

An OEM business or room for all?

Engine maintenance is big business, but the market is increasingly dominated by the OEMs. Is there room for independents, and if so, what do they need to do to position themselves as attractive alternatives?

ENGINE MAINTENANCE IS BIG business by any industry standard. The sector turned over upwards of \$15 billion last year, and that figure will rise by at least 40% by 2017 to reach well over \$21 billion, according to figures from the International Bureau of Aviation (IBA). Engines are the most expensive components on an aircraft, and their upkeep represents 35% of the total MRO spend each year. Less than a quarter of that work is carried out in-house by the airlines themselves.

With such a large volume of maintenance required each year, amid forecasts of a tripling of the global fleet between now and 2029, surely it stands to reason that there's enough work out there to keep a whole engine MRO sector healthy and otherwise engaged? You'd certainly think so; yet a number of industry professionals consulted by *AviTrader MRO* say there's not.

Leading the chorus are the lessors, who point the finger at OEM all-inclusive care packages which, they say, are smothering competition in the MRO marketplace. Jon Sharp, president and CEO of ELFC, remarks on the sharp increase in the OEMs' market share of the engine maintenance business, from around 15% a decade ago to nearly 50% today, with the 'consequent worrying impact on competitive options'. Willis Lease president Charles Willis weighs in, suggesting that there are serious anti-trust and accounting questions to be asked about OEM total care-type packages - and whether they have 'really sold their assets, as they still have effective economic and operational control over them'. And the exclusive partnerships signed by OEMs with

third-party MRO providers excluding the use of PMA parts opens up a whole new kettle of fish - a debate we'll explore later in this article.

But let's hear from the original equipment manufacturers themselves first. Brian Ovington, senior marketing manager for MRO at GE Aviation, which has the largest single chunk

of the global engine maintenance market (see table at right) says that there is plenty of room for in-house airline MRO providers as well as third-party independent MROs to handle worldwide demand for engine maintenance.

"GE and its joint venture CFM have more than 23,000 engines in service on a variety of aircraft from regional jets to widebody aircraft," says Ovington. "Of these engines in service, we'll see about 4,000 shop visits per year and we anticipate this to remain at this level and maybe even increase as more engines enter service

"We'll see about 4,000 shop visits per year for GE and CFM's 23,000 engines in service. GE has the capacity to handle about a third of these at its branded facilities."

Brian Ovington, senior marketing manager for MRO, GE Aviation

based on record orders that were made in the last part of the decade. GE has the capacity to handle about a third of these shop visits at its GE branded facilities."

Customers see the value in having an OEM service their engines, says Ovington. "GE continues to see a 4-5% growth in the backlog of long term agreement each year - with the current backlog of service contracts with 140 customers valued at \$59 billion. Additionally, with GE's extensive in-house repair capability, and access to the largest supply of new and used materials, we can offer competitive solutions ranging from one shop visit to large, multi-year agreements."

GE has an extensive network of OEM and partner MROs, including third-party providers like Air France/KLM Engineering & Maintenance, ST Aerospace and Standard Aero, which can now offer customer workscopes similar to what OEMs provide, along with OEM material.

There is room for independent shops, provided they have some sort of joint venture or full-support agreement, or both, with an OEM, according to Frank Walschot, senior vice president, engine maintenance at Zurich-based SR Technics.

"OEMs play a major role, but customers typically do not like monopolies. So you see partnerships with airlines and established MROs in various formats, depending on the OEM. Also, for certain engine models the OEMs will not have the capacity to handle volume in their own facilities so again, they set up partnerships."



SR Technics' Walschot

Singapore's ST Aerospace, like SR Technics, has a number of cooperative agreements with OEMs that allows it to develop and deliver proven, cost-effective solutions that 'increase asset value and reduce lifecycle cost'. Choo Han Khoon, the company's executive vice president, Engine Total Support, says that partnerships with OEMs like GE allows it to offer a 'solution or a product that is of known pedigree and configuration'.

