

E-Jet family technical support providers

The E-Jet family has a fleet that is predominantly in North America and Europe. Therefore, the majority of support is found in these two areas.

This survey summarises the major aftermarket and technical support providers for the Embraer E-Jet family of aircraft. It is grouped into seven sections covering the categories of technical support offered by each provider.

1. Engineering Management and Technical Support (*see table, page 25*);
2. Line maintenance and in-service operational support (*see first table, page 26*);
3. Base Maintenance Support (*see second table, page 26*);
4. Engine Maintenance (*see first table, page 27*);
5. Spare Engine Support (*see second table, page 27*);
6. Rotables and Logistics (*see third table, page 27*);

7. Heavy Component Maintenance (*see fourth table, page 27*).

Some of the technical support providers are listed in most, if not all, of the seven sections and could be termed as 'one-stop-shop' service providers for the E-Jets. This means that they provide most of the technical support services that an airline customer would require. The tables show the range of services that these facilities are capable of offering.

As the tables show, the maintenance, repair and overhaul (MRO) and other technical support facilities are able to provide a complete range of line and base maintenance services, as well as engine and heavy component maintenance for the E-Jet family.

The major maintenance providers include: ExelTech Aerospace, Aveos Fleet Performance and Embraer. The major

engine maintenance providers include GE Engine Services and Aveos Fleet Performance. Due to the financial, personnel, time and tooling costs of certain specialist jobs, none of the facilities are able to offer every single listed capability, but some do come close.

By the end of 2012, there are likely to be over 800 E-Jets in operation, with potentially another 300-plus aircraft that are on order. The maintenance market will need to continue at current levels, and then grow by about 35% over the next three years if the expected fleet expansion does occur. The oldest E-Jet is just five years old, and the maintenance market growth does not include the increased requirements that will be needed over the coming years as the E-Jets mature and more heavy base checks come due.

The backlog of E-Jet deliveries amounts to nearly 350 aircraft that are destined for all areas of the world. Existing operators will already have maintenance contracts in place with third-party facilities or in house, but the maintenance of those aircraft going to new operators, however, will need to go to tender. This will be where a lot of the growth could be seen, as more third-party operators, both airline-connected and independent, start to offer capabilities around the world.

Many of the third-party facilities available around the world were once part of, or are connected to, an airline.

The Executive Jet model (of which there is currently only one being operated) within the E-Jet family has not been considered in the data below. The market shares, as produced by Aircraft Fleet & Analytical System (ACAS) for the month of June 2009, do not include this model. The geographical breakdowns are conducted according to ACAS's view of countries and their relevant world region.

Engine maintenance

The E-Jet family has just the one engine option for each aircraft model: the CF34-8E for the E-170 and E-175; and the CF34-10E for the E-190 and E-195 models. Although the engine is part of a family that is maintained by many facilities, there is still a limited choice of MRO facilities that cover these engine variants.

As would be expected, General



Although the E-Jets fleet is likely to climb to about 900 active aircraft, the technical support market is still likely to be limited to OEMs and a few independent maintenance providers.

E-JET FAMILY ENGINEERING MANAGEMENT & TECHNICAL SUPPORT

Facility	Outsourced engineering service	Maintenance records service	Documentation & manuals management	Maintenance programme management	Reliability statistics	AD / SB orders management	Check planning	Config IPC management	Total tech support
Aveos Fleet Performance Inc.							Production planning		Y
Egyptair Maintenance & Engineering	Y	Y	Y	Y	Y	Y	Y	Y	Y
Embraer Services (Nashville)	Y	Y	Y	Y	Y	Y	Y	Y	Y
Embraer Maintenance Center (Brazil)	Y	Y	Y	Y	Y	Y	Y	Y	Y
Embraer Service Center (Fort Lauderdale, France & Singapore)	Y	Y	Y	Y	Y	Y	Y	Y	Y
ExelTech Aerospace	Y	Y	Customer supplied	Y	Y	Y	Y	Y	Y
Finnair	Y	Y	Y	Y	Y	Y	Y	Y	Y
Flybe Aviation Services	Y	Y	Y	Y	Y	Y	Y	Y	Y
Fokker Services / Stork	Y	Y	Y	Y	Y	Y	Y	Y	Y
Goodrich	Y	Y	Y	Y	Y	Y	Y		Y
Lufthansa AERO Alzey									Y
Lufthansa Cityline	Y	Y	Y	Y	Y	Y	Y	Y	Y
Lufthansa Technik									Y
MTU Maintenance						Engine only	Engine only	Engine only	Engine only
Nayak Aircraft Services	Y	Y	Y	Y	Y	Y	Y		Y
OGMA	Y	Y	Y	Y	Y	Y	Y	Y	Y

Electric (GE) takes the majority of the engine overhaul market. Its engine shop in Strother, USA, alone has just over 48% of the share, which according to ACAS equates to over 500 engine shop visits to date. If those figures are combined with those completed at its headquarters and Welsh engine shop, the result is that GE holds nearly a 58% market share.

