Digitalisation.... up and running? Or still in the fledgling stage?

Data-driven solutions are being expanded across airlines.
Photo: Lufthansa Systems

Volker Hildebrand, Consultant at Lufthansa Consulting puts aircraft maintenance data to the test.

Various associations, institutions and consultancies state the significant potential of digitalisation across all industries. Like all major industries, also commercial aviation strives to benefit from the opportunities offered by digitalisation. Data-driven solutions such as dynamic bundling or real-time baggage tracking services are constantly being expanded across airlines.

These efforts seem to have a positive impact on customer experience, product competitiveness and revenue generation. However, beneath the surface, digital solutions – for example, in Maintenance, Repair and Overhaul (MRO) and Continuous Airworthiness Maintenance Organization (CAMO) business -- appear to be struggling to succeed. While other sectors like the automotive industry have made significant leaps in digitising and automatising their production over the past few years, digitalisation in MRO and CAMO is still in its infancy. Given the immense impact of maintenance on a carrier's operational and economic performance, this development is especially astonishing. In this article, Lufthansa Consulting experts provide a brief overview of the reasons for the current state of digitalisation in aircraft maintenance and suggest how to clearly prioritise efforts in order to harvest the potential of digitalisation for MRO and CAMO.

According to industry benchmarks, the root cause for the sluggish progress of digitalisation in aircraft maintenance lies in the extensive lifecycles of equipment. In particular, fast-paced developments like digitalisation feed on incremental innovation and improvements.

Manufacturers of consumer goods and cars have to implement new products in short cycles in order to stay competitive. This allows them to adapt their production, processes and technologies with high frequency. On the contrary, OEMs in aviation are tied to immense development and certification costs leading to product lifecycles, which exceed those of consumer goods by a factor of ten or more. Considering that the idea of real-time data collection was a futuristic vision when the majority of today's active aircraft fleet was developed, it is hardly surprising that maintenance organisations lag far behind the digitalisation progress of other industries. Nevertheless, increasing competitiveness in air transport and related maintenance services demand that players in this industry overcome existing hurdles and boost efficiency. The consultants therefore recommend a structured short- to long-term approach in order to fully exploit the potential of digitalisation in aircraft maintenance.

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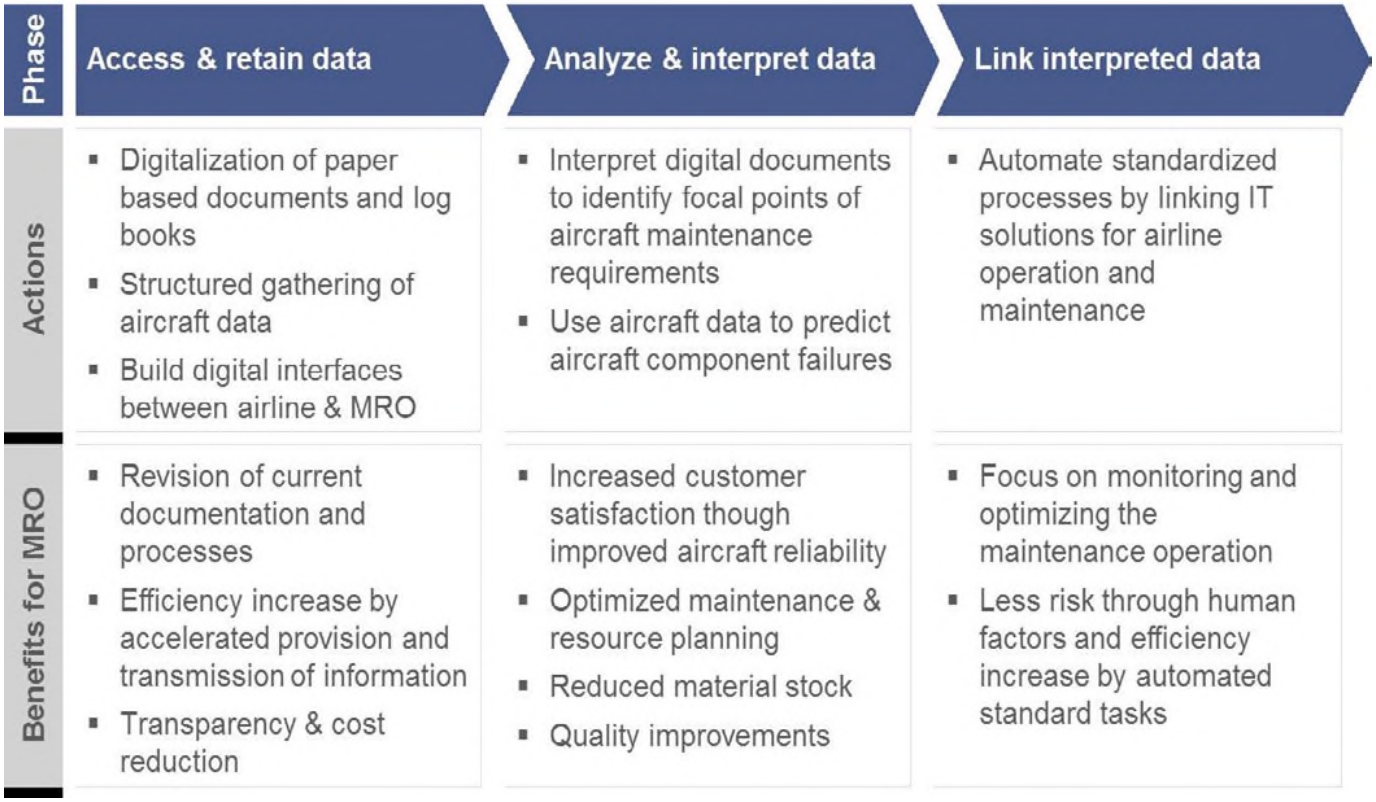


