

More airlines are outsourcing the process of acquiring and repairing rotatable inventories to reduce capital investment. Specialist parts providers and large airlines are increasing their range of services so smaller carriers can reduce their own activity in the process in inventory management.

Rotatable inventory suppliers survey

The trend towards an increased level of sub-contracting of maintenance and other activities includes support for rotatable or line replaceable unit (LRU) component provisioning, management and repair. This survey lists information about the rotatable/LRU support services offered by major providers in the US and Europe.

Inventory management process

The process of inventory management involves ensuring rotatables or LRUs are available whenever required. While some components, termed 'minimum equipment list' (MEL) or 'no-go' items, are essential to the operation of an aircraft, replacement of non-essential parts can be deferred. Airlines do not need to hold a spare part for every component on the aircraft at every station to which it flies. Airlines can access parts under a short-term swapping agreement from other airlines that are stationed at major airports they fly use. This reduces the stock of inventory that an airline has to hold.

Non-essential parts and those with low failure rates do not prevent an aircraft returning to its home base, should they fail at an outstation. Failure of a 'no go' item at an outstation will ground an aircraft until a solution has been found. An airline can use its own stock and engineers, engineering companies or other airlines to rectify these 'aircraft on ground' (AOG) situations.

This means that airlines can keep a stock of rotatables at their home base and smaller stocks at outstations to which they fly regularly, or where there are few host airlines to provide assistance.

In general, the amount of stock required per aircraft reduces on a curvi-linear basis. The number of items actually required for a given level of availability reduces sharply when increasing from one

aircraft by each additional aircraft and then reaches a constant level at a fleet size of 30-40. The number of items required for each part number per aircraft has its own curvi-linear relationship.

The repair and overall management of rotatables must be considered alongside the quantities required and their location. Large airlines have the facilities to repair high-value rotatables, while many specialist repair agencies cater for the growing number of smaller airlines. A high volume of repairs is also carried out by the original equipment manufacturers of parts.

Parts have to be returned and made available on time to the right location. Reducing the time for repair reduces the inventory required. Parts must be certified and repaired with the right approvals, and must have the documentation has to prove this. Parts also have warranties against failure for varying periods of initial use, with failure to claim these costing airlines millions of US Dollars per year. Warranty claims therefore have to be managed. AOG situations also have to be dealt with. The process of supplying, repairing and maintaining inventory therefore requires a large management activity.

Sub-contracted inventory

The curvi-linear relationship between inventory requirements and fleet size means that carriers with large fleets enjoy economies of scale and so can justify owning their own inventories. Large airlines can reduce costs by pooling or leasing their inventory to smaller carriers. As fleets get larger it becomes more economic for airlines to hold their own inventories of each part, than access them from third party suppliers.

Large carriers also have the benefits of economies of scale for repair and management. They have facilities in place with the capacity to manage their own

repairs, as well as provide services for other carriers.

Small airlines find it economic to acquire their inventories from third party sources. Small fleets require a high volume of inventory per aircraft. Accessing parts from a third party supplier reduces this requirement, because inventory can be shared between fleets of other airlines.

The repair and management process requires a critical mass of staff, but also a large investment for a facility. Sub-contracting repairs and only paying for services actually used is also the more economic option for small airlines.

Types of service

Small airlines are interested in maintaining an operating schedule reliably for the lowest possible cost and capital investment, and minimal management input.

Most third party suppliers have developed a system whereby a customer airline holds an inventory of essential/no go items, parts with a high failure rate and parts which are unique in a homebase stock. Inventories of the same parts, or some of the same parts, also have to be held at outstations to allow operational reliability to be maintained.

Other parts that do not need to be held at an airline's home base are those with low failure rates, long intervals between failures, and non essential items. As this second group of parts does not need to be replaced on the aircraft immediately, replacement units can be acquired up to a few days after failure and removal. These items can therefore be held by a third party and also shared between other carriers, improving the economy of their utilisation. The components held in a pool can account for as much as 80% of all LRUs.

