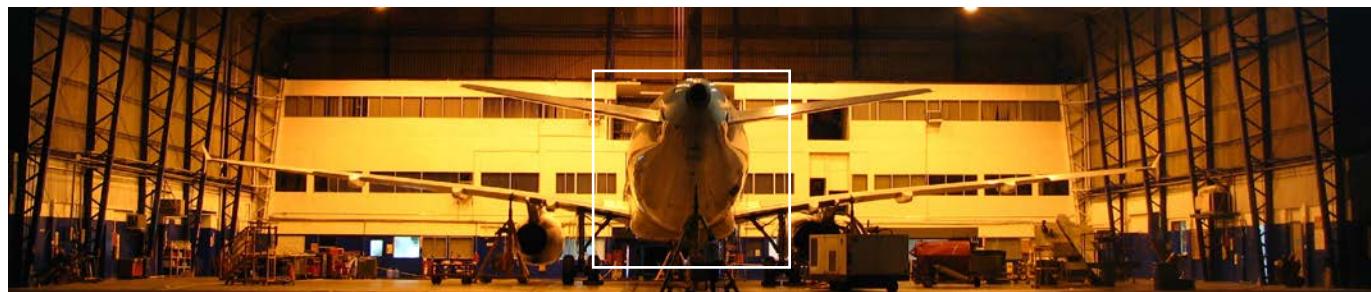


Aviation MROs

Delivering long-term value in a transformed aftermarket



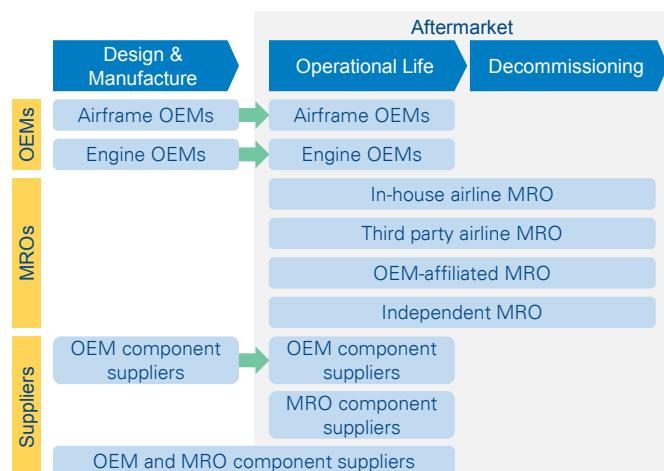
As the Maintenance, Repair and Overhaul (MRO) landscape is disrupted by the emergence of new technologies and the growing presence of Original Equipment Manufacturers (OEMs) in the aftermarket, we examine these challenges and propose a framework by which the MRO service providers can continue to deliver value.

Continuous operational efficiency gains, the rise of low-cost airlines and the growing convenience of flight booking have all contributed to the on-going commoditization of air travel. Despite China's economic slowdown, IATA still expects global passenger volumes to more than double by 2034, reaching 7bn, driving demand for incremental aircraft and generating value in the aftermarket. Similarly, while there may be early signs of softening demand, Boeing's long term market forecast for 2015-34 also foresees a doubling of the number of aircraft in service, to reach 43,560 by 2034, with 56% of orders accounting for growth; such growth is expected to see the global MRO market expand from \$51bn in 2011 to \$71bn by 2021ⁱ.

The aftermarket provides a variety of critical services, including engine, components, base and line maintenance, with engine maintenance accounting for around 40% of total maintenance cost. These services have largely been provided by in-house ('captive'), airline third party and independent MRO service providers, with OEMs playing a more limited role. However, aggressive forays by engine and airframe OEMs into the aftermarket is re-shaping the sector, forcing traditional aftermarket service providers to re-evaluate their value propositions.

After summarizing the key drivers of this phenomenon, this article explores their implications, considering both supply and demand perspectives. Finally, we present a proposed framework with which MRO service providers can evaluate how to deliver value in a transformed aftermarket environment.

