

Operating leases and outsourced maintenance have become increasingly common. The relative benefits of different acquisition and maintenance strategies are identified here, along with their suitability for different types of airlines.

Airline fleet planning & maintenance strategies

Two of the most important considerations for airlines are how they are going to finance fleet acquisitions, and maintain their aircraft.

The main aircraft financing and maintenance options, their comparative advantages, and the better combinations of financing technique and maintenance management are discussed here.

Aircraft financing options

The main aircraft acquisition strategies available to airlines and lessors include: outright ownership; finance leases, operating leases; sale-and-leaseback (SLB) transactions; and transactions completed in the capital markets.

Outright ownership

In an outright ownership scenario the aircraft is bought directly by an operator from the manufacturer, or older used equipment is acquired from other operators or owners, including lessors.

Operators that acquire aircraft on an outright ownership basis may keep them for most of their economic lives. A more recent trend has seen some large low-cost carriers (LCCs) acquire aircraft and then sell them on before they reach the end of their first base maintenance cycle. This allows the airline to avoid rising maintenance costs, and keeps the average age of the fleet relatively low. These aircraft will find their way into the secondary leasing market.

An operator may finance an outright purchase using internal funds. There are also a number of external finance channels, including the capital markets (see tables, pages 20 & 22), secured debt and export credit agencies (ECAs).

Finance lease

A finance lease works in a similar way to a mortgage. Rather than paying the entire value up front, the operator raises a certain amount of equity and pays off the remaining debt value via monthly repayments over an agreed lease term.

The main advantage of a finance or capital lease is recognition of expenses sooner than equivalent operating leases.

The lessee can also claim balance sheet depreciation each year on the asset, and deduct the interest on the lease payments as an operational expense.

The lease term will need to be long enough to spread the monthly debt repayments in an affordable manner. At the end of the lease term, ownership of the aircraft passes to the operator.

“A finance lease will normally only be used for new aircraft since it is more difficult to obtain financing for older used aircraft,” explains Maurick Groeneveld, director of aircraft management at German fund manager Doric GmbH.

Operating lease

Operating leases are the most common form of aircraft leasing, and are used for about 98% of the commercial jet aircraft controlled by lessors.

When an aircraft is taken on an operating lease no large upfront payments are required. The operator pays the lessor a monthly lease fee for a fixed lease term. The lessor will normally also require monthly cash maintenance reserve payments for major maintenance cost events to reduce their exposure in case of early termination or default of the lease.

At the end of the lease term the aircraft is returned to the lessor. The lease agreement will include specific return conditions that stipulate the maintenance

condition and configuration in which the lessee is obliged to return the aircraft.

Typical lease terms vary depending on the type and age of the aircraft. Lessors may lease an aircraft out multiple times before disposing of it. “The second and third lease terms will be shorter than the first, when the aircraft is still new,” explains Groeneveld.

“Generally the lease terms for narrowbodies are shorter than those for widebodies,” continues Groeneveld. “The first lease term for a narrowbody might be for up to eight years. The first lease term for a regional jet (RJ) might be a bit longer. For a widebody the first lease term could be up to 10 years.

“There are several reasons why lease terms for widebodies are longer than those for narrowbodies,” continues Groeneveld. “The first is that the interior configurations of widebody aircraft are more varied and complex than those for narrowbodies. This results in additional reconfiguration costs and ground time. Both a lessee and a lessor will, therefore, want to maximise the time on lease and minimise the number of reconfigurations. The second reason is that remarketing and placing widebodies is difficult because there are fewer airlines operating them.”

Sale and leaseback

An SLB transaction involves selling an aircraft to a lessor that then leases it back to the operator under an operating lease.

The owner of an asset can access cash tied up with its ownership, and there are tax advantages as lease costs can be offset against profits.