Engine Maintenance: Market Share		
Engine MRO	Country	Mkt share
GE Aviation	USA/UK	12%
Lufthansa Technik	Germany (HQ)	6%
Delta TechOps	USA	4%
Snecma	France	4%
MTU	Germany	3%
IBA		

"Engine maintenance is not an OEM business per se," said Choon. "We believe that there is room in the engine MRO industry for airline shops and independent MRO specialists like ourselves. We offer complementary service offering to OEMs' after-market solutions. In many instances, engine OEMs may not be able to cover a comprehensive range of services. That is where we come in; we're able to provide more customizable solutions with a geographical proximity to customers."

Smaller companies, too, can find their niche in the 'backshop' of the OEM and their MRO partners. Andrew Walmsley, VP of sales and marketing at Jet Aviation Specialists, a small family-owned independent repair facility in Miami, says the company has found a role as a 'reliable

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partner for either niche repairs, or repairs on parts no longer deemed core products. As larger organizations struggle to match resources to capacity demands, we are able to supply them with the flexibility to meet the peaks and surges that come with market changes."

THE RISE AND RISE OF THE OEMS

The OEM weapon in securing an ever-larger slice of the engine maintenance pie is two-pronged. First of all, any MRO wishing to repair engines must have a product repair licence from the OEM in question. "At the end of the line, you have to deal with the OEM to be able to fix their engines," said one industry observer, "so you might as well maximize your relationship with them through a partnership, which will give you reduced prices on parts. In return, you're generally obliged only to use parts manufactured by that OEM."

And secondly, the OEMs have been phenomenally successfully in expanding their market share through long-term support contracts sealed as part of the initial engine sale. It takes years and millions in investment to design an engine, but the real return on investment comes from component sales. "Selling spare parts is the OEMs' bread and butter," said another observer. "They will do whatever they can to protect their market."

"Leasing companies own 32% of the aircraft order backlog and so they should have an important voice. Lessors do not like these all-inclusive care packages, because there is no choice of MRO provider."

Jon Sharp, president and CEO, ELFC

An example of the OEMs' continued expansion into the MRO business, according to Steve Williams, director of technical purchasing at AJ Walter Aviation, can be seen with Snecma's growth in its services division by purchasing or creating various commercial ventures, such as its Snecma Morocco, Snecma Brussels and Snecma Americas subsidiaries. Snecma has also diversified its product offering to increase its market share and now offer a full range of component repair services directly from the Snecma Chatellerault facility, to their own engine shops and the various airline facilities such as Finnair and Iberia, allowing them to capture an even greater amount of the market.

