

# Managing Component Maintenance Costs to Create Value

Component maintenance can account for up to one-fifth of total maintenance costs for an airline, yet many airlines still purchase component repair services inefficiently on a part-by-part basis. This white paper details a more effective approach for airline executives, one that leverages supplier capabilities and thereby reduces costs and risk while also improving performance and reliability.

For many airlines line replaceable unit (LRU) component maintenance, repair, and overhaul (MRO) represents a complex management challenge. For a variety of reasons, including expiring warranty coverage, aircraft aging, OEM-generated service bulletins, parts availability, and the sheer volume of parts to manage, airlines often experience escalating total costs. Yet many airlines are missing opportunities to control component maintenance costs, which typically range between 15 and 20% of their total MRO cost.

Our experience suggests several proven tactics that can be employed to manage component maintenance cost drivers. Indeed, by leveraging supplier capabilities, airlines can significantly reduce maintenance expenses, improve predictability, reduce maintenance risk, and at the same time increase part availability and overall reliability levels.

To realize those benefits, airline executives must build partnerships that align the airline's risk with that of the MRO providers. These partnerships should be built around five principles:

- Develop detailed, probabilistic models on maintenance costs over the lifecycle of the aircraft
- Leverage market options
- Align risk
- Clarify the gray areas
- Rigorously manage the sourcing process

### **Develop a Detailed Perspective on Maintenance-Lifecycle Costs**

Many airlines purchase component repair services on a discrete, part-by-part basis, whether in the spot market or under longer-term agreements.

Pricing structures typically range from simple time and materials to fixed prices per usage increment. Unlike engine maintenance, few airlines enter into "total care" solutions that cover broad portfolios of components across an aircraft. This decision stems in part from the difficulty in predicting LRU component repair demand over several years and in part

from the belief that having a long-term LRU component maintenance agreement will mean missing out on future MRO cost reductions. Some of the cost uncertainties relate to environmental factors, usage patterns, interchangeability between parts, no fault founds, and modifications that can affect the reliability of LRU components.

However, part-by-part strategies typically do not maximize value over the lifecycle of the aircraft. A more effective sourcing approach focuses on developing a long-term perspective on maintenance costs, particularly on total-cost-of-ownership elements such as inventory ownership and parts availability. This approach is anchored by a robust, baseline spend-analysis model, which provides a detailed, systematic perspective on current maintenance costs and a probabilistic perspective on future maintenance requirements. By understanding the key drivers of spend and having a model that can simulate future spend over the entire fleet, maintenance executives can project a maintenance cost curve for the next five to ten years. Insight gained from the model can inform dialogues between maintenance executives and their MRO supplier counterparts.

Construction of these probabilistic models is complex because of the large number of parts, problems with data availability and accuracy, interchangeability, part number variation, and modeling complexity. Over the life of the aircraft, the models forecast removals, work-scopes and associated repair prices, LRU replacement costs (e.g., OEM or alternate parts), and overhead costs. The models account for aging factors (e.g., removal rates, scrap rates, and service bulletins) and the changing dynamics of the airline operation such as fleet size and operating conditions.

Airline executives can use these simulation models to compare supplier bids and to analyze different scenarios and potential savings. The baseline serves as a benchmark throughout the sourcing process, becoming the fundamental analytical tool to support decisions during negotiations.

## Leverage Market Options

Effective cost management requires a detailed understanding of the underlying marketplace, including the supplier landscape, specific capabilities, ownership structures of various suppliers, and the full range of innovative inventory and parts options available in the marketplace. Four opportunities are particularly important:

- **Inventory strategies.** Several contemporary inventory tactics have emerged and gained acceptance over the past few years, designed to place control of various aspects of supply chain operations and risks in the hands of the party best able to manage them. For example, an inventory sale-leaseback program leverages the MRO supplier's capabilities in inventory sourcing and management while leaving all operational control such as inventory levels and selling decisions with the airline. For this to work, the MRO supplier must have a lower cost of capital than the airline or the ability to cross-utilize or optimize the parts required. Alternatives include pooling with non-competing airlines and subscribing to a fulfillment program.
- **Owner-operated part opportunities.** Airlines can reduce costs by developing and certifying their own replacement alternatives for simple parts that do not require Parts Manufacturer Approval (PMA) or Supplemental Type Certificates (STC). Airlines with approved plans in place do not have to use parts sourced from original-part manufacturers. Instead they can substitute parts they develop themselves. Airlines can also partner with non-competing airlines to share part-development capabilities and expenses. For some parts, the cost savings can exceed 90%.
- **PMA strategies.** PMA parts often offer significant savings from OEM list prices, especially on LRU components. Airlines can stimulate PMA market development through a strategic partnership that grants a long-term contract to the PMA manufacturer. Even if certain aircraft and engine lessors restrict the use of PMAs, knowledge of what's available will provide negotiating leverage; however,

incorporating PMAs into the fleet may impact relationships with OEMs.