Third party suppliers can provide airlines with access to a common pool or



inventory of parts which they do not logistically require at their home base. The pool provider can dispatch parts to an airline, and deliver them without jeopardising reliability. Removed parts are replaced with other serviceable items, a practice often known as an open exchange pool.

An airline's homebase stock can be owned, but airlines are attempting to limit their capital investment. Some third party parts and rotables suppliers have begun to offer customers lease packages as a way of minimising investment. Airlines have also bought inventory, sold it to parts suppliers and then leased it back.

Access to the pool of non-homebase inventory can be made through fixed rate agreements. Many suppliers offer access to a pooled inventory on a power-by-the-hour (PBH) basis. The actual agreed rate will depend on the number of parts to which the airline requires access.

The pool provider will already have an arrangement in place to get parts repaired. The airline can use the pool provider to arrange repair of its home base inventory as well. This repair management fee is also usually charged on a PBH basis. One repair fee can thus be charged for the repair of all items. The repair fee can also include a management fee, which can also be constructed to include services such as warranty management, AOG management and administration.

The services providers offer can be extensive and remove the need for an airline to have engineering input into the process of inventory management. A parts provider can offer an initial provisioning (IP) service, which determines the amount of inventory

required, and decides the split between home base stock and stock accessed from a pool. Airlines also like to perform reliability programmes to identify the main causes of poor reliability. This is more commonly done in parallel with component tracking. Each part can be tracked with computer systems, and so failure intervals followed. These services are now offered by an increased number of parts suppliers.

Third party providers

Access to and the repair and management of inventory can now be acquired from a number of third party specialists. The dominant providers are US and European, and are either specialist companies or the engineering divisions of airlines. Some larger companies have bases and support centres in various locations around the world.

European providers

Airline Rotables (ARL) is a UK-based rotatable support supplier and is part of the Singapore Technologies Group. ARL is a non-airline supplier which specialises in the 737, 757 and A320, and offers on-wing support for the aircraft types' relevant engines. Its support location is at Stansted Airport, UK. ARL has customers in all regions of the world, including New Zealand, the US and Asia Pacific. It supplies customers with a homebase inventory and access to a pool for remaining parts. "We offer a repair management service for all components to our customers. Home based stock can be owned by the airline or leased from us. Airlines can then pay a PBH rate for

The number of parts required for each aircraft and fleet size has a curvi-linear relationship. Only airlines with large fleets can now justify owning their own inventory, and there is a trend towards more airlines sub-contracting the process of inventory supply to larger carriers or third party specialists.

access to pool stock and repair management," says Stuart King, commercial manager at ARL. "The PBH rate can also include a management fee for administration, logistics, warranty management and AOG service."

ARL also offers IP services, reliability programmes and exchange and pooling. "We have a computer system for tracking rotables by serial number. This allows us to build a database of reliability and failure rates, and identify weaknesses, such as poor repair quality. We can use this to improve reliability. This also allows us to establish soft times to remove parts so that failures can be anticipated and problems avoided," says King. "We have also developed a web-based system for customers where they can order parts on-line and track the progress of individual parts."

A.J. Walter is a UK-based parts supplier that supports airlines and maintenance facilities. The firm has developed a large capability and supports the A300, A310, A320, A330, A340, 737, 747, 757, 767, DC-9, DC-10 and L-1011. Various regional aircraft types are also supported, including the BAE 146/RJ, CRJ, ERJ-145, ATR42/72 and Dash 8 family (see table, page 30).

A.J. Walter is based near London Gatwick airport, but has an additional storage location in Florida and 40 offices worldwide. It provides LRU support for the aircraft types listed and engine LRU or on-wing support for their relevant engine types.