SLB transactions are normally carried out for new aircraft that are either on order with the manufacturer or have only recently been delivered, although airlines

INITIAL PUBLIC OFFERING (IPO)

An initial public offering (IPO) of shares, often referred to as a stock market launch, is a strategy in which a privately held company sells shares, usually to investment banks that in turn sell those shares to individual investors on a stock exchange for the first time. Through the process, a private company becomes a publicly traded company.

Airlines and aircraft lessors often access the IPO market to raise capital to acquire aircraft as well as for general corporate purposes.

For example, in late February, low-cost carrier Wizz Air, which operates mainly in Eastern Europe, received net proceeds of about GBP103 million (\$155 million) from the sale of new shares and about GBP154 million (\$230 million) from the sale of existing shares held by initial investors, including private equity firm Indigo Partners and German transport finance specialist bank DVB Bank.

IPO proceeds have been earmarked to help Wizz Air pay for the 26 A321 aircraft on order as it competes with rivals easyJet and Ryanair.

As part of plans to expand by 15% per year, Wizz Air aims to build up its fleet to 85 Airbus aircraft by 2017 from 54 aircraft at present.

In February, Shenzhen-based CDB Leasing Co, in which China Development Bank holds an 88.95% stake, announced plans to raise between USD1 billion and USD1.5 billion in an IPO this year.

HNA Group, which owns Hainan Airlines, holds an 8.38% stake in the lessor. Bankers are pitching to lead the IPO but the leasing company has yet to mandate advisers and underwriters.

The planned IPO follows a USD94 million (\$141 million) listing in Hong Kong in July 2014 by China Aircraft Leasing Group Holdings, the first aircraft lessor to go public in the city.

routinely agree SLBs on used aircraft to raise cash.

SLB transactions are one of two main ways lessors acquire aircraft along with direct purchase from manufacturers.

Ownership versus leasing

Each of the potential aircraft acquisition strategies has its advantages. The comparative benefits of ownership versus leasing are discussed here.

Advantages of ownership

One of the main advantages of owning an aircraft is that airlines have complete flexibility in the way they are operated and maintained.

“With an operating lease you are flying an aircraft you do not own,” says Groeneveld. “The operator will have to fulfil certain reporting and maintenance requirements, pay maintenance reserves on an on-going basis, and address lease return conditions.”

Lease return conditions are agreed before the lease term commences. They specify the aircraft’s required maintenance condition and interior configuration when it is returned at the end of the lease.

Lease return conditions often require an aircraft to be returned fresh from a C or heavy airframe check, and bridged

onto a maintenance programme that is the latest version of the manufacturer’s maintenance planning document (MPD). They may specify that all outstanding airworthiness directives (ADs) and service bulletins (SBs) must be complied with, and also dictate the life that should be remaining on certain life limited parts (LLPs). The required time remaining until the next engine performance restoration, auxiliary power unit (APU) inspection and landing gear overhaul may also be specified.

The lease term can be timed to coincide with an aircraft’s heavy check visit, in which case some of the costs incurred by the lease return requirements could be met by the airframe maintenance reserve fund. The operator will cover any costs incurred as a result of lease return requirements that are over and above the heavy check tasks. If the aircraft’s return from lease does not correspond with its heavy check programme, the operator will incur greater costs.

The lessee will also need to cover the cost of any interior refurbishment needed to bring the aircraft up to agreed re-delivery standards. The costs may be added to the lease rentals in some form of reserve.

“Airlines are getting a lot better but we still see a lack of understanding and preparation when it comes to re-delivery

requirements,” claims Brian Fitzgerald, director at CloudCARDS Ltd.

“Airlines focus on flying the aircraft and maintaining its airworthiness,” says Fitzgerald. “Technical departments are not generally geared up to meet re-delivery requirements, and tend not to have a separate budget allowance for lease-return events.

“Some airlines do not grasp the full extent of the lease return requirements until it is too late and end up missing the re-delivery date,” continues Fitzgerald. “This incurs additional fees for the lessee and also the next operator, which may have to find a short-term replacement aircraft.”

