A new lease of life

The recent slump in fuel prices has allowed airlines to operate more mature engines cost-effectively, making the most of green-time while putting off the hefty investment needed for newer models. Hannah Davies explores end of life options for engines, the current state of the engine market and asks what the future holds for such a dynamic marketplace.

In recent years the engine market has been a platform for innovation and growth, and consequently competition. Now with even more companies crossing over into this space, industry players are being forced to offer more comprehensive services in order to meet airlines’ growing demands for cost-effective solutions.

As an engine is a huge investment for an airline — CFM International’s (CFM) CFM56-7B26 engine has a mature full-life value of $8.65m and International Aero Engines’ (IAE) V2533-A5 engine is valued at $9.13m — selecting the best-suited end of life option for such a high-cost asset is critical.

Certainly, there are far more solutions available in today’s market with providers working towards becoming one-stop shops. And the movement of the original equipment manufacturers (OEMs) into the aftermarket is as apparent in the engine market as it is elsewhere.

Carl Glover, GM of Engine Solutions at global aviation services provider AAR, notes this has been particularly apparent with the surplus end of life solutions business, explaining that the move has been a “stated strategy for some key participants to control more of the life cycle revenue of the engine market”. As OEMs control more of the aftermarket, MRO providers and solutions suppliers have all had to up the ante when it comes their offerings, resulting in a vigorous engine market.

Market overview

While there is no denying that the next generation of engines are creating a buzz within the industry and the OEMs aftermarket coverage for these engines will increase significantly, the current worldwide fleet remains full of mature engines; engines that are now proving to be far more efficient and cost-effective to operate thanks to lower fuel prices.

Leo Koppers, SVP, MRO Programmes at MTU Maintenance (MTU), explains that close to 30 per cent of all its shop visits this year (2015) should be performed on mature engines. Thus the German MRO has developed specific solutions for those engines, offering customers an alternative to OEM solutions.

As lower fuel prices continue to impact the market, airlines are not only benefiting from wide-ranging support packages and attractive end of life solutions, but they are also able to continue operating older assets while making a profit. The engine business has taken on a “completely new market dynamic, where operators see that it has become economically viable to continue flying their older engines and make use of the remaining green-time,” explains Koppers.

Operating mature engines has its risks due to the likelihood of more shop visits, higher material usage and increased maintenance costs. According to Mark Brown, SVP asset management at US-based Apollo Aviation Group (Apollo Aviation), the number of scheduled shops visits versus operational market size for the engine type is one thing to monitor, as it can directly impact the value of the asset at retirement age.

He cites the V2500-A1 variant “where the shop visit cost is many times the value of the engine in the market and the operational market size is less than 100 engines with about 40 additional engines stored.” In this case, it would not be economical for an operator to continue flying with the engines. It could instead turn to a solutions provider to seek a financially beneficial end of life
option, such as engine teardown for surplus parts, engine exchange or green-time lease outs.

The cost of the final engine shop visit is also a big deciding factor when an engine nears its retirement age as the cost of a visit can exceed the value of an engine, which could also potentially drive a retirement to total displacement, says AAR’s Glover.

Old or new?
As the A320neo family and the 737MAX prepare for entry into service, the lifecycle of older engines will change “dramatically”, according to Thomas Boettger, director product line CFM56 at Lufthansa Technik’s (LHT) engine services division, since there are fuel savings up to 10 per cent achievable.

Thus the MRO has developed products such as Smart.Life for customers who operate older aircraft. “Since the fuel price is extremely low and there are no capital costs for these mature aircraft anymore, Smart.Life guarantees significant savings in regard to MRO expenditures, spare engines and lease return costs,” he explains, adding that “it might be very profitable to fly an A340-300 or an older A320, as the fuel advantage of new aircraft (e.g. 777) is weaker than the cost advantage of mature aircraft”.

Indeed, outside factors such as the low fuel prices, the market, OEM control and engine retirement activity, all play a part in whether the main industry trend is to hang onto older engines or transition to a newer fleet, comments Paul Smith, SVP Commercial Bids, Business Development at UK-based TES Aviation (TES).

It is an operator’s market right now. Customers want tailored packages to help manage their engines fleets across the entire lifecycle. To meet demand “innovative service offerings have been developed such as engine lease and green-time engine exchange in which the expense of the shop visit is avoided”, says Marta Garbayo, director, aftermarket sales at Pratt & Whitney Aftermarket in the US.

Endless options
There are many end of life solutions, but selecting the right option is key to operating a cost-effective fleet. MTU Maintenance offers the industry its MTU™ Mature Engine Solutions service, which is a tailored package for airlines that operate ageing aircraft and engines.

There are two main products within this solution: ‘Instant Power’ which covers leasing and engine exchange and ‘Smart Repair’, which is inclusive of material salvation and customisable workscooping. Through these services MTU aims to give operators the lowest total or flight hour cost possible. “With a new generation of engines entering into service and an increasing number of retirements for older models, asset owners also need to find strategies which allow them to maximise the value of their ageing engines,” explains Koppers.

The company is able to optimise engine usage by leasing out the asset to another operator for green-time, and then when leasing is no longer an option or parting out the engine brings more revenues, it will provide teardown management to generate income through the reuse or remarketing of any serviceable engine parts. “As both an engine lessor and an MRO provider, it is MTU’s core competence to permanently evaluate the asset and estimate when the right timing for teardown has come,” says Koppers.

