

The past nine years has seen the engine repair and inventory supply market change to a situation increasingly dominated by the OEMs. Airlines now want packages only few companies other than OEMs can offer. Does this mean even less choice for airlines in the future?

What choice is there for engine inventory?

Acquisition of engine inventory has evolved rapidly over the past ten years. The spare engine supply industry has changed from one of ownership and a few short-term leases to one offering a wider choice of acquisition methods.

These include short-, medium- and long-term operating leases, finance leases, combined maintenance and inventory power-by-the-hour (PBH) and guaranteed cost deals, and sale and leaseback transactions. Paradoxically this development has been paralleled by a reduction in the number of companies airlines can approach to acquire engine inventory.

The current fleet of about 10,000 jet airliners is supported by a global fleet of about 4,000 spare engines. The factors that determine this number are on-wing time between removals, numbers of engines per aircraft, average time for a shop visit, the safety margins an airline requires against shortages and the number of aircraft in each airline fleet.

Improvements in technical efficiency have reduced the number of spare engines

required. This includes longer on-wing times, more twin-engined aircraft and shorter shop visit turn times.

The global fleet of installed engines is predicted to reach 35,000 units in another 10 years, and this will require in the region of 7,000 spare engines. This will be required by more than 1,000 airlines and so it is important for carriers to have a choice.

Traditional inventory

Prior to increased competition airlines owned their aircraft and engine inventories. Engine maintenance was either performed in-house or sub-contracted.

Airlines owned most, if not all their engines. The number of ways airlines could exploit a smaller degree of spare engine ownership was through pooling, either with IATA or maintenance partnership members.

A small portion of engines could be acquired on short-term leases. This market evolved along with the rest of the aftermarket, but was used principally

when airlines needed a small number of engines for a short period as a result of an unforeseen shortage.

In the past manufacturers were involved in engine repair and maintenance as a minority of their activities. They had to operate engine shops to provide maintenance services to smaller operators and modifications.

The onus of traditional ownership of spare engines always lay with the airlines because of the high investment required. Original equipment manufacturers (OEMs) have always been able to supply spare engines, but have always preferred to dissuade airlines from relying on this because of the investment. OEMs have always kept a minimum number of spare engines.

Airlines thus always took the risk of ownership. An excess number of engines were always held, absorbing large volumes of capital. Ownership of spare engines also increased capital investment and airlines then became involved in the disposal of engine inventory, the profitability of which is a hit and miss affair.



Changing fortunes

Cost consciousness and technical efficiencies led to a reduced number of required spare engines. It also led to a reduction in the pace at which airlines replaced old aircraft, larger purchase discounts for new equipment and the development of new financing techniques away from straight cash purchases.

This triggered a change in the engine maintenance and inventory supply market and a process of improving maintenance cost efficiency. This included a greater reliance on third party maintenance, or least partial divestment by airlines in their facilities, and the negotiation of fixed rate or power-by-the-hour (PBH) maintenance deals for all elements of aircraft, engine and component maintenance.

With increasing pressure for manufacturers to win sales and market share, engine manufacturers would have been tempted to offer discounts on new engines which eroded profit margins. Profits remained in supplying spare parts, so OEMs looked for ways to increase their presence in this sector.

The traditional group of airline maintenance facilities was joined by a growing number of independent maintenance providers and spare parts suppliers. This was triggered by the arrival of more airlines and also the development of an aircraft, engine and parts aftermarket. This happened as the first of the large primary airline fleets were retired and dispersed to a growing number of new operators.

This development, started in the late 1970s, saw a flourishing aftermarket

develop and grow during the 1980s and into the 1990s. This market soon became identified as a profitable sector and the one where engine manufacturers could increase their share of the aftermarket activity for overhaul and spare parts.

The three main manufacturers have been involved to different extents in the engine maintenance and aftermarket in the past.

OEM evolution

Until the early 1990s Rolls-Royce (RR) had a market limited to a select number of 747 and L-1011 operators. The exception to this was its dominance in the 757 market. The relatively small number of airlines operating RR engines was one factor which allowed the manufacturer to maintain control over the overhaul market for its products. Only a few independent engine shops have ever had the capability for maintaining RR engines.

In recent years RR's market fortunes have expanded. Most engine shops with RR capability have sold a portion of their shares to RR, allowing the manufacturer to maintain a degree of control in the repair market of its own engines.

There were and still are a large number of airline and independent shops providing capability for Pratt & Whitney (P&W) engines. These included Greenwich Air Services, Volvo Aero Engine Services, Aerothrust, M&M, Amjet, Aviall, Swissair Technics, Lufthansa Technics, Alitalia and Finnair.