“Some of the more common complications that arise during the lease return process are related to the aircraft’s maintenance programme,” explains Fitzgerald. “The return conditions will often require that the aircraft is returned with a maintenance programme bridged to the latest version of the manufacturer’s MPD, which can be revised two or three times a year at some point during the lease term.” The level of bridging maintenance needed will depend on how far the lessee’s maintenance programme differs from the current MPD revision.

CloudCARDS Ltd has developed its CARDS® software to help airlines plan and manage their lease return maintenance event.

CARDS® manages the delivery to the next operator in parallel to re-delivery from the current operator, to minimise lost rent between the two airlines.

In some cases owning aircraft can provide an airline with greater flexibility. “Aircraft ownership can provide more flexibility to react to market changes,” explains Nico Buchholz, group fleet manager at Deutsche Lufthansa AG. “If a market weakens, aircraft may be parked but airlines with operating leases will still have to make lease repayments even if the aircraft is not flying.

“An operating lease is more expensive than ownership in the long term,” adds Buchholz. “Airlines that own aircraft tend to keep them for longer. The economic life of an aircraft is 20-30 years. With an operating lease the airline could end up paying most of the value of the aircraft over a 12-year lease term, and will own nothing at the end of it. You are essentially giving away 10 years of the aircraft’s economic life.”

Another advantage of ownership is that it allows an airline to build up its balance sheet.

Advantages of leasing

The most obvious advantage to leasing is that it does not involve the large up-front capital required for ownership.

This is particularly true for an

Airlines with medium- and large-sized fleets can justify the cost of performing CAM and Part M functions, maintenance control, component management, and line maintenance in house.

operating lease, which also comes with the benefit that the residual value risk for the aircraft is passed to the lessor.

Buchholz points out that leasing may be the best option if an airline requires a certain aircraft at short notice. “There could be a longer wait when buying directly from the production line. A lessor may already have an aircraft available in its portfolio.

“Taking aircraft on operating lease can provide flexibility,” continues Buchholz. “Airlines can return leased aircraft after a certain number of years and replace them with new types, so they can renew a fleet earlier or more easily than if they owned the aircraft. They can introduce larger or smaller types, or aircraft with longer range to meet changing strategies or demands.

“Operating leasing may also allow for an easier market exit from a particular aircraft type,” adds Buchholz.

Other advantages of the shorter-term nature of operating leases include: an opportunity to experiment with new aircraft types to test their suitability; the flexibility to cover interim demand, such as a gap to the introduction of newly ordered aircraft; and adding aircraft to cover seasonal demand. This is a common strategy for tour operators, and usually involves used aircraft.

A finance lease would require less up-front capital than an outright purchase. The operator would still own the aircraft at the end of the lease term, however. A finance lease would not come with re-delivery conditions, but the residual value risk would be passed to the operator. A finance lease would also require more up-front capital than an operating lease.

SLB transactions can be used to generate capital and remove residual value risk. “Operators can order direct from the manufacturer and define the aircraft specifications they need,” says Groeneveld. “They could make a profit by getting a discount from the manufacturer before the aircraft to a lessor for higher price.

Aircraft maintenance

“There are two main areas in maintenance,” explains Rick Fieldwick, chairman and partner at FlyerTech. “These are the actual hands-on maintenance functions, such as removing and repairing components, and the



engineering and airworthiness management functions.

“Under European Aviation Safety Agency (EASA) guidelines, organisations that perform hands-on maintenance functions must have Part 145 approval,” continues Fieldwick. “Those that perform airworthiness and engineering management functions need Part M approval.” The same terms apply under Federal Aviation Administration (FAA) regulations.

Physical maintenance is performed on airframes, engines and components.

Line maintenance includes lighter activities that can be performed during aircraft turnarounds or night stops.

Heavier or more complex maintenance will be performed during base checks or engine shop visits.