A.J. Walter has more recently provided rotatable support packages for airlines operating the 737NG, A320, A330 and A340, with IP packages totalling \$25 million, in the past 12 months. A.J. Walter is one of the few firms to offer its own repair services, and carries out repairs and repair management either through A.J. Walter Group companies, or companies it represents. One of A.J. Walter's advantages is that it has an inventory of 350,000 line items, a total of 2.5 million parts and a value in excess of \$200 million. These are available for purchase, exchange, loan or lease.

Christopher Whiteside, managing director of A.J. Walter, explains that it offers inventories for sale or lease to airlines and IP services. It also offers customers the option of sale and leaseback of inventories.

A.J. Walter also claims to be unique

EUROPEAN ROTABLE, LRU & ON-WING SUPPORT PROVIDERS

Company	Aircraft types supported	Engine types supported	Support locations	Services offered
Airline Rotables	737, 757 & A320	Relevant to aircraft	Stansted, UK	IP, repair management, reliability programmes, exchange & pooling & financing.
AJ Walter	All Airbus, 737, 747, 757, 767, DC-9, DC-10, L-1011, BAE 146/RJ, CRJ, ERJ-145, ATR 42/72 & Dash 8.	All major types	Gatwick, UK	IP, repair management, reliability programmes, exchange & pooling, & leasing.
CASCO	ATR 42/72, BAE 146/RJ, Boeing range, Bombardier and Dornier	ALF 502	Horsham, UK	IP, repair management, reliability programmes, exchange & pooling, & financing.
FLS Aerospace	737 Classic, 737NG, 757, 767 & A320	JT8D, CFM56, V.2500, CF6, RB211 & PW4000	Stansted & Manchester, UK; Dublin, Ireland; & Copenhagen, Denmark	IP, repair management, reliability programmes, & exchange & pooling.
Air France Industries	A310, A320, A330, A340, 737 Classic, 737NG, 747 and 777	CFM56-3/-5A/B/C/-7 CF6-50, CF6-80 & GE90	Paris, France; UK; US; South America; & China	IP, repair management, reliability programmes, exchange & pooling, & financing.
Iberia	A320 family, A340, 757, 747 & MD-80	CFM56-5A/B/-5C, RB211-535E4, JT8D-200 & JT9D	Madrid, Spain	IP, repair management, & exchange & pooling.
KLM Engineering & Maintenance	737 Classic, 737NG, 767, 747, DC-10 & MD-11	CFM56-3/-7 & CF6 family	Amsterdam, Netherlands	IP, repair management, reliability programmes, pooling & financing
Lufthansa Technik	All Airbus types, 737 Classic/NG, 747, 757, 767, 777, MD-80, MD-11, CRJ, Fokker 50 & Dash 8	CF6 family, CFM56-3/-5/-7, JT8D, JT9D, PW4000, V.2500, PW100, RB211-535, Trent 500	Hamburg & Frankfurt, Germany	IP, repair management, reliability programmes, exchange & pooling, & financing.
Sabena Technics	A320, 737, 757 & 767	Relevant to aircraft types	Brussels, Belgium & Stansted, UK	IP, repair management, reliability programmes, & exchange & pooling.
SAS Component	A320, A340, 737NG, 767, MD-80 & Fokker 50.	Relevant to aircraft types	Copenhagen, Denmark; Oslo, Norway; & Stockholm, Sweden.	IP, repair management, reliability programmes, exchange & pooling & financing.
SR Technics	A310, A320 family, A330, A340, MD-80 & MD-11	PW4000, CFM56-5B/-5C/-7 & JT8D-200	Zurich, Switzerland; plus support in Asia, Europe & Americas	IP, repair management, reliability programmes, exchange & pooling & financing.

in offering customers an exchange service for parts plus overhaul, or an exchange and overhaul in a single price. It also claims to offer customers access to pooled inventory at rates superior to most of its competitors.

CASCO is a UK-based parts provider specialising in regional aircraft, including the ATR42/72, BAE 146/RJ, various Bombardier types and the Boeing range of aircraft (*see table, this page*). CASCO's

main support base is Horsham, UK and has various other locations in Europe. Its services include IP, repair management, pooling programmes, financial assistance. Customers include Aer Lingus, Flightline, Albanian Airlines and Clubair.