Similarly, airlines can leverage PMAs by creating benefit-sharing mechanisms in their MRO contracts, which encourage PMA development and use. One way is to reward the party that initiates the change. In this manner, both parties have strong incentives to identify lower material costs. Regardless of an airline's perspective on the usage of PMA parts, at a minimum their existence should play a role in all aspects of negotiations.

- **Designated engineering representative (DER) strategies.** DER repairs are approved repairs that increase an aircraft part's useful life. It's important for airlines to track industry-available DER and extended-DER repairs through dedicated research and to maintain a database of MRO providers offering such services. Airlines with strong engineering capabilities may also evaluate the effectiveness of such repairs and, in addition, develop others in-house. Understanding the availability of these repairs and incorporating them into negotiations can help drive long-term reliability improvements and cost savings.

## Align Risk

The most effective long-term agreements are those that align the risks with the party (MRO provider or airline) best able to manage it, thereby driving total costs down for both parties (Exhibit 1). Each party must assume responsibility for shortfalls in its own performance, whether through no-fault-found rates, negligence, or simply not following the maintenance manual.

Some deals represent one end of the risk spectrum through time- and material-based fee structures that make cost completely variable, exposing the airline to substantial risk (e.g., work scope, removal, scrap, service bulletin), with only labor rate risk under the responsibility of the MRO provider. Here, the provider has a reverse incentive to maximize revenue by using additional labor and parts. At the other end of the spectrum, fixed-cost contracts transfer all risk to the supplier. Under these con-

## Exhibit 1 The risk spectrum

	No risk exchanged	Risk alignment	Risk transfer
<b>Deal structure</b>	<ul style="list-style-type: none"> <li>■ No transfer of risk, incentives are not aligned</li> <li>■ Generally leads to higher costs for both parties</li> <li>■ Airline always pays more than expected</li> </ul>	<ul style="list-style-type: none"> <li>■ Appropriate risk transferred, making the deal less expensive for both parties</li> <li>■ Incentives truly aligned, including no-fault-found penalties, limits on inbound carryovers</li> </ul>	<ul style="list-style-type: none"> <li>■ All risk transferred to MRO provider or OEM. MRO provider has incentives to perform on quality and turn time</li> <li>■ Misaligned incentives cause large risk premiums for the airline or risk for the MRO providers</li> </ul>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>■ Simple deal structures with cost plus for both sides</li> <li>■ No risk for either party</li> </ul>	<ul style="list-style-type: none"> <li>■ Lowest-cost option to both the MRO provider and airline</li> </ul>	<ul style="list-style-type: none"> <li>■ Airline is completely covered for all risk, perhaps including service bulletins, no-fault-founds, repairs related to flight operations, incursions, and inbound carryovers</li> </ul>
<b>Drawbacks</b>	<ul style="list-style-type: none"> <li>■ Airline always pays more than it should</li> <li>■ Second bills often hurt the relationship</li> </ul>	<ul style="list-style-type: none"> <li>■ Complex deal structures requiring complex equations, penalty structures, and negotiations</li> </ul>	<ul style="list-style-type: none"> <li>■ Airline is not motivated to lower MRO costs related to the deals</li> </ul>

tracts, while the airline transfers cost fluctuations to the provider, the carrier often overpays over the life of the aircraft as the MRO charges a premium for the higher level of risk it assumes.

It's more effective to search for middle ground along the risk spectrum in executing long-term agreements. For example, as aircraft age, the total cost of LRU maintenance rises substantially. By structuring a contract based on cost per flight hour (CPFH) and aircraft age, prices adjust to reflect the underlying cost profile the MRO provider incurs, with total payments from the airline to the provider reflecting this same profile (Exhibit 2). Under these long-term deals, two topics that should be considered above all others are the replacement of units deemed beyond economic repair (scrap replacement) and incorporation of service bulletins into the CPFH rate. This motivates the MRO provider to make appropriate repair and upgrade decisions, optimizing maintenance costs over the life of the program.