Part M or continuing airworthiness management (CAM) functions include: monitoring aircraft utilisation; technical document and library management; development and control of an aircraft’s maintenance programme; planning maintenance tasks and checks; monitoring life limited parts (LLPs) and time-controlled and on-condition or condition-monitored components; reliability analysis; determining required inventory of spare parts and components; logistics of component management; evaluation of ADs and SBs, technical records management; engine health monitoring (EHM); and maintenance management.

In 2008 EASA introduced Airworthiness Review Certificates (ARCs). These are used to periodically validate an aircraft’s Certificate of Airworthiness (CofA).

These annual airworthiness reviews

include a visual inspection of the aircraft and its technical records, to establish that it is being maintained and managed in accordance with EASA requirements.

A current ARC might have its validity extended, or a new ARC may be issued.

Part M sub-part G approval allows basic CAM functions, and sub-part I privilege allows ARC initial issue.

Other maintenance and engineering functions in addition to Part 145 and Part M include maintenance control (Maintrol) and component support.

Maintrol is responsible for resolving technical defects that have arisen during a flight; these are recorded in the aircraft’s technical log. Maintrol must decide where, when and how to resolve them while liaising with those responsible for line maintenance, technical management, spares and logistics.

Maintrol may fall under Part 145 responsibilities, although this is not an EASA requirement.

Component support is required to ensure spare parts are available to avoid delays in completing scheduled maintenance, and aircraft-on-ground (AOG) scenarios. An aircraft will go AOG if a no-go component fails and a serviceable replacement is not available.

No-go components are those that must be serviceable for an aircraft to operate. They can be identified using a minimum equipment list (MEL). No-go items are often rotatable line replacement units (LRUs). An airline will need to have a stock of spare components at its main base and outstations. Unserviceable parts will be sent for scheduled maintenance, testing, and repair if required, before being returned to stock. This requires repair, documentation and logistics

ENHANCED EQUIPMENT TRUST CERTIFICATES (EETCs)

Enhanced equipment trust certificates (EETCs) are debt instruments, basically structured corporate credits, that entitle certificate-holders to revenue from leasing aircraft. The trust owns the aircraft and leases the aircraft to a company (usually an airline). Certificate-holders receive lease payments until the certificates mature, at which point ownership of the aircraft is transferred to the lessee. EETCs can be sold into the public market or placed privately.

Investors in EETC transactions involving US operators (usually airlines) have traditionally taken comfort from 'liquidity facilities' attached to the certificates that guarantee a period of lease payments to investors in case of lessee default to allow for timely repossession and remarketing of those aircraft.

Recently, investors outside of the US have relied on provisions of the Cape Town Convention and Aircraft Protocol for protection. Cape Town offers protection similar to a liquidity facility as relates to prompt repossession of aircraft due to a default event.

Debt tranching provides various levels of over-collateralisation through cross-default and cross-collateralisation at the equipment note level and cross-subordination at the pass-through level.

The senior class typically has a longer tenor and a lower loan-to-value (LTV) than the junior class.

Air Canada announced on 12 March the pricing of a \$1.03 billion private offering of three tranches of EETCs, with Cape Town protection and with proceeds earmarked to fund the purchase of eight 787s.

The \$667.4 million, 12-year A tranche is priced at 3.600%, and features a 54.6% LTV; both the eight-year B and five-year C tranches are sized at \$182 million. The B tranche is priced at 3.875%, and the C tranche carries a 5.000% coupon. Initial LTVs through the B and C tranches are 69.2% and 84.4%.

management.

Part 145, Part M, Maintrol and component support activities may be performed in-house or outsourced.

In-house

Some airlines may have facilities and staff required to perform most maintenance and maintenance management functions in-house.

One advantage of in-house maintenance is that an airline has complete control of the maintenance process. If certain maintenance activities or functions are outsourced, a third-party provider will probably be working on behalf of multiple operators, so an individual airline may not receive the same priority they would enjoy if the work were performed internally.

