

Low-density and low-yield regional markets are, not surprisingly, those with low population densities. They almost exclusively use small turboprops. Regional jets are forcing the retirement of mid-size turboprops, which will become available at low values and lease rates. This will make it hard to justify new turboprops or jets.

# Sourcing aircraft for low-density & low-yield regional markets

**T**here are more than 5,000 regional aircraft in operation, at least 4,700 of them being turboprops. Although less than 100 turboprops will be delivered this year, regional jet manufacturers are planning for annual production of about 400 turboprop and jet aircraft. While regional fleets will be increasingly based on jets, there are still low-demand and low-yield markets that will probably only ever operate turboprops. Where are these markets and will they be met by new or used aircraft?

## Developed world

Countries with the lowest population densities are most likely to need to service low-demand routes. Air transportation is the only option. This article concentrates on the 29 Organisation for Economic Co-operation and Development (OECD) countries. These are the 15 nations of the European Union (EU), together with Australia, Canada, Czech Republic, Hungary, Iceland, Japan, Korea, Mexico, New Zealand, Norway, Poland, Switzerland, Turkey and the USA. The top ten of these, excluding Iceland, are examined here in detail.

Analysis of the markets first reveals that all those with low population densities or weak economies almost exclusively operate turboprops, not jets.

This is because of unit operating costs. The issue of aircraft acquisition then becomes one of whether an airline needs to acquire new or used aircraft, and what size is required.

## Australia

Australia is a large operator of 19-30 seat equipment. There are only seven modern generation 50-seat turboprops in Australia. Of about 100 19-seat aircraft, half are older-generation de Havilland Canada Twin Otter, Embraer Bandeirante and Fairchild Metro II/III aircraft.

These should be prime candidates for replacement with the later generation of 19-seat turboprops.

The Dash 8 and Saab 340 are equally popular, with nearly 30 of each. There are only 12 Brasilias with six operators. Embraer has subsequently managed to place a number of used aircraft.

The large regional operators are moving to replace 19-seat aircraft with 30-seaters.

## Canada

Canada has a large number of smaller operators, but an additional factor is Bombardier. The local manufacturer accounts for 51% of regional aircraft operated. The only types to have made significant inroads into what is almost a

captive market are the BAE Jetstream 31, HS748 and Beech 1900D.

The J31's success highlights how performance differences can shape the market, since poor hot and high performance of the type is not as important in Canada as in other global regions.

The other 19-seater to have made significant inroads into the market has been the Beech 1900D, with 38 in operation.

The 30-seat market is dominated by the Dash 8-100. The only other 1980s-generation equipment are four Saab 340s and five Embraer Brasilia's of Air Montreal.

With a ratio of 3:1 in favour of 19-seat versus 30-seat aircraft, Canada is also a large potential market for cost-efficient 30-seaters.

Canada has a large number of 50-seat aircraft. Canada's enthusiasm for the HS748 is such that it remains as popular as the Dash 8-300, each with 26 in operation. The remaining aircraft are all older-generation Convair CV-580, Dash 7 and Fokker F.27 aircraft.

## New Zealand

In many ways New Zealand is a smaller version of the Australian market. It has a similar distribution in terms of seat category, with 37



19-seaters, 17 30-seaters and 10 50-70 seaters.

A number of Saab 340s and J32EPs have been leased. Mount Cook Airlines recently accepted the last of its seven ATR72-500s.

## Norway

Norway is an example of a market that demands high-performance aircraft. There are four Dornier 228 operators and Wideroe is completely equipped with Dash 8s. SAS operates five Fokker 50s. Only Wideroe and SAS operate new aircraft.

Norway has one of the most extensive networks of subsidised air routes in Europe. As with all Public Service Obligation routes, these are put out to tender throughout the EU, Norway and Iceland. The tender requiring the lowest amount of compensation is selected, this being dependent on meeting a minimum specification.

Wideroe recently lost several routes to smaller operators Arctic Air, Coast Air and Guard Air, which all operate 19-seaters in place of Wideroe's Dash 8-100. This demonstrates the importance of low-cost aircraft.

## Finland

Finland is a limited market. Air Botnia was acquired by SAS to compete with Finnair in its home market. Finnair is interesting, because it accessed the used market for ex-Transasia of Taiwan aircraft. The three aircraft acquired took the place of six Saab 340s previously operated.