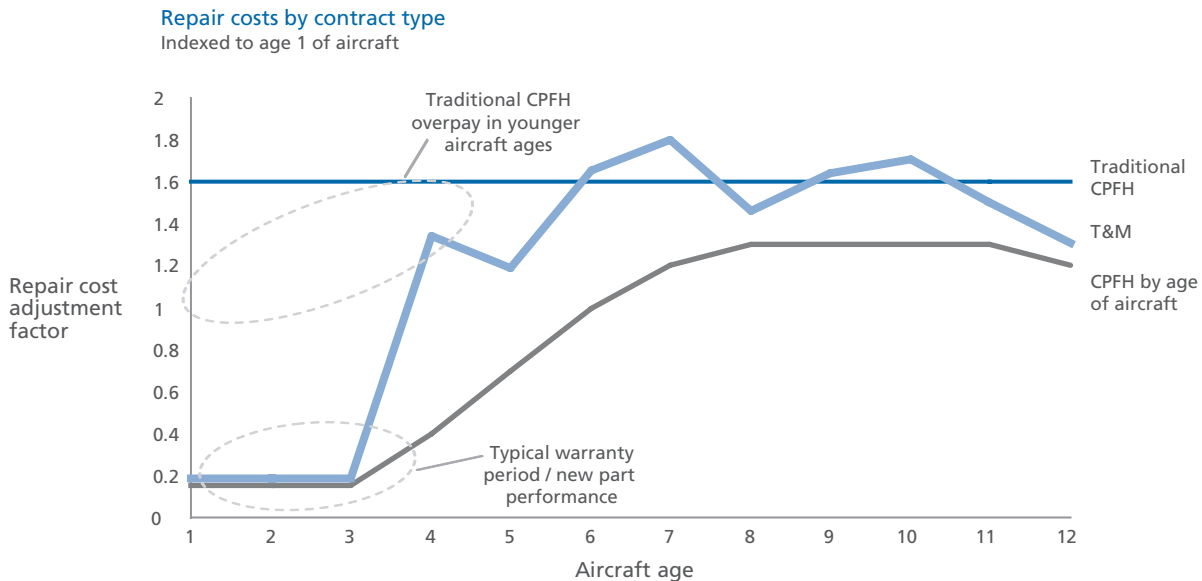
### Clarify the Gray Areas

The best long-term agreements leave little room for ambiguity; they spell out cost and performance certainty. Ambiguous agreements that require ongoing mutual agreement set the stage for conflict.

Our experience suggests four categories of contract terms that need consistent attention:

- **Performance guarantees and associated damages and credits.** Airlines usually define performance measures narrowly and argue later about broader damage caused by the MRO provider's failed performance. Defining performance guarantees to reflect the actual impact to the airline (e.g., parts-related delays and cancellations, Minimum Equipment List) with appropriate damages helps to define expectations at the outset. In addition, most carriers are reluctant to offer suppliers incentives or credits for surpassing performance expectations. Wielding a stick and no carrots rarely works and does not recognize the impact that the supplier's performance has on the airline's operation.
- **Regulatory compliance rules and penalties.** Contracts state the scope of services that the MRO provider will offer, but often neglect to specify mandatory compliance with FAA regulations and OEM part modifications. In order to fully align risk with suppliers, airlines must be explicit about how service bulletins and airworthiness directives will be treated. Ambiguity results in the airline paying "over

## Exhibit 2 Different ways to pay for repairs



and above” charges for these services at a later date, with little leverage to negotiate favorable rates.

- **Scope and structure.** Many contracts fail to draw a clear line between what is and is not included in the deal structure. Correctly framing the deal structure raises the odds of favorable negotiations and operational outcomes. Issues such as the scope and length of the contract, performance requirements, rules and formulas for price adjustments, and termination rights need to be defined prior to distributing an RFP so that all suppliers understand the expectation of the airline and price their proposals accordingly. Moreover, airlines must be aware, prior to negotiations, of how the scopes of their different repair agreements interact. For example, LRUs replaced during an airframe heavy maintenance visit can still fit inside a CPFH arrangement, but airlines must ensure a seamless connection between the airframe MRO supplier and the LRU repair provider, including transportation and warehousing responsibilities.
- **Provisions for a “second bill.”** In CPFH agreements, airline managers must think carefully about the potential for second bills (i.e., MROs charge