"In terms of maintenance, an operator with in-house capability will be able to guarantee the best slots for its own aircraft," says Ray Kazmierczak, director and owner at RFK Consulting. "It will also be able to tailor the maintenance facility to suit its own standards, including the speed at which checks are processed."

Another advantage of in-house maintenance is that it may involve less operational disruption. Maintenance or hangar facilities are likely to be situated

at the operator's main base or bases, whereas an outsourced base check may not even take place in the operator's home country. "The aircraft will have to be positioned to and from the third-party facility," says Peter Cooper, planning manager at Civil Aviation Services in Shannon. If the third-party maintenance facility is not situated on the airline's route network, empty positioning flights will be required. These will cost the airline money, particularly for fuel. They could also increase the amount of time the aircraft is unavailable for operations.

Airlines with their own maintenance facilities can gain economies of scale and earn additional revenue by offering outsourced maintenance and engineering services to other operators. A number of legacy carriers use this approach including Air France, British Airways, Iberia, Lufthansa, KLM Delta Air Lines, TAP Portugal and United Airlines.

"An advantage of performing in-house Part M, is that airlines can focus priorities on certain reliability standards," says Fieldwick. "Some carriers, for example, place more emphasis on passenger experience and comfort."

Outsourced

In reality all operators are likely to outsource at least some of their

maintenance requirements. It would not be economically viable to invest in the facilities, equipment, tooling and training required to cover all outstations and every maintenance eventuality for an entire fleet.

There are regulations in place that stipulate the minimum management roles and responsibilities that have to remain in-house for airlines with an Air Operator's Certificate (AOC).

EASA requires these airlines to have: an Accountable Manager, responsible for the AOC; a Nominated Post Holder, responsible for maintenance; and a Quality Manager. The operator does not have to perform any other Part 145 or Part M, Maintrol, or component support functions in house. It is, however, ultimately responsible for any maintenance performed on its aircraft. The continuing airworthiness responsibility, which is an element of Part M, remains with the operator at all times.

The operator has to clarify in its Continuing Airworthiness Management Exposition (CAME), which is part of the AOC, the maintenance providers that will perform each task, including Part M functions.

The airline will need access at all times to any data and records connected with an aircraft and its engines, regardless of how much maintenance it outsources.

Most maintenance functions can be outsourced, including physical maintenance tasks, such as base checks, line maintenance, component repair and engine shop visits.

There is a growing trend among engine manufacturers and component support providers to offer comprehensive power-by-the-hour (PBH) support for their engines and components. This could mean that fewer airlines will maintain in-house capability for engine and component maintenance and stock.

There are comprehensive component support packages available from parts traders, independent and airline-affiliated maintenance repair organisations (MROs), and original equipment manufacturers (OEMs).

Maintrol and CAM functions can also be outsourced.

Some large MROs offer airlines comprehensive maintenance and component support packages, including Part 145, Part M, Maintrol and component support functions. The MRO may perform all the contracted maintenance functions in-house or outsource some to specialist vendors.

There are organisations that specialise in providing outsourced CAM functions. FlyerTech is one such example.

The ratio of maintenance functions that are performed in-house or outsourced will vary widely by airline.

At one end of the scale are airlines



with their own maintenance facilities. They may perform all of the engineering management functions and most maintenance tasks in-house, but require specialist, outsourced expertise for certain components of aircraft maintenance.

At the other end of the spectrum are airlines that outsource the entire maintenance process, including maintenance management functions.

Other carriers will have a more balanced split between in-house and outsourced activities. An airline could, for example, keep line maintenance and maintenance management functions in-house but outsource complex activities, such as base checks and engine shop visits.

There are a number of potential benefits to outsourcing maintenance.

A significant investment is needed to establish the facilities, component inventories, tooling and staff required to perform comprehensive in-house maintenance.

A start-up airline could avoid this investment by outsourcing its maintenance functions. Alternatively an established airline with its own maintenance facilities could divest them to raise capital.

