

Launch of 50-seat regional jets was met with scepticism ten years ago. Despite this Bombardier and Embraer launched products into an unknown market, and achieved success. There are now four manufacturers contesting for another unknown market. What are the sales prospects?

Scouring the globe for 70-105 seat jet sales

The regional airline industry has changed since BAE and Fokker drove each other to near destruction. Has it changed enough to support four manufacturers of 70-105 seat regional jets?

Between 1986 and 1996 competition between BAE and Fokker was at its peak. Combined annual deliveries for the 146/RJ and Fokker 70/100 never exceeded 78, equal to 6.5 a month. The average rate was nearer 4.5 a month.

This lack of historic demand has not dissuaded Embraer and Fairchild Dornier from launching all new designs, and Bombardier developing existing aircraft. Are the market prospects changed and large enough to allow each of the four current manufacturers to make a reasonable return on their investment?

The competitors

BAE Systems is offering its re-engineered RJX family. So far a launch order for two RJX85s has come from Druk Air, and the only other commitment is an option for six from Cityflyer Express.

BAE's biggest strengths are the potentially large European market base and unique short field performance capability. This last advantage is illustrated by the current use of 146/RJs. Many operators in Europe serve airports that can only be reached through the performance capability of these aircraft, for example Florence, London City and Lugano. Crossair, which is replacing its RJs with Embraer ERJ-170/190s, may still retain some RJs to serve high-performance markets.

Bombardier is offering the CRJ700 and CRJ900. In January 2001 Brit Air accepted the first CRJ 700. This is a full

year ahead of the BAE RJX's entry into service, two years ahead of the ERJ-170, and two and a half years ahead of the 728Jet. This advantage has helped Bombardier gain 196 firm orders.

Embraer launched its ERJ-170/190 family on the back of a launch order for 60 from Crossair. The manufacturer set an aggressive development schedule, but appears to be proceeding with first delivery to Crossair targeted for 2002.

Since Lufthansa Cityline placed its launch order in April 1999, Fairchild Dornier has experienced repeated delays on the 728Jet programme. Lufthansa will not receive its first aircraft in 2003. Fairchild has yet to launch the 928Jet.

Orders

Current orders for the four regional jets total 464. This includes four for 928Jets placed by Bavaria Leasing, and 30 ERJ-190s for Crossair.

The RJX has only two orders. Bombardier has the largest share of 196 firm orders, and the most airline customers. Fairchild has 144 firm orders, with 65 from airlines. Embraer is in third place with 120 orders, 60 from Crossair and 30 from Regional Airlines.

GECAS has placed orders for 135 of the 462 GE-34 powered twinjets sold.

Airbus and Boeing

In addition to the four regional aircraft manufacturers, the top end of the market is further crowded by Airbus and Boeing, with the A318 and 717.

Airbus currently claims 159 orders for its A318, versus Boeing's 151 for the 717. Orders for these two have been placed by major airlines and lessors.

The A318 has commonality with three other A320 family members. This supports the argument that the A318 only makes sense when it is operated with the other family members. Boeing does not yet have a commonality advantage, although it is considering the development of a smaller variant.

Market potential

The most contentious issue over the market for 70-105 seats jets is sales potential. This is the most highly debated market segment in air transport. Forecasts for most other sectors made by competing manufacturers often come close, but there are wide differences in opinion in the 70-105 seat sector.

The main reason is that it is not clear where demand for these aircraft will come from and many possible markets are not yet clearly identified. This is in terms of what type of airlines will require the aircraft, what markets will be served and what parts of the world will provide the major markets and opportunities.

Several markets have been suggested for 70-105 seat jets. The market is divided in two. The first comprises 51-70 51-70 seat aircraft: the sector larger than the 50-seat jets and turboprops and up to the 70-seat jets and turboprops, including the ATR 72 and Dash 8-400.

The significance of the upper limit of 70-seats is that it is the largest jet possible in the US regional airlines. The regional jets included are the ERJ-170, 728Jet and CRJ700.

