions that the air transport industry has experienced since January 2001, the reality of 30 aircraft per year supports the prediction of 50 reasonably well.

Conclusions

Clearly from the fleet changes that have taken place among the major

operators, the rate at which newer aircraft are being introduced is yet to rise to the level first expected. New generation turboprop freighters have only just started to come onto the market, and replacement of older types will be more economic when values of older aircraft fall to acceptable levels. Another major factor for the small numbers of younger aircraft converted in recent years is the fall in freight traffic volumes. Traffic growth resumed in the second half of 2002 and continues, but total volumes have yet to reach 2000 levels. More importantly for turboprop freight operators is the decline in volumes and yields of express packages.

Younger aircraft are being placed with new operators such as Air Contractors, Air Omega, North South Airways and Solenta Aviation.

Despite the best efforts of the Brasilia, the industry standard 4-tonne freighter remains the Shorts 360. The biggest hope for the Brasilia and Saab 340 is as a replacement for the large number of Fairchild Metros currently employed on freight operations, particularly in the US.

There are signs that the market for the older F.27s and HS.748s is drawing to a close. Good examples of the F.27 were almost impossible to obtain two years ago, but now they are virtually unsaleable. None of the major F.27 and HS.748 operators have expanded their fleets, although Horizon Airlines in Australia continues to expand with large freight door-equipped HS.748s.

Miniliner of Italy purchased Air France's fleet of eight F.27-500s and is gradually adding them to its fleet. Among the major operators, Farnair and FedEx have selected the ATR42/72, and Westair the ATP, as replacements. This leaves Emerald Airways and WDL as undecided operators.

Although demand for the older aircraft has died off, this does not mean there has been a significant increase in demand for direct replacements.

It is apparent that European operators in particular have yet to find the ideal replacement. The ATR72 is a favourite choice, since it offers an increase in capacity, although still with a smaller freight door. Demand for the ATR72 from passenger operators ensures a limited supply of aircraft and keeps pricing high. This has pushed operators towards the ATR42, which offers less payload than the F.27-500 or the ATP. There are concerns about support for the ATP and its reliability associated with the small number of aircraft built.

Another restriction on aircraft replacement is a simple lack of financial resources. Virtually every freight operator is privately owned, without the resources or inclination to finance large numbers of expensive aircraft. The only exception is

TURBOPROP FREIGHTERS TO ENTER SERVICE SINCE JANUARY 2001

Airline	Number	Aircraft
Farnair	2	ATR42
Solenta Aviation	4	ATR42
Vensecar Int'l	3	ATR42
Air Contractors	1	ATR72
Farnair	1	ATR72
Westair	5	BAE ATP
Alpine Air	1	Beech 99
Ameriflight	2	Beech 99
Corporate Air	2	Beech 99
Alpine Air	12	Beech 1900
Air Omega	2	EMB 120
Corporate Air	4	EMB 120
Swiftair	1	EMB 120
BAC Express	1	F.27
Miniliner	2	F.27
Six Cargo	1	F.27
Horizon Airlines	2	HS748
BAC Express	6	Shorts 360
Emerald	6	Shorts 360
Express Airways	2	Shorts 360
Roblex Aviation	3	Shorts 360

FedEx, which buys the aircraft and then has them operated by independent airlines. One of the economic benefits of older aircraft is that during a downturn these can simply be left inactive. With newer generation aircraft there are undoubtedly operating cost savings of lower fuel burn and maintenance requirements. However these are only beneficial when the aircraft are actually being flown and their higher financing charges need to be paid whether they are flying or not.

Significantly few of the aircraft have incorporated large freight doors where these have been available. Aeronavali expects to convert 300-400 ATRs over a 20 year period, of which about 40% were expected to be fitted with large freight doors. Of the 18 (11 ATR42s and seven ATR72s) post delivery freighter conversions, only one ATR72 has the large freight door installed.

The similar experience with Westair's ATP conversions (only one large freight door out of eight aircraft) suggests that the take-up of large freight door conversions will be a lot less than 40%. The biggest obstacle is their cost, and FedEx at least appears to have concluded that the \$1 million investment required cannot be justified.

This may change with possible consolidation or reorganisation of express package airlines' air route networks and fleet plans following the decline in express package volumes and yields. **AC**