FLS Aerospace is a large independent European airframe maintenance facility that provides rotatable support for the 737 Classics, 737NG, 757, 767, A320 family and A330. It also provides on-wing LRU

support for the JT8D, CFM56, V.2500, CF6 and RB211. FLS has support locations at Copenhagen, Denmark; Dublin, Ireland; and Stansted and Manchester, UK. It also has consignment stocks at various airports around the world.

FLS has developed by acquiring airline maintenance facilities, and offers IP services and consignment stock recommendations. FLS also has its own

Parts repair is an expensive process. Small airlines can sub-contract the whole process of having their inventories supplied and repaired by third party specialists. Contracts can be arranged where inventories are leased and remaining parts and repair of all items are paid on a PBH basis.

component repair capabilities, but also uses other repair agencies. These all come under the control of its component management services. Although it does not offer financing assistance for acquiring rotables, it does have exchange and pooling programmes.

FLS supports many European operators, including British Airways, easyJet, Air Europa, Aer Lingus, MyTravel, Air 2000, Air Malta and Deutsche BA. It currently supports 124 737 Classics in a variety of fleets.

Several European carriers offer third party maintenance services, part of which include rotatable and LRU support.

Air France Industries is one of the largest, with capability for the A310, A320, A330, A340, 737 Classic, 737NG, 747 and 777. It offers on-wing support for the CFM56-3/-5A/B/C/-7, CF6-50, CF6-80 and the GE90 (*see table, page 30*). It is able to support airlines worldwide, with locations in France, the UK, the US, South America and China. It offers rotatable support services of inventory evaluation and IP, repair and repair management, reliability programmes, and pooling and exchanges. As an airline maintenance facility, Air France Industries has the in-house capability to provide full rotatable support management services. It can also provide customised financing solutions. Air France currently supports 500 aircraft in its pooling programme, including its own fleet, and aircraft for 30 customers. Its total inventory is 30,000 part numbers and is valued at \$350 million. Customers include Virgin Atlantic, Air Mauritius, Royal Air Maroc, TAM, Thai and Star Airlines.

Iberia supports the A320 family, A340, 757, 747 and MD-80. It also offers on-wing LRU support for the CFM56-5A/-5B/-5C, RB211-535E4, JT8D-200 and JT9D (*see table, page 30*). Its main support base is at Madrid, Spain. Like most airline third party maintenance services, Iberia offers IP, repair management, and exchange and pooling programmes.

KLM Engineering and Maintenance, whose main base is in Amsterdam, Netherlands offers its customers its total component care service. The aircraft types it can support are the 737 Classics, 737NG, 767, 747 family, MD-11 and DC-10. It also offers on-wing support for the CFM56-3/-7 and CF6 family (*see table, page 30*). Additional services are IP,



repair and repair management, reliability programmes, pooling, and financing assistance as part of the pooling service. KLM Engineering and Maintenance's customers include Atlas Air, Sahara Airlines, Virgin Atlantic and Garuda Indonesia.

Lufthansa Technik is Europe's largest third party maintenance supplier. In addition to its own fleet, it is also a partner in Airliance Materials and a member of the Star Alliance. It therefore has direct and indirect access to inventory and rotables of virtually any modern jetliner and engine type. These include all Airbus types, the 737 Classic, 737NG, 747, 757, 767, 777, MD-80, MD-11, various regional jets, the Fokker 50 and Dash 8. It can also provide on-wing support for the CF6-50, CF6-80, CF34, CFM56-3/-5A/-5B/-5C/-7, PW4000, JT8d, JT9D, V.2500, RB211-535, Trent 500 and PW100 (*see table, page 30*).