The large number of shops with P&W capability is explained by the growth of the aircraft aftermarket, which

The larger engine shops with GE, P&W and Rolls-Royce engine capability has reduced in the past nine years with the OEMs having bought or made joint ventures with them. GEES has made the largest acquisitions, after buying shops in the UK, US, Brazil and Malaysia.

involved large numbers of P&W-powered aircraft, and P&W having the largest market share for several decades.

Until the mid-1980s the majority of General Electric (GE) engines were operated on the A300, DC-10 and 747 by a minority of major airlines. The number of independent engine shops with GE capability was therefore limited.

This situation changed with more GE-powered aircraft entering the market and more engine shops had GE engine capability. GEES has expanded in the aftermarket since 1991 after acquiring several large independent and airline engine shops. These include British Airways, Aviall, Greenwich Air Services and Varig. These shops not only had capability for GE engines, but also for other types. This allowed GEES to take large market share, particularly of modern engine types, as well as a large part of the aftermarket. To ensure supply of spare parts GEES formed partnerships with suppliers. One example is with AAR.

P&W followed with a strategy of forming partnerships and joint ventures with airline maintenance facilities.

Complete simplicity

The choices for airlines now have for acquiring inventory has widened in techniques, but airlines are now becoming increasingly reliant on the OEMs for support and have fewer choices for acquisition to make from a diminishing aftermarket.

Airlines have managed to secure engine maintenance contracts on a fixed cost basis. The high demand for such services is forcing more engine maintenance providers to offer these contracts. Coinciding with the need to have predictable repair costs airlines are also seeking guaranteed or predictable engine inventory costs, rather than owning and managing their engine inventory and incurring unexpected costs for emergency situations, or holding excessive numbers of engines.

This inevitably leads to airlines requiring complete engine support from an independent company which can undertake the entire management of engine inventory so that the exact number of engines, their cost and management can be guaranteed. Such an undertaking ultimately requires the



independent to have engine ownership and take the risks of ownership and management. Complete guaranteed cost maintenance and inventory packages may even be required by major airlines which still own their own engine repair shops and spare engine inventories.

While these packages may seem to be a straightforward proposition, it is complicated by banks' and other financing institutions' dislike of engine ownership, due the complications of title, repossession and insurance. These packages also require a range of skills individually supplied by specialists in the industry. Such deals therefore require the financial power of large organisations.

Apart from the OEMs, there are few organisations with the range of skills and financial power to offer these complete packages to airlines. Now OEMs control a large part of the repair and spares market they can offer airlines acquiring new fleets all the services they require. The OEMs are prepared to offer airlines fixed price deals and these have often become part of the offer when new engine orders are taken.

Inventory evolution

Operating leasing of engines developed as a short-term solution to unexpected problems and provided spare units on the 5% of occasions a powerplant was needed. Owning such engines was uneconomic for airlines in relation to their utilisation.

Companies in the aftermarket such as Ages, AAR, Aviation Sales, Kellstrom and Willis Lease Finance Corp offer short-term leases. These leases are up to nine months in duration and deals are made on the spot market. As a consequence

engines may only be utilised about 50% of the time and so market rates are high, although they fluctuate. The expense is also increased by the need to transport and change engines. Lease rates are determined by current supply and demand and so lease rate factors cannot be applied to an engine type. There is currently a glut of JT9Ds and other older engines and so lease rates will be low.

The engines more commonly available on the short-term market are the JT8D and JT9D for the older types operated in small fleets by carriers which want to minimise long-term investment.

The growth in aircraft operating leasing then led to medium-term leases of engines to match aircraft lease terms and suit an airline's requirements with respect to fleet flexibility. Medium-term lease rate factors are more akin to aircraft financing and determined by interest rates, lease term and lessee creditworthiness. "Lease rate factors have been less than 1% and as high as 1.4," explains Jon Sharp, chief executive of Engine Lease Finance (ELF). "Terms are typically 3-6 years and they are becoming more popular in parallel with aircraft operating leases".

Long-term leases, of more than five years, are also used. "These can have similar lease rate factors as medium-term leases, but interest rates are stabilising and customers usually require fixed term rates. The lessor then obtains a currency swap to get a fixed rate for the lessee," explains Sharp. "Over the past two years it has been possible to get just a nine basis point difference between a two and seven year term".

While operating leasing is a simple and predictable process for airlines, it is not easy for lessors. Although engine assets retain their value well, banks are

Airlines are now being offered fixed price engine maintenance, inventory & parts management and used engine disposal packages which completely eradicate the need for a carrier to deal with independent suppliers. Airlines are still having to own a large portion of their inventories.

selective about financing engine purchases for airlines because of the complicated issues of . As a consequence specialist engine lessors are required. These require easier access to financing. One example is ELF, which in 1998 became part of a joint venture with The Ages Group, Bank of Tokyo-Mitsubishi and Volvo Aero Engine Services to form Aviation Lease Finance (ALF).