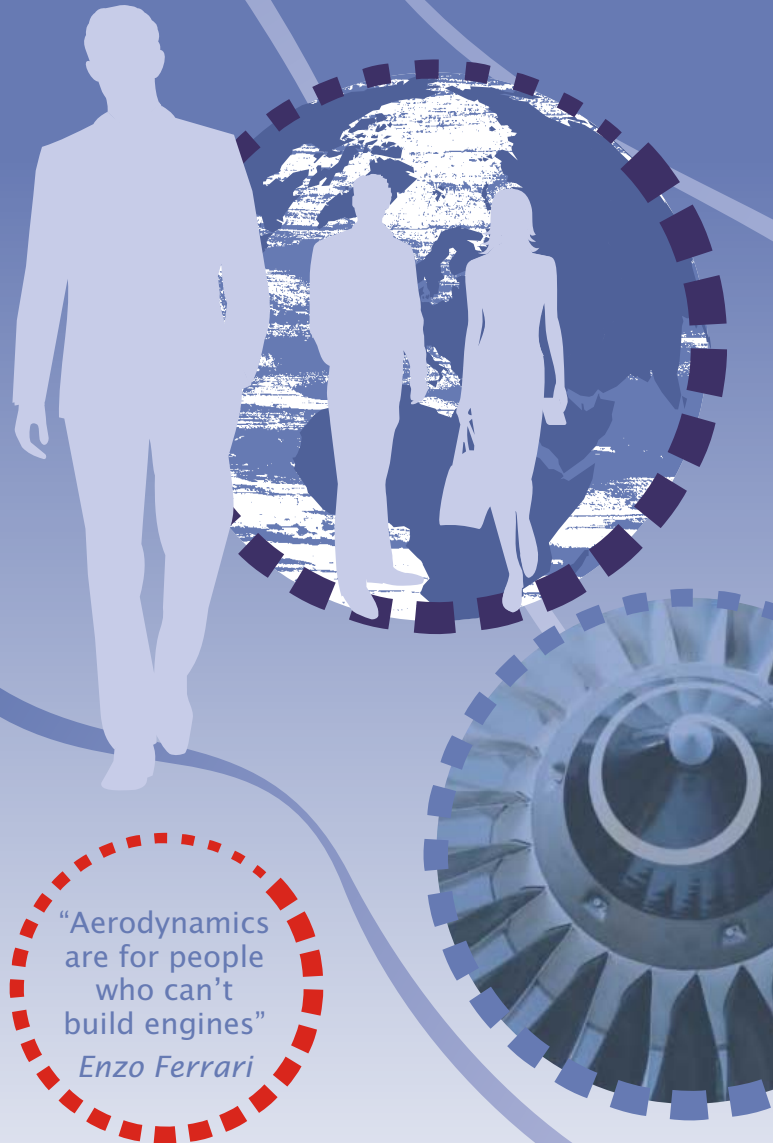
As a result, says Williams, the independents are left to compete for a decreasing percentage of shop visits. The only good piece of news for them is "the continued expansion of the global airlines market over the last decade and the subsequent growth in the MRO sector. This has masked the effect of a lower percentage of engines available to the independent provider."

That reduction in the supply of repair facilities for the customer is 'not healthy', according to ELFC's Sharp. Leasing companies own 32% of the aircraft order backlog, he explains, and so should have an important voice. "Lessors do not like these all-inclusive care packages, because there is no choice of MRO provider: the OEM keeps the maintenance reserves, thereby reducing lessor security and the portability of the fund accumulated from one lessee to the next is questionable. If airline shops and third-party independent MROs are to stop the erosion of their market share, they have to develop competing packages and somehow get them in at the point of sale of the engine."

Enrique Robledo Martín, director of power plant maintenance at Iberia Maintenance, agrees that reduced competition means 'less cost reduction pressures and less overall improvement'. "In other industries, like the pharmaceutical industry, there is an agreement which allows the research and development return for 10 years, after which com-

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Steve Williams of AJ Walter Aviation

petition is promoted, which reduces the price of medications. I think this industry needs to think in the long term and find solutions to promote competition in the engine maintenance sector."

Indeed, this lack of competition could even throw up serious anti-trust issues, according

to Charles Willis, who says OEMs should be 'careful about whether they've really sold their engines' through their warranty programs, or whether they in fact still have effective economic and operational control over them. He says that lessors and airlines alike tend to be 'suspicious' about OEM intentions when they see hourly repair management or total care agreements. "The airlines continue to want alternatives to the OEMs."

WHAT'S A 3RD-PARTY MRO TO DO?

With GE holding 12% of the global engine maintenance market, double the share of the next entrant, LHT (and three times that of third-placed Delta TechOps) and Snecma, through its 50% stake in CFMI, holding fourth place with 4%, it's clear that OEMs are the ones to beat - and that they take a lot of heat from their rivals.

But it's hard to ignore the benefits of a total-care type deal with an OEM for many carriers, particularly those with big fleets, which will get attractive service packages as part of their original engine deals.

"The OEMs are picking up an ever-increasing portion of the available MRO business. The only good piece of news for the independents is the continued expansion of the global airline market over the last decade and the subsequent growth in the MRO sector."

Steve Williams, director of technical purchasing, AJ Walter

GE's Ovington says that many of his customers have chosen to go the OEM route because of 'relationships beyond services' and the 'broader support' offered through solutions like GE's OnPoint, which offers "low cost of ownership, with world-class fulfillment, customer support and commercial flexibility. Beyond maintenance needs, customers are also looking for way to better manage all the data that they have, and GE Aviation has developed myEngines, which consists of digital app suites to help customers better manage this data."