## Sweden

Although it has a population of less than nine million, Sweden's geography is perfect for air transport. The result is Europe's second largest operator of 19-seaters, behind France. Of the 15 operators that fall into the regional category, 10 operate 19-seat equipment. This situation is changing, with many of them moving into larger equipment. Four airlines have all recently acquired Saab 340s.

Although the country has a high proportion of 19-30 seaters, the most common aircraft are in the 40-70 seat category. The most popular type is the Fokker 50. SAS Commuter operates 20, Skyways 13 and Flying Enterprise two.

Only SAS Commuter has new aircraft. It is the world's largest Q400 customer.

The regional jet has made a limited impression on the Swedish market, with Skyway's acquisition of four Embraer ERJ-145s. However, these have been concentrated on international operations. Domestic operations centre on a continually expanding fleet of used Fokker 50s.

## USA

The USA has a very concentrated regional airline network with all sizeable operators affiliated with, or owned by, one or more of the major airlines.

Based on announced fleet replacement plans, these operators are likely to be almost completely regional jet-equipped by the second half of the decade.

This will result in the availability of a

*Many of the world's low-density markets operate 19-seat turboprops, such as the Metroliner and J31/32. Retirement of large numbers of 30-seat turboprops from large US regionals will reduce their values and lease rates and they will replace these small turboprops.*

large number of 1980/90s generation turboprops. Most significantly these are ATR42s, BAE J32s, Beech 1900Ds, Embraer EMB-120s and Saab 340s.

Since the USA lacks the secondary tier of operators that would be natural candidates for these aircraft, the majority of the 19-seaters will undoubtedly be exported. The larger aircraft will filter down to take their place among the US operators.

Despite perception of jet dominance, large-scale scheduled passenger operations with 19-seater aircraft are still centred in the USA, with large fleets of the Beech 1900D and the J32 in particular. In fact, the largest operators of 19-seat equipment are all US operators.

The future for these aircraft is going to be a challenge for their current owners since of these 10 operators, ACA, Trans States, Mesa and Continental Express, have announced their intention to phase out this class of aircraft from their operations.

These fleets are not under threat from the regional jet, as much as from the availability of cost-effective used 30-seat turboprop equipment. As EMB-120s and Saab 340s are replaced with regional jet equipment, large numbers are becoming available. The widespread introduction of regional jets has hit the EMB-120 particularly hard. Brasilia operators ASA, Comair, Continental Express and Skywest, are the most ardent supporters of the regional jet. The US maintains a fleet of 106 Brasilias, but this is well below its peak level of nearer 250.

Saab Aircraft Leasing, in particular, is targeting the 19-seat replacement market. Chicago Express Airlines has recently committed to nine ex-American Eagle Saab 340Bs and Chautauqua is replacing its J31s by expanding its Saab 340A fleet.

In terms of trip operating costs, the 30-seaters are moving ever closer to the 19-seaters. Since weight-related charges are pretty irrelevant in the USA, the largest cost variable between different-sized aircraft is acquisition cost, fuel and maintenance.

Flight crew costs will not change if 30-seaters replace 19-seaters. There will be an additional for a cabin attendant, which is not required on aircraft up to 19 seats.

Assuming a typical net yield of \$50, then a 30-seater at a lease rate of

*The US market has been fundamentally changed by regional jets. Acquisition of these will cause a trickle-down effect of large turboprops replacing older and smaller ones. This will start with types such as the Saab 340 replacing 19-seat turboprops.*

\$30,000/month will break even with only a couple more seats filled than the 19-seater at a lease rate of \$15,000. The larger aircraft though will have 11-15 more seats on which to make a profit.

Since lease rates of the 19-seaters will fall in parallel with those for 30-seaters, the 30-seaters' cost per seat advantage will tend to increase.

As the fleets of BAE J32s and Beech 1900Ds are replaced, it will be natural for them in turn to replace the older-generation, BAE J31, Beech 1900C and Fairchild Metro.

These earlier aircraft will then be moved on into the smaller operators as replacements for the even older Twin Otters and Bandeirantes as well as smaller aircraft. Unfortunately for BAE, no such market exists for the J32, since although it would be a natural replacement for the J31, most J31s have already given way to either J32s or other aircraft types.

The only major US J31 operators are Chautauqua and Chicago Express Airlines, both of which have ordered Saab 340 aircraft as replacements.

In an earlier round of disposals, BAE Asset Management successfully placed 75 J32s returned by American Eagle. US-based scheduled operators were important customers, accounting for 40 aircraft. If the USA is no longer going to have demand for 19-seater aircraft then owners are going to find it a struggle to find new homes for them.