The second sector is 71-105 seat segment, which includes the A318 and 717. The regional jets included are the ERJ-190-100/-200, CRJ900, 928Jet (if launched) and Avro RJX.

US REGIONAL AIRLINE SCOPE CLAUSES WITH RESPECT TO 70-SEAT JETS

Major airline	Alaska	American	Continental	Delta
Upper seat limit	Unlimited	70	59	70
Number of aircraft permitted with more than 50 seats	Unlimited	67	Unlimited	Unlimited
Firm orders already placed	30	25	Zero	57
Options held	25	25	Zero	168
Major airline	Northwest *	TWA	United*	US Airways
Upper seat limit	55	Not permitted	50	69
Number of aircraft permitted with more than 50 seats	Linked to mainline fleet	Zero	215	9% of US Airways fleet
Firm orders already placed	36	Zero	Zero	Zero
Options held	Zero	Zero	Zero	Zero

* *Mesaba RJ85s are grandfathered in Northwest fleet, and escape upper seat limit of 55. Air Wisconsin 18 BAe 146s are grandfathered in United fleet, and escape upper seat limit of 50.*

Market evolution

Until the launch of these larger jets, the development and evolution of regional aircraft programmes followed a logical sequence. Small turboprops were replaced by orders for 30/35-seat turboprops which in turn were replaced by 45-50 seat turboprops.

The advent of the 50-seat regional jet, started by the CRJ200, was met with scepticism. Bombardier intended the aircraft to pioneer regional point to point, or hub-bypass, services in the US. It forecast demand for 500-600 aircraft over 10 years. Much to its surprise, Delta connection carrier Comair used the CRJ100/200 to improve hub-feed services, since passenger demand was stimulated through preference over turboprops. High costs were exceeded by stimulation of passenger traffic which boosted load factors and yields.

This fuelled demand for 35-50 seat regional jets from all major US regional carriers. Embraer was the only other regional aircraft manufacturer to recognise the potential market, but still forecast only the same 500-600 aircraft sales over 10 years predicted by Bombardier.

Since the CRJ programme launch less than 10 years ago, Bombardier and Embraer have won about 1,310 orders for their 50-seat jets; the CRJ100/200 and ERJ-145 products, twice the level of both forecasts. Fairchild entered the market too late to exploit large orders.

Much of the regional jet explosion came from the US, with US majors seeing the potential for increasing traffic feed into their hubs. A few European carriers also ordered the 50-seat jets, although Europe favours larger aircraft.

The US regional jet explosion was accompanied by the adoption of scope clauses, used between US majors and their regional affiliates to limit the number and, more importantly, size of regional jets operated by regional partners (see table, this page). These are used by pilot unions to prevent an unlimited number of major services being transferred to regionals, which have lower pilot salaries.

While scope clauses limit the US market for 70-seat jets, Europe will generate higher sales prospects because it has always operated aircraft of this size. European airlines also do not have the same limitations of tough scope clauses, and the market is not dominated by

major hubs that make it hard to compete with point-to-point and secondary market services.

Use of the larger 71-105 seat jets in the US could also be stifled by scope clauses. These aircraft may, however, find a market in the smaller end of major airline fleets. Replacement of DC-9s and 737-200s has been anticipated, and TWA, Frontier and Hawaiian have already placed orders for A318s and 717s, indicating the potential. Aloha is considering the RJX. The biggest prize is Northwest's long awaited DC-9 replacement order.

Economic pressures mean some US carriers will find it hard to justify aircraft this small. This may favour the lighter RJX, ERJ-190, 928Jet and CRJ900 over the A318 and 717.

The market for these aircraft again is more likely to be Europe, because of secondary airlines operating larger regional jets in smaller markets.

Examples are Crossair, Lufthansa Cityline, British European and KLM Cityhopper, which already operate the Avro RJ and Fokker 70/100. The market for the largest regional jets will therefore come from replacement of older aircraft and providing capacity for new routes.