As the aircraft fleet grows and more engines require shop visits, and the number of facilities with capabilities grows, it will be interesting to see how this figure changes. Having said that, GE has large facilities all over the world, so it is likely to continue to take a large portion of the market.

StandardAero, which pushed GE into second place with engine overhauls for the Embraer ERJ-145 family, is an expert on the Rolls Royce AE3007 (*see ERJ-145 family technical support providers, Aircraft Commerce, December 2008 / January 2009, page 23*). According to ACAS, Standard Aero has only had three engine shop visits from E-Jets in recent times, despite also being CF34 experts. This is quite possibly because it predominantly deals with corporate jets. Also, while it does maintain the -1, -3 and -8 models of the CF34, it does not yet have capability for the -10, and GE (Strother) has cornered the US market. StandardAero could well increase its market share over the coming years.

The next largest market share is taken by a group made up of contracts that are unknown or are for tender. This amounts to nearly 30% of recent market share.

The next individual company is Aveos Fleet Management, which accounts for 11% of the engine overhaul market. Lufthansa Technik takes the next biggest share of the market, when both its main shop and that at Lufthansa A.E.R.O. Alzey are combined.

As previously mentioned, there are and will continue to be a growing number of choices for operators as the E-Jets fleet grows. This is because many engine shops are developing their CF34 capabilities to include the -8E and -10E series. This is true of MRO companies such as MTU and Lufthansa Technik, as well as airline maintenance departments.

For the APU market, about half of APUs are maintained by Sundstrand Power Systems in the US. The other half are maintained in-house by airlines or are up for tender.

Base maintenance

The base maintenance market is divided into light and heavy checks. The figures differ between the two checks, but the order that the facilities fall into generally stays the same.

There are still a number of operators that undertake their base maintenance in house, with nearly a quarter of light checks and 19% of heavy checks being completed this way (equating to 91 and 117 aircraft respectively). There are 10% of light checks and 15% of heavy checks for aircraft with maintenance contracts up for tender, or completed by an unknown facility.

ExelTech Aerospace is by far the most prolific of the remaining third-party facilities. It has taken 27% of the market share for both checks, and comes close to being a one-stop-shop when it comes to E-Jet maintenance.

As well as maintaining engines, Aveos Fleet Performance also undertakes a large amount of airframe maintenance, assisted by the number of E-Jets in the Air Canada fleet. For both checks, it has gained 12.5% of the market. This means that facilities in Canada have nearly 40% (190 aircraft) of the base maintenance market share.

Embraer itself has performed about 12% of base maintenance checks at its Nashville, USA facility. There are other MRO facilities, as seen in the tables, that undertake maintenance on the E-Jets, but they all contribute less than 4% each, with many doing less than 1% (about five aircraft) each of base check maintenance.

These figures will change over the next year or so as the global fleet increases and more facilities increase their capabilities and capacity. This could well be true of companies such as Flybe, which is increasing its E-195 fleet. At the same time Flybe is reducing its 737 and BAE146 fleet, meaning that there will be an increase in E-Jet capacity at Flybe Aviation Services.

North and South America

North America is the largest operator of E-Jets with 293 aircraft (54%), while South America has only 12% of the

E-JET FAMILY LINE & LIGHT MAINTENANCE SUPPORT

Facility	Maint. Op. control	AOG support	Line checks	A checks	Engine QEC changes	Engine changes	Landing gear changes	APU changes	Thrust reverser changes
Aveos Fleet Performance Inc.		Y	Y	Y	Y	Y	Y	Y	Y
Egyptair Maint. & Engineering	Y	Y	Y	Y	Y	Y	Y	Y	Y
Embraer Services (Nashville)	Y	Y	Y	Y	Y	Y	Y	Y	Y
Embraer Maint. Center (Brazil)	Y	Y	Y	Y	Y	Y	Y	Y	Y
ExelTech Aerospace	Y	Y	Y	Y	Y	Y	Y	Y	Y
Finnair	Y	Y	Y	Y	Y	Y	Y	Y	Y
Flybe Aviation Services	Y	Y	Y	Y	Y	Y	Y	Y	Y
Goodrich	Y	Y							Y
Lufthansa Cityline	Y	Y	Y	Y	Y	Y	Y	Y	Y
MTU Maintenance		Y			Y In co-operation with partner				
OGMA	Y	Y	Y	Y	Y	Y	Y	Y	Y