Its main support location is at Hamburg, Germany. Lufthansa Technik offers reliability programmes and analysis, customer requirements and aircraft and engine condition monitoring. Lufthansa Technik will provide IP for its customers, and the recommendation of inventory will be constantly monitored during the contract. Lufthansa Technik is also able to offer pooling programmes for parts that are not only in its inventory, but also via the inventories of some of its Star Alliance partners. Lufthansa Technik claims its customers' costs go down to the same level achieved by airlines with large fleets, because they have access to inventory shared by 400 Airbus and Boeing aircraft. Lufthansa Technik also offers Total Technical Support (TTS), which includes all elements for support,

including line maintenance, repair and overhaul, parts pooling and logistics.

Sabena Technics supports the 737, 757, 767 and A320 family, and on-wing support for the CFM56-3/-5 series, with support locations at Brussels, Belgium; and Stansted, UK. Sabena Technics can support 40-50 aircraft, and offers IP; reliability programmes; and exchange and reliability programmes.

SAS Component is one of Europe's largest component support providers from its bases in Copenhagen, Denmark; Oslo Norway; and Stockholm, Sweden. It offers rotatable and LRU support for the 737NG, 767, MD-80, A320 family, A330, A340 and Fokker 50 (*see table, page 30*). It provides the usual services of IP, reliability programmes, exchange and pooling programmes, as well as the financing of rotables. SAS Component has a wide variety of customers, including Air Europe, Volare Airlines, Alitalia, Air One, Britannia, Egyptair, Lauda Air, LOT Polish, Martinair and Royal Jordanian.

SR Technics is another major European airline maintenance provider. It offers rotatable support for the A310, A320 family, A330, A340, MD-80, MD-11, PW4000, CFM56-5B/-5C/-7 and JT8D-200.

Its main base is at Zurich, Switzerland, but it also has branch store operations worldwide, including the Asia Pacific, Europe and the Americas. Besides basic IP services, SR Technics also offers consulting on aircraft specification and vendor selection. It also offers repair management, reliability programmes, exchange and pooling, and also financing assistance. Customers include KLM, Garuda, Aero Lloyd, Air Jamaica, Thai and Martinair.

N AMERICAN ROTABLE, LRU & ON-WING SUPPORT PROVIDERS

Company	Aircraft types supported	Engine types supported	Support locations	Services offered
AAR Corp	All Boeing, all DC & MDC & various regional types	CFM56 series, CF6 series, PW2000/4000, JT8D, JT9D, V.2500 & RB211	Chicago & New York, USA; Amsterdam, Netherlands & Mitcham, UK	IP, repair management, reliability programmes & financing
Airliance Materials	All Airbus, all Boeing, all DC & MDC & CRJ	CF6 series, CFM56, CF34, V.2500, JT8D, JT9D, PW2000, PW4000 & PW100	Chicago, San Francisco, & Indiana, USA; Montreal, Canada; Hamburg, Germany; Dublin, Ireland; London, Ireland; Tokyo, Japan & Singapore	IP, repair management, reliability programmes & exchange & pooling
Ansett Spares	A300, A320, 737, 757, 767, BAE 146/RJ, F.27, F.28 & Fokker 50	Relevant to aircraft	London, UK; Los Angeles, US & Melbourne, Australia	IP, repair management, exchange & pooling & financing
Source One Spares	A300, A320, All Boeing & all DC/MDC		Houston, Texas	IP, repair management, exchange & pooling & financing
Volvo Aero	737 series, 757, 767, 747 & various regional	JT8D, JT9D, PW4000, V.2500, CFM56, PT6 & PW100	Boca Raton & Seattle, US; & London, UK	IP, repair management, exchange & leasing
Delta TechOps	737 Classic, 737NG, 757, 767, 777, MD-11 & MD-80/90	CFM56-3/-7, CF34, CF6-80, JT8D-200, PW2000 & PW4000	Atlanta, USA	IP, repair management, reliability programmes, exchange & pooling & financing
Air Canada Technical Services	A320 family, A330, A340, 737, 767 & CRJ	CFM56-2/-5A/B/C, CF34, JT9D & PW4000	All major Canadian airports, Miami & Chicago, US; London & Glasgow, UK; Zurich, Switzerland; Frankfurt, Germany, Hong Kong; Beijing, China, Tokyo, Japan & Barbados	IP, repair management, pooling & financing

North American providers

AAR is one of the leading independent spares suppliers in the industry. AAR has headquarters in Chicago, but stores and logistics bases in New York; Miami; Atlanta; Mitcham, UK; Amsterdam, Netherlands; and Singapore (*see table, this page*).