51-70 seat jets

In most markets continued traffic growth usually means additional carriers serving a route and frequencies being added. Once this has been saturated, average aircraft size increases. Without the issue of scope clauses in many US airlines blocking progress to larger aircraft, most carriers would acquire 70-seat and then larger jets. The 50-seat replacement market alone would fuel a large demand for these aircraft.

Current scope clauses limit this, and this issue raises concerns over the other potential markets for 70-seat and larger jets, and whether they are enough to sustain four manufacturers.

The main markets for 70-seat jets are as replacements for 50-seat and 70-seat jets in Europe. There will also be further growth in Europe of point-to-point or secondary services, but little potential is expected in the US.

Bombardier also anticipates demand in China and in certain parts of the Asia Pacific region. Embraer also sees potential demand in the Asia Pacific, South America and Australia as regulatory issues are relaxed and more opportunities come available to airlines in these regions.

Bombardier forecasts a global demand for about 2,800 60-79 seat aircraft over the next 20 years, which includes all the same types in the 51-70 seat category. It also includes turboprops, which Bombardier anticipates will take about 1,100 of these orders. This leaves a

There are about 660 BAE 146/RJs and Fokker 70/100s in operation, most of which will require replacing in the next 20 years. The majority of these are in Europe, which will also generate a market for new aircraft for serving point-to-point routes.

market for 1,700 jets.

While the US has dominated the 35-50 seat jet market, Europe is expected to dominate the 60-79 seat jet demand, and take about half these orders. This is mainly because of scope clauses limiting the US market. Bombardier predicts the US will be the second largest, and China the third largest market.

Embraer forecasts a market similar to Bombardier. Embraer predicts sales of about 1,200 aircraft in this category over the first 10 years, which will account for about 60% of the total over 20 years. Thus the 20-year market could be as much as 2,000 units, close to Bombardier's expectations.

Embraer stresses that its forecasts are highly conservative, and compares its expected 35-50 seat market with actual sales. It expects sales of about 400 each in Europe and the US in the first 10 years.

A market for 1,700-2,000 jets would be equal to an annual sales volume of 85-100, or seven or eight per month. This would be divided between three manufacturers. Although low, these production rates would be combined with larger members of the ERJ-170, CRJ700 and 728Jet families.

71-105 seats

The largest potential for this segment is in Europe and the US, replacing F.28s, Fokker 70/100s and BAE 146/RJs. There is also the replacement of larger DC-9s and 737-200s in the major carriers.

In-roads have already been made by the 728Jet, CRJ900 and ERJ-190. Major European carriers have already ordered the A318 and 717.

Embraer sees regulatory changes in South America, Australia and China creating potential for larger regional jets, just as it will for 60-80 seat aircraft. Embraer conservatively forecasts a market for about 1,650 aircraft in 10 years for the larger jets, or 165 per year. This includes the A318 and 717, and so will be fought by six manufacturers if the 928Jet is launched. This will leave an average of 275 per manufacturer.

The 50-seat growth market

Europe is seen as the major market for 70-100 seat regional jets. The 50-seat regional jet market has been dominated by orders from US operators. Of a total



of 1,310 Canadair RJs and Embraer ERJ-145s ordered to date, 884 (67%) are from the US and 307 (23%) for Europe. Of the 295 new generation 70-110 seat jets currently on order by airline operators, only 112 (38%) are in the US with 171 (58%) from Europe.

The large size of most regional jet operators in the US has resulted in 70% of orders being made by only 10 carriers. Consolidation of regional carriers is likely to continue, so customer prospects for new 70-105 seat jets may be limited.

The subject of regional airlines operating larger equipment is an area fraught with union issues, particularly in the US. With few exceptions, all the major US carriers have been forced to limit the number and capacity of regional jets operated by their regional subsidiaries/partners. Scope clauses affect operators differently (see table, page 40).