global fleet according to ACAS's June 2009 data. Again, many of the operators have in-house maintenance facilities, but there are also a growing number of other MRO facilities offering E-Jet maintenance. This is aided by the vast E-Jet fleet that is already flown in the North American area.

As mentioned previously, Aveos Fleet Performance and ExelTech Aerospace are facilities in North America that have a large share of the market. Both are considered independent MROs, although Aveos Fleet Performance started as the maintenance department for Air Canada.

Other independent MRO facilities in North America include AAR, Certified Aviation Services, Empire Aero Center, First Wave MRO Inc., and Goodrich.

As well as maintaining their own fleets, many operators offer third-party maintenance capabilities to others. These

companies include US Airways.

There are 63 aircraft currently being operated in South America, but again, like in the Asia Pacific area, the maintenance market is not large, even though the aircraft is a South American product. The main facility is in fact Embraer's Maintenance Center in Brazil. With this and many large MRO facilities in North America, the South American fleet is well catered for.

Europe

Although Europe has the second largest E-Jet fleet, it has just 16.5% of the global fleet. There is a relatively good choice of facilities for both engine and airframe maintenance, although none of them currently work on the large numbers that are seen by Aveos, ExelTech and GE in North America.

The vast majority of European facilities are in fact developed from airline maintenance departments and include Alitalia, Finnair, Flybe, LOT Polish Airlines and Lufthansa. This is directly connected to the fleet that those airlines have chosen to fly in recent years. OGMA and SR Technics are two of the few independent facilities that offer E-Jet maintenance.

Standalone engine maintenance is offered by GE in Wales and by MTU in Germany, the latter being an independent facility.

The growth of the E-Jet fleet within Europe could well see capacity and capability growing within those facilities that already offer the service, but also among more of the independent facilities and new operators, such as British Airways. Nearly 100 new aircraft will be delivered to Europe alone over the coming years, which emphasises this point.

Asia Pacific

The greater Asia Pacific region accounts for just 9% (or 50 aircraft) of the global E-Jet fleet. As such there are currently limited maintenance options for E-Jets based in Asia Pacific. The facilities that do have capability will be on a small scale at the moment, or will just deal with in-house maintenance. Operators may have in-house maintenance facilities, but few also offer third-party capabilities to others.

Mandarin Airlines does a fair amount of its own maintenance in house, but it does not offer third-party maintenance. Instead, it has an agreement with China Airlines to do some of its base maintenance checks. China Airlines' capabilities, as well as others such as

E-JET FAMILY BASE MAINTENANCE SUPPORT

Facility	C checks	Heavy checks	Composites	Strip / paint	Interior refurb.
Aveos Fleet Performance Inc.	Y	Y	Y	Specific areas only	Y
Egyptair Maintenance & Engineering	Y	Y	Y	Y	Y
Embraer Aircraft Maintenance Services (Nashville)	Y	Y	Y	Y	Y
Embraer Maintenance Center (Brazil)	Y	Y	Y	Y	Y
Embraer Service Center (Inc. Fort Lauderdale, France & Singapore)	Y	Y			
ExelTech Aerospace	Y	Y	Y		Y
Finnair	Y	Y	Y	Y	Y
flyBe Aviation Services	Y	Y	Y	Limited areas only	Y
jetBlue Airways					
Lufthansa Technik				Y	Y
OGMA	Y	Y	Y	Y	

Paramount Airways, could improve as the E-Jet fleet in the area grows.

More than 50 additional E-Jets will be delivered to the Asia Pacific over the coming years. Within this number, Hainan Airlines alone has a backlog of 40 aircraft to be delivered over the next three years.

Middle East and Africa

The combined E-Jet fleets of Africa and the Middle East amount to just over 8% of the global fleet, with 16 aircraft in Africa and 29 in the Middle East. With such low current numbers, it is predictable that there are no facilities currently offering E-Jet cover, other than within the maintenance departments of the major airlines of the regions that operate this aircraft.