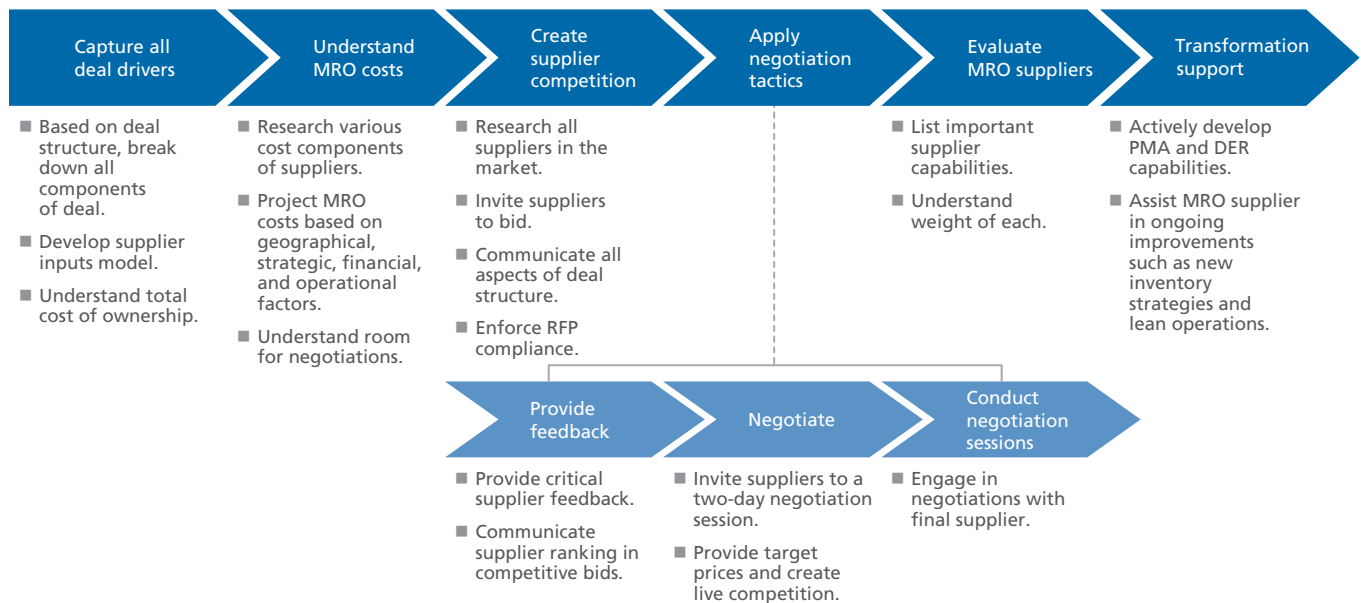
for excluded items). Some contracts that appear to be all-inclusive actually allow numerous exclusions that over time can add millions of dollars of costs to the lifecycle of a deal. For example, exclusions under “negligence” or “normal wear and tear” should be discussed and defined. To avoid ongoing disputes and surprises, parties need to agree explicitly in advance on these “over and above” costs, and airlines should cost out these items.

### Manage the Sourcing Process

Once airlines have a solid understanding of their forecast baseline costs and desired sourcing goals, they should run a rigorous, competitive sourcing process (Exhibit 3). Keep in mind three aspects of the process: communication, competition, and negotiation.

- **Communication.** Airlines need to be in close contact with prospective suppliers from the moment they release their maintenance RFPs until a contract is signed. An active, real-time dialogue between the parties allows the suppliers to truly understand the work bid on and helps the airline to better understand suppliers’ capabilities. Channel the communication through a central contact at the airline, but maintain supplier access to technical experts.

### Exhibit 3 Conducting an effective sourcing process



■ **Competition.** There is no substitute for rigorous, competitive sourcing. Too often, airline executives and sourcing professionals try to out-guess the market and circumvent the competitive process by entertaining unsolicited offers from suppliers that appear to offer attractive benefits.

While there are several means of creating competition through the sourcing process, one of the most effective methods is to provide suppliers regular feedback on their position relative to other bidders. Without violating confidentiality, airlines can generate significant concessions on price by inviting vendors to participate in a short-duration, auction-like process. Providing detailed pricing feedback (for example, ranking the bids and giving suppliers a range to respond to) helps to ensure that supplier executives are acutely aware of their bid’s position relative to their competitors.

■ **Negotiation.** Having a rigorous negotiation framework can be a powerful mechanism for maximizing savings. We have found that it can be highly effective for airlines to bring together potential

suppliers at the same time for a short-burst, structured two-day negotiation session. At the beginning, airline executives must be emphatic about the need for bids that are both comprehensive and comparable and completely compliant with the requested bid format. As suppliers recognize they are being compared on the same basis, they will focus on those aspects of the bid most important to the airline. This type of negotiation approach requires extensive preparation and knowledge of the negotiation process along with a deep, analytical understanding of contracts, cost baselines, and specific deal mechanics.

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In the face of ongoing pressure among airlines to maintain low costs, aircraft maintenance has become a critical element of bottom-line performance. Strategic deal design and redefining MRO relationships have thus emerged as a critical task. Well-structured, strategic MRO partnerships can help give airlines the edge they will need to succeed in an increasingly competitive industry environment. ❖

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