Sales of 70-seaters have so far been limited to operators without scope clause restrictions. In particular these are Atlantic Southeast Airlines and Comair, now both Delta subsidiaries, together with American Eagle and Horizon; all of which have CRJ700s on order.

Recent activity with regard to scope clauses at United and American has concentrated on increasing the number of 50-seaters, rather than extending the capacity limit upwards. American nearly gave up its allowance for a fleet of 25 CRJ700s.

Only one of 12 operators of 50-seat jets, independent Mesa Airlines, has placed orders for both ERJ-145 & CRJ200 families.

Of the remaining 11 operators, seven have gone for the CRJ200 and four for

the ERJ-145. Of the four ERJ-145 operators, Continental Express is currently restricted to aircraft of up to 59 seats and American Eagle has already selected the CRJ700 as its 70-seat equipment. This leaves only Chautauqua and Trans States as ERJ-135/140/145 operators that may be prospective ERJ-170 customers.

Bombardier is in a stronger position with the CRJ700. Both Comair and Atlantic Southeast Airlines have already ordered 57. The increasingly close ties between Atlantic Coast and Delta are also likely to see CRJ700s as the favourite choice. This would be a blow to Fairchild Dornier, since Atlantic Coast is the only sizeable US 328Jet operator.

Two of the remaining five CRJ200 operators have BAE 146/RJ fleets; Air Wisconsin and Northwest. Air Wisconsin has a need for the performance of the BAE 146, and Northwest's fleet is young.

This leaves Midway and Skywest. Midway is concentrating on the CRJ200 and 737-700. Skywest cannot operate aircraft with more than 50 seats.

The 10 principal 50-seat jet operators in the US are dominated by Bombardier. If a time comes to select a 70-seater it is going to be difficult to divert any of these CRJ operators away from the CRJ700s.

There is the possibility that scope clauses will be relaxed or even scrapped altogether. Comair, which has no limit on the number of 70-seat aircraft it can operate, will begin CRJ700 operations in a few years. It is likely that Comair will experience the same level of traffic stimulation it did when it introduced the CRJ100/200. It will also be able to open new spoke routes from its Cincinnati



hub, as it did with the CRJ200.

"The 70-seat jets have two main roles in the US," explains Trung Ngo, vice president of marketing at Bombardier. "The first is hub feeding. This is supplementing new routes and adding new ones, some with longer stage lengths than already operated. Although hub feeders are smaller in the US because of tougher competition than in Europe, high load factors on 50-seat jets because of growth will stimulate the need for larger aircraft once possibilities for more frequencies are saturated. The second role is hub bypass routes".

Other US carriers currently held back by scope clauses may not be able to ignore the positive effects of additional hub feeding. American and Delta are likely to experience with the CRJ700. This may, over time, force other US majors to consider relaxing scope clauses to reduce the possibility of losing traffic to other airlines. "It is feasible that scope clauses will be relaxed, and this of course would stimulate a larger market for 70-seat aircraft. Now it is difficult to say what the competitive reaction to the CRJ700 entering service will be. When Delta starts operating the CRJ700 its competitors will react," says Ngo.

While manufacturers would like to see scope clauses relaxed or scrapped, they are also realistic about the possibilities. "Scope clauses are a barrier to the 70-seat market, and we expect them to stay longer than was originally thought," says Orlando Ferro, director of market intelligence at Embraer. "We expect negotiations between airlines and their pilot unions in 2004, and this may allow some relaxation and more potential for 70-seat aircraft".

Point-to-point services

Point-to-point services were originally envisaged as being a market that would be created by the introduction of regional jets. These were defined as non-stop routes connecting two spoke cities, or hub bypass routes. There are few hub bypass routes in the US, and this is partially explained by major hubs and airlines dominating traffic flows.

This is only one definition of point-to-point operations. The other is routes from major cities to secondary markets, for example smaller cities served from La Guardia or Boston. These are fragmented markets, since they do not rely on traffic feed from hub-and-spoke systems, and have enough traffic to sustain them.