The operators with maintenance departments offering third-party capabilities include EgyptAir (EgyptAir Maintenance & Engineering) and Royal Jordanian (JorAMCo), the former coming relatively close to being a one-stop-shop.

New E-Jets in the regions will account for 17 aircraft in the Middle East and 14 aircraft in Africa. Only two of the operators already have the type, so there are potentially four new maintenance contracts to be awarded. One of those new operators will be South African Airlink in 2011, so maintenance is very likely to be completed in house. This could mean that South African Airlink covers southern Africa, while EgyptAir covers northern Africa and JorAMCo deals with the Middle East, although Goodrich has a small capability from its offices in Dubai.

If an aircraft encounters problems in areas that have no maintenance cover, such as some regions of Asia, Africa and the Middle East, many of the major global MROs would be able to assist the operator by sending out the relevant personnel and parts. Airlines with their own maintenance department would also be able to do this, if not already done, to cover their network.

Summary

Although the E-Jet fleet is set to reach about 900 aircraft, the technical support market looks likely to remain a specialist one served by a few providers. The fleet will remain focused with a relatively small number of airlines. The technical support market will mainly be divided between Embraer, GE, some independent airframe and engine shops, and the larger airline maintenance and engineering departments. **AC**

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E-JET FAMILY ENGINE MAINTENANCE

Facility	Engine health monitoring	Engine maint. Management	On-wing engine maintenance	Engine shop visits	Parts repair schemes
Aveos Fleet Performance Inc.			Y	Y	Y
Egyptair Maintenance & Engineering	Y	Y	Y		
Embraer Services (Nashville)	Y	Y	Y		Y
Embraer Maintenance Center (Brazil)	Y	Y	Y	Light repairs	Y
ExelTech Aerospace			Y		
Finnair	Y	Y	Y		
Flybe Aviation Services		Y	Y	Mgt & workscope approval	Limited
GE Engine Services	Y	Y	Y	Y	Y
Goodrich					Y
Lufthansa AERO Alzey	Y	Y	Y	Y	Y
MTU Maintenance	Y	Y	Y	Y	Y
Nayak Aircraft Services	Y	Y			
OGMA					E170/175 only

E-JET FAMILY SPARE ENGINE SUPPORT

Facility	On-wing support	AOG services	Short-term leases	Medium/long-term leases	Engine pooling
Egyptair Maintenance & Engineering	Y	Y			
Embraer Services (Nashville)	Y	Y			
Embraer Maintenance Center (Brazil)	Y	Y			
ExelTech Aerospace		Y			
Finnair	Y	Y	If available	If available	If available
Flybe Aviation Services	Limited to line & base EMM tasks				
GE Engine Services	Y	Y	Y		
Lufthansa AERO Alzey	Y	Y	Y	Y	Y
MTU Maintenance	Y	Y	Y	Y	Y

E-JET FAMILY ROTABLES AND LOGISTICS

Facility	Rotable inventory leasing	Rotable inventory pooling	Repair & document management	AOG support	PBH rotables support
Egyptair Maintenance support & Engineering	Limited support	Limited support	Limited support	Limited support	Limited
Embraer Services (Nashville)	Y	Y	Y	Y	Y
Embraer Maintenance Center (Brazil)		Y	Y	Y	Y
Embraer Service Center (Fort Lauderdale, France & Singapore)		Y	Y	Y	Y
ExelTech Aerospace				Y	
Finnair	Y	Y	Y	Y	Y
Fokker Services / Stork	On system level	On system level	Full cap.	Full cap.	On system level
Goodrich	Y	Y	Y	Y	Y
Lufthansa Technik	Y	Y	Y	Y	Y

E-JET FAMILY HEAVY COMPONENT MAINTENANCE

Facility	Wheels, tyres & brakes	APU test & repair	Thrust reversers	Landing gear	Landing gear exchanges
Egyptair Maintenance & Engineering	Y		Y		
Embraer Services (Nashville)	Y		Y	Y	Y
Embraer Maintenance Center (Brazil)	Y			Y	Y
Embraer Service Center (Fort Lauderdale, France & Singapore)	Y	Y		Y	Y
Finnair	Y			Under study	Under study
Flybe Aviation Services	W&T only				
Fokker Services / Stork	Dormant cap.		Dormant cap	Dormant cap	
Goodrich			Y		
Lufthansa Technik	Y			Y	Y