Ovington underscores the mutually beneficial arrangements with its network of independent shops. The choice of MRO providers for airlines which operate GE and CFM-powered aircraft

differentiates us, he says, "from other engine OEMs, and we believe customers value this choice."

Even so, there are many who believe that independent MROs have the agility, the skill - and the hunger - to outplay the OEMs at their own game. Mike Cazaz, president of asset management company Werner Aero Services, says there are 'many independent shops that do just as good a job (and sometime better) than OEMs. They've invested in tools, expertise and technology to handle the specialized work. And let's face it, OEMs, in their current capacity, can not handle the amount of work on the engines that are out on the market today."

The three key buying factors that airlines consider when choosing an engine MRO partner, quality, cost and turnaround time (TAT) can turn the tables in an independent's favour. Ca-



Weld repair process on a CF6-50 combustor dome
Jet Aviation Specialists

zaz works with many shops that pride themselves on OEM-quality standards of work, frequently have shorter lead time TATs and offer lower prices.

Iberia's Robledo points out that independents and third-parties can offer a set of solutions that the OEMs "normally do not have: complete operational support for components, airframe and engines, focus on repair and not replace, offers for non-OEM parts and repairs, operator experience and, for ageing types of engines, they probably know the engines better than the manufacturers themselves".

When they're not tied down by long-term total care-type deals, airlines can afford to pick and choose the best deals; indeed, they are increasingly driven by necessity to pressure service providers for the lowest-cost solutions in this post-recession era coloured as it is by rising oil prices and cut-throat competition.

A key area for cost reduction, and a subject that we've been leading up to, is, of course, the issue of PMA parts. AJ Walter's Williams believes that airlines are 'increasingly accepting of the use of PMA material, Designated Engineering Representatives (DER) repair schemes and the use of used serviceable material - all of which have a major impact on the cost of a shop visit. Obviously, the OEMs have a natural resistance to some of these key parameters, and this provides the independents with a considerable cost advantage".

One airline supply chain executive summed it up by saying, that from an airline point of view, "more and more PMA parts are being developed for new generation aircraft. I would certainly install PMA parts if they save money." **(see overleaf for more on the PMA debate).**



Engineers at work in Iberia Maintenance's engine shop

Iberia

Weighing in on the PMA debate: Where we are now

THE ISSUE OF PARTS MANUFACTURER APPROVAL (PMA), OR THE USE of parts manufactured by firms other than an OEM, continues to ignite fiery debate in the MRO sector – especially in the USA, where industry leaders like Chromalloy, Heico and Wencor have been supplying the industry with PMA parts for decades.

This month is significant in that a 2009 **FAA revision** to US regulations harmonizing standards for aircraft parts comes into effect. As of April 16th, regulations for all quality systems will be the same for all production approvals – whether implemented by OEMs or by PMA manufacturers. In reality, there won't be any major changes, because all manufacturers have been held to the same standards, but the process will now be clearer in FAA regulations.



They look like the real thing...

The total annual PMA spend, estimated to be \$400 million, is a very small percentage of the overall parts outlay, but it is likely to grow as airlines look for new ways to contain costs in an era of spiking fuel costs. There is strong resistance from OEMs, which have been successful in locking up carriers in long-term 'total care' type contracts, as well as lessors concerned about residual values of their stables of aircraft and engines – but with oil at over \$100 a barrel these days, PMA parts and non-OEM **Designated Engineering Representatives (DER)** repairs costing at least 30% less than those offered by OEMs begin to look increasingly attractive.

The key distinction is where the PMA part is used. "We all fly planes with PMA parts," said one executive. When an OEM-manufactured sign asking passengers to 'Please wipe the basin after use' costs \$450 and a similar PMA sign costs \$80, the decision to go PMA is not very difficult. But move on up the food chain to highly safety-relevant parts, and the rules change: "Yes, we've seen an opening up in recent years, but the 'no-go' area remains engine gas path parts," said another.