Structural change in the aftermarket



Drivers of change

The aftermarket's transformation of the aftermarket can be attributed to a number of factors that are increasing or decreasing demand for MRO services, or introducing new, technology-led maintenance requirements:

Factors increasing MRO service demand:

- Growing air travel demand, combined with cheaper fuel, is driving capacity growth and demand for aftermarket services
- The low fuel price is delaying the fleet renewal process, extending the need to maintain ageing
- The relaxation of foreign ownership rules pertaining to airlines and their subsidiaries is encouraging airlines to outsource 'captive' maintenance activities

ⁱ Source: Frost & Sullivan

Factors reducing/displacing MRO service demand:

- As new aircraft are introduced, improvements to on-wing time are delivering longer maintenance windows, reducing overall maintenance needs
- Variable charging regimes and ICAO emissions standards encourage airlines to retire older fleets and deploy greener aircraft that require less maintenance
- The Middle East is displacing demand in traditional maintenance hubs

Technology factors impacting maintenance needs:

- A more modern fleet promises improved reliability, but also increased maintenance complexity, requiring different skills that not all MROs can provide
- The shift to advanced materials, namely composites, mean new strategies, techniques and schedules are needed compared to the more mature metallic MRO processes
- Similarly, advances in data analytics and the shift to predictive maintenance are introducing new requirements that now all providers will be well-placed to meet

Demand-Side Perspective: the search by Airlines and Leasing Companies for ever more flexible and efficient maintenance solutions

Airlines: the low cost model has had a transformative impact on the aviation supply chain, exposing all carriers – regardless of ‘type’ – to much greater levels of cost pressure. Airlines, which typically spend in the region of 10-15% of annual revenues on direct maintenance costs, face significant unit maintenance costs: for example, according to IATA, the average maintenance cost in 2013 was \$1,167 per flight hour, \$3,021 per flight cycle and \$3.1m per aircraft per annum. Furthermore, as fleets age and carriers start to incur the costs of major maintenance milestones, such as C and D checks, airlines become exposed to a growing maintenance burden.

Maintenance functions have been far from immune to cost cutting pressures, as airlines seek to improve the efficiency and flexibility of maintenance operations and more effectively manage opex and capex outlays to achieve improved margins (i.e. contribution per block hour, or CPBH) and total lifecycle costs. Airlines can only reap the full benefits of their respective network and fleet strategies if they have a robust and flexible maintenance regime in place: carriers that lack this fundamental cornerstone risk a higher frequency and duration of Aircraft On Ground (AOG) events, with obvious implications for On-Time Performance (OTP), operating costs and customer satisfaction.

In their search for flexible solutions, traditional time and materials contracts are being challenged. In their place, carriers are becoming more interested in innovative dollar-per-flight-hour agreements, whereby maintenance providers assume greater financial risk and are incentivized to maximize availability and

minimize the occurrence and duration of AOG events. In a cost-conscious environment, airlines will also be keen to reduce inventory carrying costs, than according to IATA can represent as much as 20% of inventory value, by outsourcing inventory management responsibilities.

However, the implications of heightened cost sensitivity are not uniform, and hinge on the maturity of airlines and fleets, and decisions on core competency. For example, whilst an established FSA like Lufthansa may retain their own third party maintenance function, **Lufthansa Technik**, for smaller airlines, maintenance cost certainty may be the overriding consideration, leading them to seek outsourced ‘power-by-the-hour’ solutions. For instance, the Indian start-up, **Vistara**, recently entered into a ‘nose to tail’ OEM solution with Airbus to support its fleet of 20 A320 aircraft, leaving the airline to focus on its core business.

Leasing Companies: given that over a third of the global fleet is now leased, aircraft leasing companies also have a key role to play in shaping the aftermarket.

As residual asset value is determined by a number of factors, but not least by the overall maintenance condition of the aircraft, leasing companies have a strong vested interest in ensuring that the maintenance regime is designed to protect asset value. In the case of a wet lease, whereby the lease includes the provision of the aircraft itself, plus crew, maintenance and insurance (ACMI), the OEM may incentivize the lessor to enter into an all-inclusive ‘aftercare’ package, rather than engage with different MROs on a case-by-case basis. Lessors may be receptive to the additional choice and, arguably, the reassurance that the OEMs have brought to the aftermarket.