One reason for the USA's continued need for 19-seat equipment is the Essential Air Service (EAS) programme. This subsidises airlines to serve about 100 rural communities. Most smaller independent carriers participate in the EAS programme. A further 30 communities in Alaska are covered by EAS.

Demand for 50-seat turboprops was never large. Of the 490 40-70 seat aircraft in the USA, 328 are CRJs and ERJ-145s. The only other significant type is the ATR family, with 72 ATR42s and 67 ATR72s.

The ATR72 is relatively safe since it is operated by American Eagle and Atlantic Southeast Airlines.



The situation with the ATR42 is less positive, since the main operators are American Eagle and Continental Express. American Eagle has taken delivery of 50 ERJ-145s and the first 20 out of 95 ERJ-135s. The remaining ERJ-135s could replace either the airlines' Saab 340Bs or ATR42s. Continental Express has announced plans to have an all-jet fleet by 2004.

## Mexico

The Mexican market is dominated by two operators: Aerolitoral and Aeromar. Between them they operate more than half the regional aircraft in the country.

Aerolitoral operates the world's largest fleet of passenger-configured 19-seaters outside the USA, with 24 Metro III/23s. It began their replacement with used Saab 340Bs. This is a demonstration of the natural follow-on market for the 30-seaters as they are being replaced. Aeromar operates a fleet of 14 ATR42s. All but two of these were delivered new from the factory.

The remainder of the Mexican market is made up of older-generation equipment.

## Spain

Spain has 82 19-70-seat regional aircraft. Fifty are Fokker 50s, ATPs or ATR72s with just three operators. Two of these, Air Nostrum and Air Europa Express, have built up large, single-type fleets of used Fokker 50s and ATPs, respectively. Both have experienced dramatic growth since they started in 1995/96. It was, however, something of a surprise to see Air Nostrum order 29 Dash 8-300s.

Air Nostrum has obviously been able to structure a deal for new aircraft, which, through economies of scale, matched the costs of used aircraft. Binter Canarias is the third largest operator with a fleet of 11 ATR72s.

## South America

Outside of the OECD nations the largest market is undoubtedly in South America. Most importantly, the region could be the saviour of the 19-seat market. This region accounts for 300 aircraft in this category. These consist of Embraer Bandeirantes, Twin Otters, Metro's and Dornier 228s.

Good airfield performance should be a significant advantage for the Beech



1900C and 1900D. BAE has been more successful since developing its J32EP (Enhanced Performance) modification with aircraft placed with three operators in the region, Aerocaribe of Mexico (six aircraft), AeroVIP of Argentina (six) and LAER also of Argentina (four).

## Summary

Analysis of low-density markets reveals that there are several which operate predominantly 19-seat turboprops. These include Australia, Canada, Sweden, Mexico and South America.

Apart from South America, they are all likely to replace their aircraft with 30-seat turboprops or younger-generation 19-seat turboprops.

The USA accounts for a large number of aircraft. As it replaces 30-seat turboprops with regional jets, the 30-seat turboprops start a trickle-down effect by replacing younger 19-seat turboprops. Used turboprops will be plentiful, and they can supply the markets with the largest low-density route networks. The challenge will be placing those used aircraft at the bottom of the hierarchy; the oldest and smallest. South America may provide a home for some of these. A further challenge will be presented to turboprop manufacturers trying to sell new aircraft.

One large potential market is South America, while freight conversion to develop fleets for the large freight consolidators is an emerging market.

## New versus used

The regional jet's popularity in the USA is fed by intensive competition. The same laws of market preference do not apply to low-demand markets. Competition will be from alternative forms of transport.

These services are likely to be served by either independent operators or franchises. Such organisations are driven much more by cost than the 'prestige' of new aircraft. In many cases they will be funded through subsidies from either national or local governments, so again, cost is paramount to gain the contract.

Frequencies are not usually intensive and the speed advantage of regional jets is less important. Not only will regional jets be out of the question, but so will new-production turboprops.

When adequate numbers of well-maintained modern turboprops are available, then sales of new aircraft are going to be limited. The only exceptions will be the few large operators that achieve an economy of scale. Acceptability of used aircraft varies around the world, but operators are becoming accustomed to used equipment.

There is no justification for continued turboprop production unless the types on offer provide something unique. They have to be economically competitive with used equipment. The notable exception to this argument is the 70-seat market, which is driven by Europe rather than the USA. There is now a new and improved product available in the form of the Bombardier Q400.