GE's position is clear: "GE continues to be concerned with part-level changes introduced via PMA," Jeffrey A. Conner, director of Alternate Material Strategies for GE Aviation, told *AviTrader MRO*. "Existing FAA rules regarding PMA (and repair) allow for the introduction of design, material and/or manufacturing process changes at the part level without the involvement of the Type Certificate Holder for the engine into which the changes are being introduced. Maintaining continued airworthiness of aircraft engines requires a rigorous assessment of the impact of part-level changes on other parts, sub-systems and systems in the engine, especially with respect to life-limited parts (LLP) and engine operability.

Influencing parts define the boundary conditions under which LLP operate. GE believes current FAA rules and guidance material "do not adequately address system level interactions, and, thus, may not ensure the continued airworthiness of turbine engine LLP when part level design changes are introduced on critical influencing parts".

Regardless of when in the life cycle of an engine replacement parts are introduced, GE's concern centers around "management of the mixed engine configurations that result from introduction of design, material, or manufacturing process changes at the part level. Introduction of multiple replacement and modification parts, each embodying these changes versus the type design, create unique configurations that have never been tested at the system or engine level. The resulting combination of parts (i.e. the engine) has never been tested as a system to demonstrate compliance with FAA or EASA engine-level certification requirements or to validate the applicability of Instructions for Continued Airworthiness published for the engine by the Type Certificate Holder."

It's a fair assessment. While the constituent PMA parts of an engine may have met FAA airworthiness standards, the combination of these parts, when put together in the repair of an engine, have not. But companies like Chromalloy, which manufacture gas path components, stand by their assertion that PMA parts meet the same airworthiness standards as OEM parts and that while the use of PMA parts has grown substantially over the past two decades, the number of airworthiness directives has not. PMA parts and DER repairs for gas path components can cost an airline up to 50% less than similar parts and work from an OEM.

Chromalloy specialises in the manufacture of highly safety-relevant engine parts. Its BELAC subsidiary, which produces high-pressure turbine blades, is part-owned by Lufthansa Technik and United Airlines, indicating a significant involvement of major MRO players in the development of PMA in critical areas. Other firms like Heico and Wencor focus more on non-critical consumables and expendables.

Whatever the destination of the part, Wencor president Russ Adamson says that "PMAs are crucial for an independent MRO shop to compete with OEMs. If MROs only rely on the OEM, they will always be at a disadvantage because they are fundamentally competitors. MROs can be most successful when they partner with low cost parts and labour."

The cost issue is clear, but the perception of quality remains controversial. Companies like Chromalloy, with backing from LHT and United, insist that FAA approval equates to airworthiness, whether it be PMA or OEM-built, and that lingering doubts over quality are fomented by OEMs determined to protect their business. As the majority of aircraft in operation today are leased, it's the lessors, then, with remarkatability as their *raison d'être*, that share the driving seat with the OEMs. "It's not a debate about whether to use PMA parts or not," said one industry source. "It's about finding the cheapest part. But without PMA, we're at the mercy of the OEMs. The builder and the lessor are controlling the show."



.. but do they work like the real thing? PMA engine parts and seals.

Both photos courtesy of Wencor

Weighing in on the PMA debate: What they're saying - and why

JEFFREY A. CONNER, Director of Alternate Material Strategies for GE Aviation: "Lessors that GE has spoken with focus on the criticality of parts. Many airframe parts, window shades and tray tables, for example, are not critical to the safe operation of the aircraft. Consequently, the use of PMA parts for these applications would not be a concern to the lessor. However, these same lessors typically take a much different approach with respect to use of PMA in engines where even "simple" parts can have significant impact on engine operability and life-limited parts management as a result of system interactions."