Supply-side perspective: the OEM quest to capture a greater share of aftermarket value

Engine OEMs

While there is some variation between manufacturers, the engine OEMs have historically been relatively successful in cultivating strong aftermarket positions. By leveraging the technical complexity and material-intensity of engine maintenance activities, significant barriers to entry have been established in both the wide-body and rapidly growing narrow-body markets:

- **Wide-body:** Rolls Royce is an acknowledged aftermarket leader and in 2014 held 24% of the wide body market by engine volumesⁱⁱ. As of 2014, 83% of its commercial transport engine fleet was covered by its TotalCare service, with 52% of civil aerospace revenues (£3.5bn) derived from after-sales services.
- **Narrow-body:** the GE-Sneecma joint venture, CFM, accounted for 51% of total deliveries in 2014, and controls around a third of the aftermarket services business for its productsⁱⁱⁱ. Significantly, around 80% of CFM’s next

generation LEAP engines are to be bundled with long-term service agreements.

The high penetration of engine OEMs in the aftermarket, including the faster-growing narrow body segment, restricts the ability of non-affiliated MRO service providers to compete. Where OEM support extends to the provision of spare engines, there may also be implications for the engine leasing market.

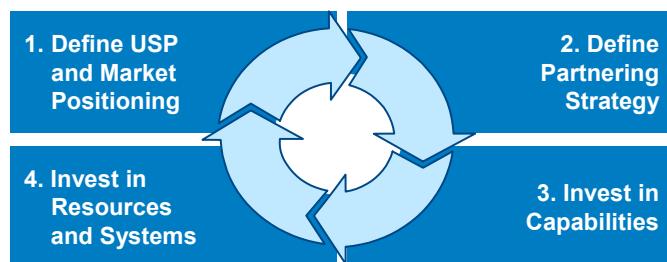
Airframe OEMs

By contrast, the airframe manufacturers have traditionally held lower aftermarket shares: Boeing's GoldCare offering, for instance, covers around 1,600 aircraft, equivalent to only 15% of Boeing's total active fleet^{iv}. However, motivated by the need to recover heavy development costs and capitalize on the projected growth in MRO revenues, the airframe OEMs have redoubled their efforts to secure Long Term Service Agreements (LTSA) at the point of aircraft sale. Combined with the technological complexity of the latest airframe designs, restrictive licensing agreements and strategic IP advantages, these offerings make it more difficult for non-affiliated MROs to compete.

Delivering value in a transformed aftermarket

Faced with these threats to the long-term viability of their business models, and changing customer expectations, there are specific questions for MRO service providers:

MRO value delivery framework



1. What is my USP and market positioning?

In this new environment, the successful independent MROs will be those with a clearly identifiable USP and market positioning. Given the OEMs' advantage in material costs, and the narrowing gap between labor costs in developed and developing markets, it is unlikely that cost will remain a sufficient differentiator. So, MROs will need to seek out new ways to differentiate themselves when competing in a mixed MRO-OEM market, to occupy distinctive market space, such as:

- **Service:** OEMs are likely to focus on clients with a minimum critical mass. Smaller entities, like regional airlines and niche lessors, could be receptive to the MRO's more personalized customer service.
- **Practical in-field experience:** while the OEMs have the lead in terms of technical understanding of next-generation

ⁱⁱ Source: Flightglobal

ⁱⁱⁱ Source: Flightglobal; Société Générale

aircraft, the MROs have decades-long execution experience of responding to AOG and other maintenance events.

- **Flexibility:** for airlines with more complex maintenance requirements, for example due to hybrid short haul / long haul fleets with many aircraft variants, MROs may be able to provide a more tailored solution.
- **Cost-Consciousness:** while replacing components with new will remain necessary in many cases, MROs should use serviceable used parts programs and alternative repairs to emphasize cultural alignment and help the operator reduce its total maintenance bill.

2. What is my partnering strategy?

In a consolidating market where, for structural reasons, the cost advantage has shifted in favor of the OEMs, achieving operational scale is key. Therefore, the development of effective partnering strategies will be essential for all MRO players, regardless of size.