AAR has one the most extensive levels of experience in the parts supply business, having dealt with more than 13,000 customers to date. "We have supported virtually every airline in the world at some time or another," explains Andy Sewall, group vice president of inventory and logistics services at AAR.

AAR can support all Boeing types, all Douglas (DC) and McDonnell Douglas (MDC) types and many regional types (*see table, this page*). AAR does not support many Airbus aircraft. In conjunction with these aircraft types, AAR also provides LRU parts for the CFM56, CF6, PW2000/PW4000, JT8D, JT9D, V.2500 and RB211-524 engines (*see table, this page*).

Additional services AAR offers

include IP, repair management at its Amsterdam, Mitcham and New York facilities; reliability programmes; pooling and financing assistance. Overall, AAR's capability extends to supporting fleets as large as 300 aircraft. "Our typical contracts are for fleets of less than 10 aircraft, with IP packages of \$1.5-3.0 million," says Sewall. "The financial assistance we can offer customers includes sale and leaseback deals and straight leasing. We have an investment grade balance sheet, and so have access to financing at a lower cost than most airlines."

Airliance Materials is based in Chicago, but also has support locations in San Francisco and Indiana, US; Montreal, Canada; Hamburg, Germany; Dublin, Ireland; London, UK; Tokyo, Japan; and Singapore (*see table, this page*). Airliance Materials was formed as a joint venture between Star Alliance members United, Lufthansa and Air Canada. The wide range of aircraft and engine types operated by these carriers is reflected in the aircraft and engines types for which Airliance Materials can provide

LRU support. This includes all Airbus models, all Boeing types except the 707, all DC and MDC types and the Bombardier CRJ (*see table, this page*). It can provide LRU support for the CF6-50/-80, CF34, CFM56, V.2500, JT8D, JT9D, PW2000, PW4000 and PW100.

Additional services offered by Airliance Materials are IP, repair management, reliability programmes and pooling and exchange services. Airliance Materials is also able to support virtually any fleet size of the aircraft types it supports. Customers include Northwest, Sabena, KLM, American and a variety of maintenance repair and overhaul facilities.

Ansett Spares is a provider with more specialist capabilities. It can support the A300, A320, 737, 757, 767, BAE 146/RJ series, F.27, F.28 and Fokker 50. It also provides support for their relevant engine types (*see table, this page*). Logistics and support locations are at London, UK; Los Angeles, US; and Melbourne, Australia. Ansett offers IP, repair management, pooling and exchange programmes, and financial assistance for rotables. Its

More airlines are seeking to minimise capital investment in rotatable inventories. Aerospace financiers are reluctant to lease rotatables, but more of the specialist parts providers offer financial assistance.

customers include KLM uk, British European, Swiss, Air France, Malaysian, Air New Zealand and Ryanair.

Source One Spares, located in Houston, Texas, provides rotatable support for all Boeing and DC/MDC types, as well as the A320 and A300 (see table, page 32). Source One Spares offers IP for its customers, and manages repairs via other facilities. It also has pooling and exchange programmes and offers financial assistance.

Volvo Aero is another of the US's largest parts suppliers. Volvo provides support to airlines either via operating leases of inventory or exchange pools. Volvo has support locations at Boca Raton and Seattle, US and London, UK. It can provide inventory for the two main 737 series, 757, 767, 747 and various regional aircraft. The relevant engine types for which it provides LRU support are the JT8D, JT9D, PW4000, V.2500, CFM56 and PT6 and PW100 turboprop engines (see table, page 32).