European growth has seen the near extinction of the 19- and 30-seat aircraft,

*The Fokker 50 is one type with short airfield performance. There are a few specialist low-density markets that require aircraft with this capability. Limited numbers of Fokker 50s means supply should remain tight.*

with the 50-seater being entry level. As the market continues to grow, this could encourage increased use of 70-seaters.

## New aircraft

The USA accounts for only 36% of the world's regional aircraft. The USA, however, has accounted for about 70% of the demand for new aircraft. This highlights its importance as the largest customer for new production.

This can be seen in the backlog of deliveries for regional jets. Bombardier has a backlog of 236 CRJ Series 200 orders, of which 183 were for the USA. The only other significant single market is Europe, with 32. In comparison, US demand for turboprops is negligible. Based on announced fleet replacement plans, the USA is unlikely to see any significant future orders for new-production regional turboprops.

At its peak, production of regional turboprops was running at nearly 350 aircraft a year. Since US demand has almost completely collapsed, the overall market for new production is extremely limited. Even if the rest of the world's demand had remained unchanged, it would only have accounted for 30% of the previous level. This substantial reduction in demand for new equipment has been demonstrated by the decisions of all but ATR, Beech and Bombardier to vacate the turboprop business.

## ATR42/72

ATR makes the point that although the turboprop market is diminished, the share per manufacturer is greater because of the exit of a large number of producers from the business.

ATR predicts a global demand for new-production 40-70 seat turboprops at about 70 aircraft per year. With a 50% share, ATR expects sales of about 30-35 aircraft per year for the next 20 years. ATR says it can operate profitably with this market size, following re-organisation.

ATR recently celebrated the delivery of the 600th ATR, but has an order backlog for only six ATR42-500s and nine ATR72-500s.

Sales so far this year have been disappointing, with only three ATR42-500s for Air Dolomiti and one ATR72-500 for Mount Cook, both existing customers. The Air Dolomiti order, coming only six weeks after a

ATR is one of two remaining turboprop manufacturers. Demand for new turboprops is estimated to have fallen to about 70 per year. This is a limited number and orders for new sales will only materialise if they offer significant advantages over used aircraft.

similarly sized order for the Canadair RJ from the same airline, is interesting because it highlights the less emotive attitude of the European operators to the turboprop versus regional jet issue. Air Dolomiti will now have a fleet of 15 ATR42s, five ATR72s and three CRJs.

Although the US market for turboprops has almost vanished, Europe continues to order aircraft on a regular basis. Now that Proex subsidies for Embraer, for example, have been ruled illegal, aircraft pricing is fairer and this should help ATR's sales. ATR expects strong markets in Europe and Asia, especially India.

## Beech 1900D

The 1900D faces a difficult market. Raytheon is now dependent on smaller orders from international customers. Most of the bigger operators of the type have announced plans to replace them with either 30-seat jets or turboprops, for example, Mesa and Continental Express. The one recent exception is Commutair, which operates 30 1900Ds. Mesa, with help from Raytheon, has placed some of its large fleet of aircraft, including disposals of 15 aircraft to Great Lakes. This demonstrates that there is a US market for the type as a replacement for the earlier 1900C.