Another potential advantage to outsourcing maintenance is that third-party providers may be able to perform the work more cheaply than an airline's in-house facility. If it provides maintenance for multiple operators the third party will experience greater economies of scale than an individual carrier. Depending on location, the third-party provider may also have cheaper labour rates than some airlines.

Some specialist maintenance providers

may have greater expertise in certain areas than an individual airline. Outsourcing maintenance to these providers could improve reliability.

Outsourcing maintenance can also lead to more predictable costs. The comprehensive support packages provided by MROs are often paid for by a monthly PBH or fixed-rate fee.

Airline strategies

The most suitable or likely financing and maintenance strategies for different kinds of airlines are considered here.

Financing

About 60% of the 20,000 commercial jets currently in service are owned by the operator. The remaining 40% are owned and managed by lessors.

Large full-service carriers have traditionally been most likely to own their fleets because of internal financial resources or the creditworthiness to finance aircraft acquisitions. "Lufthansa likes to own its own aircraft, and has the benefit of a relatively strong balance sheet," says Buchholz.

In more recent years large LCCs, such as easyJet and Ryanair, have financed the direct purchase of new aircraft, made possible by the success of their business models improving their creditworthiness. Some airlines have taken a lower cost approach to aircraft ownership by selecting older, used assets. British LCC Jet2 began operations with a fleet of used 737-300s previously operated by Ansett Australia and Lufthansa.

Airlines that are able to finance the outright ownership of aircraft may also

Some airlines have the option of both off-balance sheet and on-balance sheet financing. Despite the large growth in operating leasing, about 60% of the fleet is owned by operators. While operating leasing provides fleet management flexibility, finance leasing and ownership are financially more efficient.

take others on lease. "Even large airlines with owned aircraft like about 30% of their fleet to be leased," claims Buchholz. "This is principally for the flexibility that operating leasing can provide in terms of swapping out older types and bringing in new aircraft."

The aircraft leasing business has moved on from a sector dominated by used aircraft leases for start-up airlines or operators in developing countries. Today many of the aircraft on lease are new or nearly new and a significant percentage are on lease with first-tier airlines.

An operating lease may be the only realistic aircraft acquisition option for some carriers. "Small or start-up airlines may not have the financial backing needed to buy aircraft," says Buchholz. "If they do not lease aircraft there is no airline, so airlines with a weak balance sheet need to rely on operating leasing."

Some start-up carriers might begin operations with leased aircraft before moving mostly to owned aircraft as they mature and expand. easyJet is a good example of this approach.

Lessors like high liquidity. The most common aircraft in portfolios are, therefore, those with the largest customer base that are the easiest to re-home.

The 737NG and A320 families are the most popular types with lessors. Close to 50% of the active 737 (Classic and NG) and A320 fleet is managed by lessors. Overall about 40% of narrowbodies are managed by lessors.

This compares to about 33% of widebodies and 25% of RJs. Fewer widebodies are managed by lessors due to the smaller customer base. Lessors may also be put off by the higher transition costs of widebody interior reconfiguration.

Historically a large percentage of the RJ fleet has been concentrated around 50-seat aircraft operated by a small number of US airlines. This small user base explains the reluctance of lessors to invest in these aircraft. More recently, the Embraer E-Jet family has been growing in popularity with lessors and there are a number of leasing companies that specialise in regional aircraft including Falko and Nordic Aviation Capital.

The disposition of lessor portfolios suggests that narrowbody operators have the highest percentage chance of leasing their fleet. Operators of widebody types have fewer lease options to choose from,

The success of some European low-cost carriers has seen their cash balances and creditworthiness increase. Airlines such as easyJet and Ryanair have purchased a portion of aircraft orders in recent years. Not only do they have the available cash, but they also have the capacity on their balance sheets to make full use of tax depreciation.

but in most cases, are also the carriers most likely to be able to finance direct ownership.