"ELF/ALF now has access to financing through our partner Bank of Tokyo-Mitsubishi," says Sharp. "Consequently we are able to access more debt as deals come available and can satisfy lessees' requirements in a growing market".

With consolidation in the engine repair and spares aftermarket, independent spares providers and engine repair shops are finding it harder to get business in their traditional share of the aftermarket. While older types using the JT9D and JT8D are decreasing in number, the OEM's engine facilities have more control of types like the CF6, JT8D-200, CFM56, PW4000 and RB211, both in respect of parts and engine shop visits. Independents will maintain business through the dealings of used aircraft, engines and material with smaller airlines using older fleets. OEMs can prevent this by taking control over the ownership of their own engines. Although they do not own engine inventories used by their customers, OEMs are also including deals to buy back engines at fixed rates at fleet retirement so that control can also be taken over the aftermarket, while excluding independents to a greater extent.

Alternatives

These complete packages are appealing to airlines, because however many shop visits or spare engines are required, costs are guaranteed. This is possible even in cases where OEMs neither have an ownership stake in the repair shop or engine inventory. These deals will then increase as OEMs take greater control of the market.

Manufacturers are reluctant, however, to finance the ownership of entire engine inventories and airlines are still finding they have to retain ownership of a large number of their spare engines. This is explained by the OEMs themselves having limited resources to maintain ownership of a large number of spare engines. For example, RR, which can

offer an integrated support package, has an inventory of only about 100 engines.

Airlines are keen to avoid investing capital in spare engines and so look for ways of divesting in engine inventory. Specialist engine lessors and traders are keen to provide engine sale and leaseback transactions for airlines. Few of these independents are able to offer the complete packages airlines now require.

"ALF has partners involved in operating leasing, spares provision engine overhaul and finance," explains Bill Cumberlidge, executive vice president of The Ages Group. ALF can therefore offer similar packages provided by the OEMs. Most importantly ALF has access to debt and so can finance the purchase of engines inventories for airlines.

"We are involved in V.2500, CFM56-3/-5/-7, PW4000, PW2000, JT8D-200, CF6-80 and JT9D engines. The total fleet controlled by ALF/ELF/Ages is about 200 powerplants," says Cumberlidge. "We can provide competitive financing and buy back engines from airlines, disposing with their risk of trading in used engines". To date ALF has done deals with Singapore Airlines, Virgin Atlantic, Reno Air and American Airlines.

"Airlines we deal with can buy spare engines from the OEMs and then do a

sale and leaseback transaction with us, with the OEM's warranties still in place," says Cumberlidge. "We can provide entire engine management for airlines, and many carriers want to maintain independence from the OEMs, as well as choice, which spreads risk for all involved in the industry. We would consider doing sale and leaseback transactions on an airline's entire inventory. It just depends on the level of exposure we have with each operator".

Few companies other than ALF can offer complete engine management packages. One alternative is Willis Lease Finance Corp (WLFC). "Airlines are increasingly looking to lay-off risk and obtain predictable costs instead. Although there are many independents offering elements of a complete engine management package, airlines want to deal with companies that have flowthrough statements," claims Charlie Willis, president at WLFC. "That is, independents would need to have ability to offer all elements of a complete package so that in negotiating with an airline the independent could subsidise one aspect of the deal with another. For example, an engine lessor cannot offer an airline better repair reserves to an airline, whereas a fully integrated independent can and will in order to conclude a deal".

WLFC can offer engine overhaul, obtain parts and provide leasing. "Because we are involved in all three activities we can cross-subsidise each one to make a deal more attractive," says Willis. "The important issue is that we make a return on the overall investment".

Willis cites the lack of financing as something the airlines want to see an improvement in. "I expect to see more engine financings done with Securitisation packages, and institutions will own a lot of engines in the future. WLFC has its own securitisation facility. At the moment we have 120 leases in place, which could be packaged on a complete deal basis. We could then offer better lease rates if we can get the repair and parts supply businesses as well".

Complete package deals are attractive for airlines, but hard for new companies to enter the business. "It requires enormous amounts of capital to enter the business, and the suppliers also have to expect a low return for the first few years. The know-how to provide the complete package is also required and this is a range of skills that only specialist companies already have. The choices for airlines is reducing. Engine lessors will have to get involved with engine repair shops, and the number of independent engine shops is reducing. 