There are more hub bypass routes in Europe, since this market for secondary routes has been developing since the early 1980s, and has not been hindered by traffic flows being diverted into hubs.

With the 50-seat jets not being used for hub-bypass operations as expected, it is also unlikely that 70-seat jets this way. "It is difficult to say if airlines will use 70-seat jets for hub-bypass operations, although they definitely want hub feed," says Ngo. "Delta and American will need the aircraft at their busiest hubs. The CRJ200 opened new spokes at Cincinnati, which supported network development. The same may happen with the CRJ700".

Embraer does not expect to see a hub-bypass market open for 70-seat jets. "We concede there is a small market for 70-seat aircraft serving hub-bypass routes," says Ferro "but this will not be revolutionary. The US market is still ruled by hub-and-spoke arrangements".

Brit Air is Europe's first CRJ700/900 customer, and other carriers have ordered the type. The CRJ700/900 are well positioned to serve secondary European markets because of their light weight in relation to Europe's high cost base.

71-105 seat replacements

A study of current 70-105 seat jet operators shows it is primarily a European market. The only exceptions are the Fokker 100 fleets of American Airlines and USAir.

There are 659 BAe 146s, Avro RJs and Fokker 70/100s in airline operation. The biggest share of the fleet is in Europe, with 324 aircraft in operation.

Examining the European 70-100 seat regional jet carriers' fleets shows the top 10 have a majority of BAE 146/RJs in their fleets, which may put the RJX in a strong position. SAir and Lufthansa, however, have already made replacement selections with other manufacturers.

Aer Lingus has a limited requirement to replace eight BAE 146s, and has expressed interest in the RJX. Closeness to British Airways means Aer Lingus may follow BA selection.

BA has three principal regional jet operators among its franchise partners, wholly owned Brymon and Cityflyer Express, together with independent British Regional Airlines (BRAL). BA needs aircraft to fill the gap between the A318 and ERJ-145.

Cityflyer has options on the RJX. BRAL, which has ordered the ERJ-145, has expressed interest in the ERJ-170. Brymon Airways has already selected the Embraer ERJ-145.

Air France is consolidating its domestic regional operations around majority-owned Brit Air, and a wholly owned subsidiary, Regional Airlines, which is to be formed by the merger of Regional Airlines with Flandre Air and Proteus Airlines. Brit Air is a loyal CRJ700/900 customer.

Regional Airlines brings together three Embraer ERJ-135/145 operators, and has already ordered 10 ERJ-170s.

BAE Systems could benefit, since Cityjet, wholly owned by Air France, requires the performance of the 146/RJ for over 60% of its operations. Air France already has orders in place for 15 Airbus A318s, so in a rare set of circumstances four manufacturers could benefit from Air France Group orders.

Alitalia has two carriers within its influence. Azzurair and Meridiana operate the 146/RJ, and the latter needs the performance for operations out of Florence.

British European is the largest independent operator of 70-110 regional jets with a fleet of 16 BAE 146s. It is

The 70-105 seat market is limited to replacing just six fleets in the next 20 years. The biggest prize is Northwest's anticipated DC-9 replacement, which is likely to benefit just one or only two manufacturers.

evaluating an all-new fleet of BAE RJXs versus retaining six 146s and adding 12 new twinjets. The CRJ700/CRJ900 would probably be the favoured twinjet. With British European expanding operations from London City Airport, the RJX's high performance capability is likely to be a key advantage.

Lufthansa Cityline operates one of Europe's largest Avro RJ fleets, alongside the largest CRJ fleet outside the US. Despite launching the Fairchild Dornier 728Jet, the operator also has orders for 20 CRJ700s. Future sales within Lufthansa's influence will probably be between Bombardier and Fairchild Dornier.