AAV, a company with over 35 years’ experience in managing mature and maturing engines, offers airlines, lessors, MROs and independent companies a wide selection of end-of-life options. Its aim is to help customers preserve the value of engines and maximise return on their assets through “sophisticated inventory models” that can evaluate and cost out inventory and engines for customers.

It’s clear that individual business models are discussed and evaluated prior to engine retirement. Indeed, having a carefully thought-out plan in place ahead of retirement is the best way for an operator to manage their assets and achieve the best return on investment. “We look at demand curves, scrap rates, ESV (engine shop visits) schedules and hard time items to evaluate returns,” says AAR’s Glover.

TES, which has been at the forefront of creating innovative engine solutions since 1995, is one of the key players in independent aircraft engine consultancy and asset management services and can deliver “value-added strategic solutions tailored to individual customer needs”, explains Smith. Centering all its programmes on “the philosophy of mitigating risk and maximising asset value for our clients”, TES offers a suite of services, including PBH, virtual MRO, maintenance cost guarantee and thrust per hour programmes.

Airline experience
It would be fair to think that companies like Delta TechOps and LHT may offer something a little more desirable to operators, taking into account their sister airlines.

Delta Air Lines (Delta) has vast experience in operating mature aircraft and engines that
have just a few years left on them — with a fleet of 800 aircraft that has an average age of 17.1 years. As one of the ‘big three’ US airlines alongside American Airlines and United Airlines, Delta’s operational results speak for themselves and, according to Jack Arehart, president of MRO Services at Delta TechOps, the carrier perfectly demonstrates that “well-maintained fleets can lead the industry in on-time performance, safe operations and exceptional economics”.

Arehart says that Delta TechOps has “dramatically reshaped the cost curve on many aircraft and engines from annually trending upwards to having significant lower cost trends by using well-proven repairs processes, PMA options, DER repairs and surplus parts”. The use of such parts in engine repairs has allowed companies to offer more cost-effective solutions to customers, such as engine teardown, where parts are remarketed to allow an airline to make a return.

Apollo Aviation also provides the market with similar solutions, including disassembly and consignment for parts sales, refurbishment of engines for serviceability back into service; and exchange, sale and lease of assets in the marketplace. “The key benefit to our approach is that we are able to maximise the asset’s EOL (end of life) value by most effectively monetising the asset through part-out, or sale, or cost-efficient refurbishment back into the fleet,” says Brown.

The provider believes it is able to achieve maximum value for part-out engines thanks to its strategy of targeting the best parts distributors for specific engine types.

In addition to securing as much return on investment for customers, companies have to take into account that many operators lease their engines. So, it’s important for service providers to offer solutions that allow airlines to return their assets to the lessor in accordance with lease return conditions, with as little stress and cost as possible. LHT’s SmartLife is able to take over customers’ spare engines to tear them down, thus guaranteeing the fulfilment of lease return conditions all at a fixed price. LHT also offers customers advantages thanks to its market position and 40 per cent share of the A340-300 fleet, meaning it can switch engines among the fleets in order to reduce shop visits.

As OEMs offer comprehensive total care packages for their assets, one would assume that such end of life options would be among the best. Pratt & Whitney (P&W) has more than 10,000 engines in service and offers material packages containing a combination of new and serviceable material; customised used serviceable part fill rates and innovative Life Limited Parts (LLP) solutions with serviceable LLPs and buyback programmes.

In addition, P&W acquires individual engines and entire fleets for engine teardown, parts inspection and repair, allowing them to offer inventory solutions such as parts valuation, purchasing, harvesting for future shop visits and consignment. The OEM even has an initiative called ‘Keep the Fleet Flying’ that develops cost-optimised phase-out plans, including engine overhaul, part repair and asset management services for mature fleets.

So, as airlines report record quarterly net profits in 2015 — America made $1.9bn in Q2 of this year, a 27 per cent increase compared to Q2 2014 — it’s definitely a buyer’s market out there. But as determining factors such as fuel prices could rise at any minute, we have to wonder how the market will respond to change.

**A look ahead: challenges and opportunity**

With the global fleet expected to double by 2033, there is plenty of room for challenges, competition and innovation. AAR predicts that the growth will create some challenges for OEMs as they try to support new production and distribute their products, resulting in the transition of fleets and engines becoming available to the spares market. “Total deferral on some engine types was thought to have happened already but some engines (CFM56-3C1s) seem to be getting overhauled as people keep the 737CLs [for] longer,” says Glover.

Boettger thinks that we are currently in “the most exciting phase of the next 30 years, engine wise... We’re going through generation changes in relatively quick succession,” he explains, referring to the upcoming slate of new engines to hit the market from Q4 2015 onwards, such as the PW1000G GTF, CFM’s LEAP engine and GE Aviation’s GE9X engine that will power the 777X.

So, it’s unsurprising that P&W forecasts a bright future with strong growth in the commercial engine market. The OEM, who continues to work towards derivative versions of the GTF engine, says that its invention offers “significant runway for further fuel efficiency improvements”.

And, following on from an agreement with IBM (formalised in June 2014), P&W is “developing new levels of engine predictability and performance by investing in data analytics to accurately and proactively monitor the health of the engines on-wing and predict future maintenance visits” says Garbayo.

The transition to next-generation engines is undeniably a challenge to prepare for as these innovative, powerful machines will have substantially different MRO set-ups to older models, especially as OEMs tighten their hold on the aftermarket. However, one thing that can be said for certain is that the engine market is a truly active space and one area where there is plenty of money to be made.