There are a number of partnering options for the MRO, which could include one or a combination of the following:

- **Partner with OEMs:** as the airframe, engine and component OEMs cement their presence in the aftermarket, the development of collaborative OEM-MRO partnerships will be essential for MRO survival, dramatically reducing the time and investment required to remain competitive. Not only this: on the OEM side, as Rolls-Royce's strategic partnership model demonstrates, the development of a select pool of MRO partners can be essential to achieve operational reach, achieve cost-effective inventory management and de-risk maintenance portfolios. Similarly, for airframers, limited MRO partnerships are a way to meet the service requirements of a rapidly growing fleet, especially in the narrow-body segment.
- **Partner with MROs:** partnering with a fellow MRO service provider may be attractive where the MROs bring complementary skill sets to the table that can be used to target specific niches. For example, in 2015, **SR Technics**, a leading third party MRO, signed an MOU with **AerFin**, a specialist in end-of-life fleet solutions, to deliver a new 'Beyond Fleet Services' bundled offering to the aftermarket. The offering is focused on mature A340 fleets, and helps overcome challenges related to engine, airframe and component maintenance, and inventory management.
- **Partner with Suppliers:** to offset the OEMs advantage in material costs, and optimize material throughput times, MROs need to forge partnerships with aftermarket component suppliers. This may include partnering with PMA parts manufacturers, like **HEICO**, to reduce dependence on OEM components.

^{iv} Source: Aviation Week

- **Partner with Airlines and Lessors:** given the outsourcing trend, MROs need to find ways to secure a greater proportion of maintenance activities at the point of aircraft selection, through new sources of differentiation. For example, MROs may be willing to assume greater levels of maintenance risk, or offer more flexible contracts. Digital innovation, in the form of remote support solutions, including cloud-based MRO platforms, and other new repair technologies also have a role to play in re-defining the USP of MROs and fostering more intimate customer relationships.

3. What capabilities should I invest in?

The introduction of next-generation aircraft is shifting the materials mix, away from the dominance of metals to a future where there might be a 50:50 split between metallic and composite repairs. In parallel, the expansion of aircraft-to-ground data flows is creating new possibilities for predictive maintenance, generating demand for advanced digital capabilities. MROs therefore need to develop the required leadership and technical capabilities, and work flow, to satisfy time, quality and regulatory requirements, and realize the substantial opportunities that both advanced materials, and digital capability present. Bearing in mind that many of the techniques for composite MRO and predictive maintenance are still being formed, it is important that MROs avoid a generic approach, and develop and/or hire technical skills in specific sub-segments of the aftermarket.

4. What systems and processes should I invest in?

As next-generation aircraft and engines are increasingly capable of generating the data required to enable the shift from reactive to predictive maintenance, enabling MRO systems and processes also need to evolve. In addition to developing the required skill sets, MROs will need to be able to effectively interface with and interrogate these new data flows so that, as in the case of **AJW's Reliability and Maintenance Program**, ownership of a proprietary MRO data set becomes a source of competitive advantage. However, making a successful transition to predictive maintenance is not just a case of investing in systems and processes: it also requires a cross-supply chain culture shift at the shop floor level, so that all parties understand and buy into the reasons for replacing a consumable part before the time of failure, as part of a digitally-led prognostics approach.

Conclusion

In a new market reality, characterized by the permanent presence of the OEMs, rapid technological change and the evolving maintenance and cost requirements of aircraft operators, aftermarket consolidation is inevitable.

While strong demand for air travel and step-change reductions in fuel price may offer some respite for non-affiliated MRO service providers, such relief will only be temporary. Faced

with aggressive OEM competition, the inevitability of fleet replacement and radical advances in technology – both in the air and on the ground – MROs that stand still and do not embrace partnering to challenge existing business models, and achieve the required operational scale, are likely to face a bleak future.

Yet even in such a disrupted environment, possibilities for business transformation exist. For those MRO service providers that succeed in delivering long-term value to the aftermarket, this transformation will be based on finding robust responses to the questions posed, and developing and implementing a compelling 'future of operations' vision.

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