KLM affiliates KLM cityhopper and KLM uk do not appear to be under any pressure to replace Fokker 100s. SAS regional affiliates Air Baltic and Air Botnia are in the same position. Crossair has already ordered the ERJ-170 family, and included options for the other members of the SAir group. The largest being Sabena subsidiary Delta Air Transport.

US 71-105 seat replacement

Sales of the previous generation of 71-105 seat regional jets were relatively limited in the USA, with only six operators of this class of aircraft.

Air Wisconsin has 18 BAE 146s grandfathered under United's scope clause. Air Wisconsin has three options. First it can retain the existing aircraft. Second it may replace these on a one-for-one basis with new 85-seat jets, or third these can be exchanged on a two-for-one basis with 50-seat regional jets. Since it requires high performance capability, Air Wisconsin is a prime RJX candidate.

American Airlines recently agreed to acquire TWA. This may see A318 orders dropped. TWA has already taken delivery of 15 717s, and American operates the world's largest MD-80 fleet, so it is likely that American will cancel its A318 orders. The 717 will be the most likely Fokker replacement candidate.

Northwest has only recently received the last of its 36-strong fleet of Avro RJ85s for operation by Mesaba. Northwest, however, has over 100 DC-9s which will eventually have to be replaced. Considering its strong commitment to the A319/20, the A318 is Northwest's strongest candidate.



Midway Airlines has replaced its Fokker 100s, and so is a less likely customer. Horizon has also made its 70-seat jet replacement decision.

US Airways has made no announcements about the long-term future for its Fokker 100s. However with a large A319/20/21 order, the prospects for the A318 look good.

Summary

The total market for 51-70 seat jets is expected to be 1,700-2,000 units over 20 years. This will come from replacing and supplementing 50-seat jets and replacing older 70-seat aircraft.

The supplementation and replacement of 50-seat jets, although limited by scope clauses in the US, could still be substantial. Traffic growth will mean those airlines without, or some, limits on numbers of 70-seat jets will need to replace some or all of the 35-50 seat jets in the next 20 years. Further aircraft will be needed to cater for higher traffic.

Delta connection carriers have ordered 395 CRJ100/200s, which will eventually have to be replaced with larger aircraft. Mesa and Air Canada, also unhindered by scope clauses, have bought just under 100 50-seat jets. European airlines have also ordered about 300 50-seat jets, and about another 100 are operated in other parts of the world. This totals about 900 units. US Airways is also permitted to acquire about 40 69-seat aircraft. This makes a theoretical total of 940 potential sales on a pure one-for-one replacement basis over 20 years.

Added to this should be the need to supply additional aircraft for traffic growth for existing ERJ-145 and CRJ100/200 customers.

In addition to this there is a requirement for non-existent regional jet customers in Europe and other parts of the world, such as China, Australia, South America and the Asia Pacific.

Taking these into consideration it can be easily seen where sales of 1,700-2,000 units could materialise.

Although scope clauses are unlikely to be relaxed in just a few years, the product life cycle of these jets will span 20 years, and the market can change in this time period. Bombardier and Embraer have made conservative forecasts, assuming little or no relaxing of scope clauses.

Examining the orders of US carriers with restrictive scope clauses suggests there could be a market for several hundred more 70-seat jets if union agreements are relaxed or widened to eventually allow unlimited numbers of 70-seat jets.

Embraer's prediction of a market for about 1,600 80-110 seat aircraft in 10 years includes the replacement of DC-9s and 737-200s, which explains why the prediction for this time period is larger than the 51-70 seat market. Three hundred A318s and 717s have already been sold. It also anticipates the opening of new markets in areas of the world outside the US and Europe.

The majority of the 660 70-110 seat aircraft operated by airlines will come due for replacement in this period. The same airlines operating these aircraft will also want extra aircraft for traffic growth and new route opportunities.

Like the 51-70 seat segment, it is not difficult to see where demand for 1,600 aircraft will come from. The market has the potential to be larger if scope clause relaxation and traffic growth make more hub bypass routes viable.