RUSS ADAMSON, President, Wencor: "There is a shift happening where most lessors realize they have customers who want to use PMA parts and are willing to discuss this at the contract negotiation stage. The perception is that remarketing an aircraft is impeded by PMA. The fact is that FAA-approved parts on an aircraft do not reduce its value. Bilateral agreements throughout the world make the remarketing argument very flimsy. PMAs are crucial for an independent MRO shop to compete with OEMs. Upwards of 70% of the costs associated with a component maintenance shop visit is tied to spare parts that need to be installed. If MROs only rely on the OEM they will always be at a disadvantage because they are fundamentally competitors."

CHOO HAN KHOON, Executive VP, Engine Total Support, ST Aerospace: "Many OEMs align themselves with major service providers like ST Aerospace, especially in view of our preference in using OEM solutions for after-sales support and our responsible attitudes in ensuring their intellectual property is protected. We see this as a win-win approach in offering our services."

FRANK WALSCHOT, SVP Engine Maintenance, SR Technics: "PMA is, and will continue to remain part of our business, but the growth for engine parts may be limited due to lack of acceptance by certain key players such as leasing companies. Also, more recently-offered OEM material solutions and product upgrades make PMA parts less attractive. However, as engines mature and move into different carrier segments, there is still some room for some further development on engines with a significant installed base."

JON SHARP, President and CEO, ELFC: "PMA is not a big issue for ELF as our fleet is very modern and not much PMA exists for new engine types. Neither do I think that PMA is such a big issue world-wide in proportion to the amount of hot air it generates.

"The acceptable PMA and DER is typically on non-critical parts. No engine lessor would accept PMA in the engine gas path for example. We do not accept PMA because some airlines don't, so we would be excluded from leasing to them if our engine had PMA in it.

"PMA is not such a big deal. It is a tiny percentage of parts spend. The bigger issue is DER. Third-party MROs have to develop this activity to combat the total care type growth of the OEM MRO particularly on new engine types."

HUMBERTO PALHA, Quality Assurance General Manager, TAP Maintenance & Engineering: "Although TAP Maintenance and Engineering has no objection to using PMA parts listed on the FAA database, the company has as a policy to ask all its customer whether PMA parts can be used on their aircraft. So, only after customer acceptance can TAP Maintenance and Engineering consider the use of PMA parts."

ABDOL MOABERY, President, GA Telesis: "We do not allow PMA parts to be installed in our leased engines without our prior written approval. While there are limited areas where we will consider it, we feel that PMA parts limit our ability to effectively lease or repair our engines globally without restrictions.

We have seen PMA manufacturers develop parts for engines still in production, for example the CFM56-7B. We do not think this makes much sense as the potential benefit of a PMA part is to reduce costs on parts for an ageing engine."

STEVE WILLIAMS, Director of Technical Purchasing AJ Walters: "Going forward, the use of PMA's is going to rise; the development of PMA's is increasing and the acceptance of the airline community is helping to drive this phenomena. However, with the growing availability of used serviceable material in the market place and the ever-increasing use of more exotic repair schemes, the need for PMA is reducing. MROs like LHT are trying to reach a 100% yield for some repair processes and once achieved this makes the requirement for PMA virtually obsolete for an ageing engine."

RICHARD POUTIER, SVP, ILFC: "PMA parts are not controversial to us. We have industry standards: the FAA, EASA, China's CAAC are all working together to harmonize the industry. If they approve the PMA process, for a non-critical part, I'll put my faith in it. We ALL fly aircraft with PMA parts in them. It's a question of cost-efficiency. Airlines can't do without them. PMA parts in some cases are the avenue

ANDREW WALMSLEY VP Sales & Marketing, Jet Aviation Specialists: "An issue with PMA parts has been the OEM's push to not accept these parts for repair or installation back into engines. What this has meant is that most of the brokers are accepting this condition (no PMA), so that it does not restrict their ability to move inventory. In effect the OEMs have been successful in influencing the market beyond their own facilities and needs."

Background photo: The highly safety-relevant PMA High Pressure Turbine Blade produced by Chromalloy's joint venture company BELAC, co-owned with LHT, United and Alitalia Chromalloy