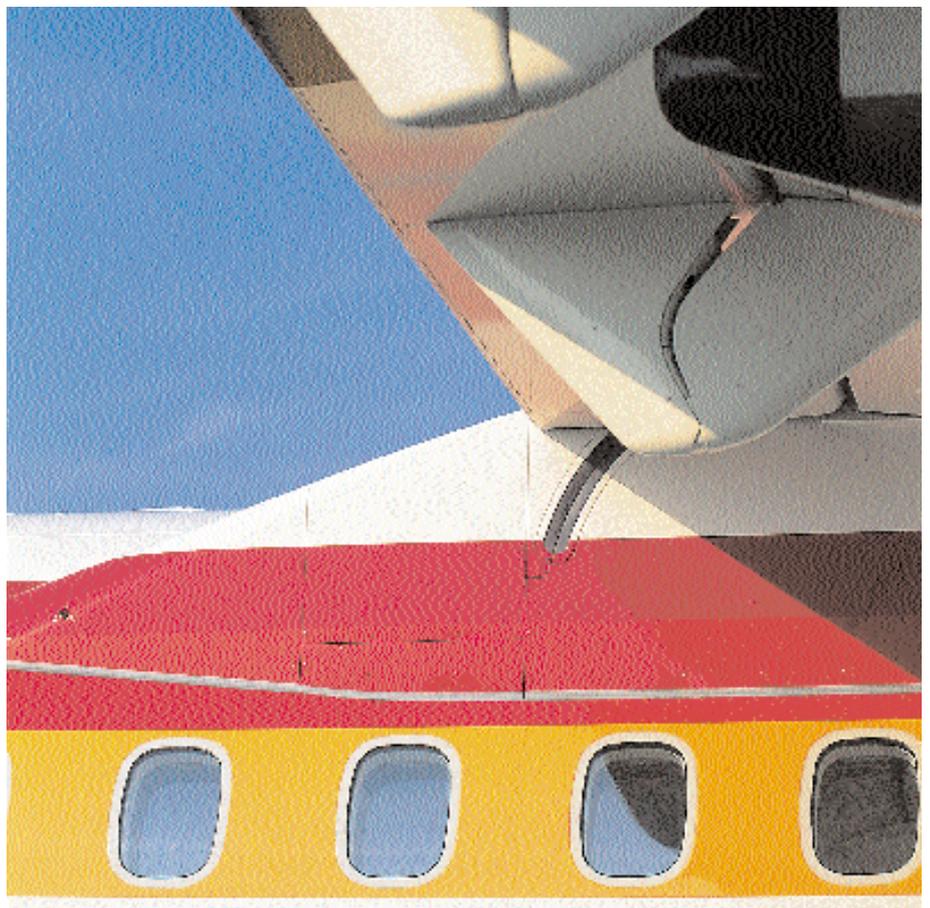
## Bombardier Q100/200/300

Deliveries of Dash 8s have fallen in the past four years from 39 in 1996 to 30 in 1999. Production at this level is only possible because of the high degree of commonality between the different variants.

The only turboprop that can lay claim to being a significant advance over earlier-generation aircraft is the Q400 from Bombardier (formerly the de Havilland Canada Dash 8-400). Prospective customers have to view the aircraft as offering a unique performance or economic advantage.

## Conclusion

The majority of low-density markets are served by the smallest class of regional airliners available, the 19-seaters. There has been a natural progression within this market, the pioneering Metro



giving way to the stand-up cabin J31/32 and Beech 1900D or the 30-seaters.

BAE retains an interest in most of the J32s ever built and the majority of these will remain in passenger operation for the foreseeable future. Most of the J31s were either outright sales or have come to the end of their head leases. There are more than 30 aircraft available that are not controlled by BAE itself. Many Beech 1900Ds have been placed on long-term finance leases through Raytheon Credit. This will ensure the 1900D remains as one of the last 19-seaters in scheduled passenger operation.

As a natural progression of the way the regional market is developing, the largest market for the 30-seaters is probably as 19-seat replacements. Since the non stand-up cabin 19-seaters gave way to the J31/32 and Beech 1900D, these in turn will give way to the cabin-class 30-seaters.

While the 30-seaters have a natural market as 19-seat replacements, the 50-seat turboprops are not so fortunate. The biggest market is the USA and here the 50-seat turboprop has been overtaken by the regional jet revolution. In Europe, the 50-seater turboprop remains a core.

In the case of the 70-seat market there is a justification for continued production of new aircraft. As we saw in *issue 4 of Aircraft Commerce*, the Dash 8-400 and the ATR72-500 offer a significant cost advantage over the CRJ 700. There is also little availability of used ATR72s.

Turboprop owners will need to be

increasingly creative in finding new markets for their used aircraft. A few 19- and 30-seat aircraft have been placed with corporate operators, but based on past experience with the Metro, which even had the benefit of a corporate sister ship the Merlin, it is unlikely this activity will absorb significant numbers. The Beech 1900D may be able to locate a market niche.

A large number of older-generation Bandeirante, Twin Otter, F.27 and HS748 aircraft will undoubtedly be broken up for spares, as will early examples of the 1980s-generation Metro III and J31.

There is a significant benefit for those aircraft which have a natural capability as freighters. More than a quarter of all Metro series aircraft built are operated as freighters. This capability is helping maintain values of the type above the BAE Jetstream, for example, whose rear passenger door configuration does not lend itself to freight operations.

The forward door configuration of the Embraer Brasilias and Saab 340s means these aircraft may find an expanding role as freighters to complement or replace the large number of Metros.

Similarly, while the ATR42 has a forward baggage/freight door as standard, the Fokker 50 does not. This will have a serious impact on future values and explains why Fokker Services is currently working on a large freight door retrofit programme for the aircraft. 