The airlines most likely to take aircraft on finance leases or SLB transactions are established carriers with a certain level of creditworthiness, because both approaches require a certain level of initial investment.

Maintenance

“Many airlines prefer to outsource their maintenance, including both Part 145 and Part M activities,” claims Fieldwick.

Few carriers attempt to set up in-house heavy maintenance facilities. Most airline-affiliated heavy maintenance facilities are long-established and associated with large legacy full-service or charter carriers.

Some legacy regional airlines, such as UK-based Flybe, also have in-house heavy maintenance facilities. They become specialists in certain aircraft types and offer services to third-party operators.

“There are entry hurdles to in-house heavy maintenance, including the investment required to establish facilities and size of fleet needed to make the operation cost-effective,” says Buchholz.

“An airline that only has a few aircraft will not invest in its own heavy maintenance facility,” says Kazmierczak.

It would cost \$50 million to set up a two-bay narrowbody aircraft overhaul facility. To fill just one bay for a year would require the equivalent of at least seven to 10 D-checks, or 15-16 C checks. This level of work would only be likely with a fleet of 25-50 aircraft.

“An operator will need a fleet large enough to support an in-house MRO and not result in too much idle capacity,” explains Cooper. “Due to different aircraft types with different size checks and modifications, it is almost impossible to match capacity precisely to demand. In most cases airlines with in-house MRO facilities will have to take on more staff than required to support their own fleets. Additional capacity can be filled by third-party work. Those with insufficient capacity will process their own aircraft and outsource any work they cannot perform in-house.”

In-house maintenance facilities may be a necessity for some. “There may be political or geographic reasons for having



in-house maintenance facilities,” says Buchholz. “Airlines in remote locations may have no choice but to perform their own maintenance.”

Many more carriers are likely to perform some lighter Part 145 functions in-house, including line maintenance.

Medium-sized and large airlines are also more likely to perform most or all Part M functions in-house.

“Start-up carriers are more inclined to outsource their Part M requirements,” claims Fieldwick. This may be because they do not have enough experience and do not wish to invest in the training or additional staff required during the start-up phase.

“Once a fleet grows to 15-20 aircraft the economies of outsourcing Part M functions start to improve and airlines might consider bringing them partly or totally in house,” says Fieldwick. “This does, however, depend on the operation. If the airline’s fleet size experiences regular seasonal variation it can be difficult to run CAM functions in-house, since the number of staff would have to be constantly adjusted. FlyerTech’s pooled resources are better able to absorb a variation in seasonal demand.”

“Another important consideration for taking CAM functions in-house is the need for airworthiness management software,” says Fieldwick. “This can require an investment in excess of \$100,000. FlyerTech has developed its own in-house software and offers airlines web access in return for a monthly fee.”

In reality most airlines are likely to outsource at least some maintenance.

The carriers that are likely to outsource the most maintenance functions include small and start-up

operators, because they do not have the finance, fleet size and experience required.

Airlines that will outsource the fewest maintenance functions are legacy carriers that have established MRO facilities.

Small and start-up airlines might outsource all or some of their Part 145 and Part M functions. As the airline grows, Part M CAM functions and some Part 145 services, such as line maintenance, may be brought in-house. It is unlikely that any but the largest contemporary airlines will establish new in-house heavy maintenance facilities.

Summary

Aircraft may be owned or leased. In either scenario maintenance could be performed in-house or outsourced.

Small and start-up carriers may have no option but to take aircraft on operating lease and outsource all of their maintenance. This is because they may not have the funds or creditworthiness required to raise the required investment.

As an airline matures and grows its fleet it may begin to vary its acquisition strategy by bringing owned aircraft into the fleet. Growth may also result in bringing some maintenance in-house. Part M activities, including technical management and CAM functions, are likely to be brought in-house along with some Part 145 activities, such as line maintenance. The carriers most likely to own their fleets and perform most maintenance in-house are established full service airlines such as Lufthansa. **AC**

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