Volvo sources many of its parts from the used market to support aircraft. "After making the IP list, we source high value parts and put them into a lease package for the airline's home base. These have to be returned to us at the end of the contract," says Irvin Lucas, vice president of sales and marketing at Volvo Aero. "We also manage repairs for the airline's home base inventory. The remaining inventory can be supplied in a number of ways. Airlines often make their own IP and buy inventory. They then have to tap into a pool for the other items. We can determine and supply this home base inventory. We also sometimes work with original equipment manufacturers (OEMs) on behalf of the airlines to buy some of the IP inventory."

Besides supporting airlines, Volvo also assists maintenance providers. "There may be one which has A340-200/-300 maintenance capability, and wants to enter the A340-500/-600 market. We acquire A340-500/-600 inventory and lease it to the maintenance provider so it can then provide a full maintenance and support service for the aircraft," explains Lucas.

Volvo Aero can use Volvo Aero Leasing to finance and lease inventory to airlines. Once leases have finished Volvo Aero can trade the inventory on the market. "Financiers themselves are



reluctant to finance rotatables because of residual value risk. We can use Volvo Aero Leasing to finance parts, and then Volvo Aero to market them," says Lucas.

Delta TechOps, the maintenance and engineering division of Delta AirLines, has increased the marketing activity of its maintenance capabilities to smaller airlines in recent years. Delta TechOps has a wide range of capabilities, and can provide full maintenance and support for most Airbus and Boeing aircraft and Pratt & Whitney, General Electric, CFM International and International Aero Engine types when including the capability of its alliance partner Air France Industries.

Delta TechOps can provide rotatable and LRU support for the 737 Classic, 737NG, 757, 767, 777, MD-11 and MD-80/-90 aircraft. It can also provide LRU support for several CFM56 variants, the CF34, CF6-80 series, JT8D-200, PW2000 and PW4000 (see table, page 32).

Delta TechOps benefits from already supporting an extensive airline operation, and a partnership with Air France Industries. Delta TechOps can therefore provide support to airlines from 48 locations in 13 countries.

Being the maintenance facility of an airline, Delta TechOps already has the capability for all management and support services for rotatable and LRU support. These include IP, repair and repair management, reliability programmes, pooling and exchange programmes and the financing of rotatables.

In addition, because it is an airline division, it has the added advantage, which independent suppliers do not, of also having mechanics and the infrastructure in place to perform line

maintenance for its customers.

Delta Tech Ops already supports 800 aircraft in the Delta and Delta Connection fleets, and so claims to be able of supporting almost a limitless number of aircraft. Some of Delta TechOps's customers include ABX, Royal Air Maroc and World Airways.

Air Canada Technical Services (ACTS) has an extensive rotatable support service. It can offer customers support for the A320 family, A330, A340, 737, 767 and Bombardier CRJ. The engine types it can provide LRU or on-wing support for are the CFM56-2/5A/-5B/-5C, CF34, JT9D and PW4000 (see table, page 32).

Like Delta TechOps, ACTS can also offer customers line maintenance services for the same aircraft and engine types, as well as the 747.

ACTS has support locations at its main Canadian bases of Vancouver, Calgary, Winnipeg, Toronto and Montreal. It also has a stores facility in London, UK to support European operations. It has other Canadian stores facilities supporting line operations at Ottawa, Edmonton and Halifax. US bases are Miami, Chicago and Honolulu. Other global stores are Zurich, Frankfurt, Hong Kong, Beijing, Tokyo (Narita), Glasgow and Barbados.

Again, because ACTS is an airline division it has the infrastructure and ability to offer IP, materials management, parts repairs, and reliability programmes. ACTS also has a pooling programme as part of its materials management process. It can also work with its customers to decide an appropriate rotatable support level and can assist in the financing of rotatables. Examples of its customers include Atlantic Coast Airlines, United, ABX, Air Jamaica and BWIA. [AC](#)