Step 1: Access and retain data

As a first step towards tapping the potential of digitalisation, airlines' CAMO and MRO organisations will have to do their basic homework and make the relevant data available and accessible for further usage. One major milestone in this endeavor will firstly be the digitisation of maintenance documentation.

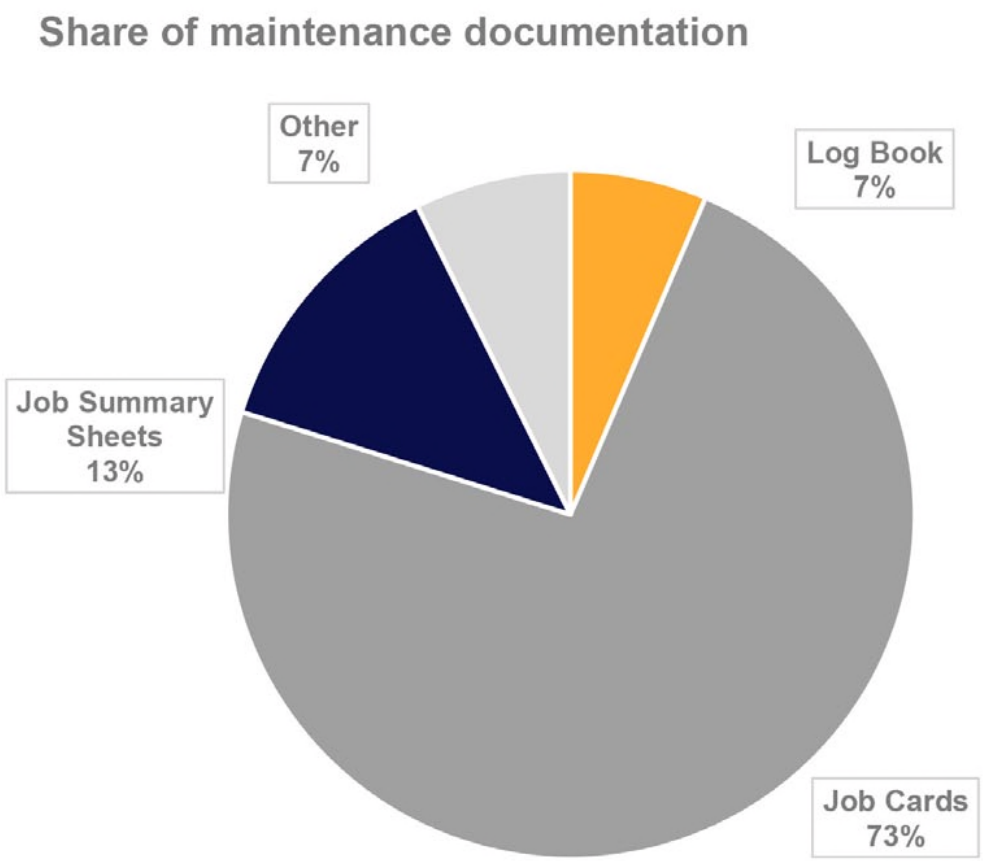
As things stand at present, CAMO and MRO business is still characterised by paper-based documentation and the collection of non-standardised aircraft information. The digital availability of basic industry-focused information is key to benefiting from rapidly developing computer systems and analytic capabilities. The transfer of documentation and information lays the foundations for time and cost reductions by saving paper, accelerating the provision and transmission of information and avoiding duplication of effort.

Digital documentation will provide MRO providers and their clients with continuous transparency of their fleet's maintenance condition and availability. Besides monitoring the customer's fleet, MRO companies will significantly facilitate leased aircraft transfers. Since around 40% of the global fleet of aircraft is leased, the lack of standardised maintenance records for lease transfers incurs high costs and significant delivery delays. Hence, all involved stakeholders have the potential to benefit greatly from digital maintenance records.

While the digitalisation of maintenance documentation lies in their own hands, challenges concerning the access of aircraft data emerge. MRO organisations have to overcome the gap between the varying availability of aircraft data. Aircraft technologies that have been around for several decades, respectively, that were developed several years ago, as well as restrictions on full data accessibility by OEMs or an airline's labour unions challenge MRO providers to gather standardised aircraft data. Only the structured exploitation of data through the use of existing aircraft sensors offers the opportunity to monitor aircraft condition in real time and provide the relevant services. By analysing AOG-relevant components or parts that demonstrate unpredictable failure behavior, maintenance costs can, potentially, be significantly reduced. Making that data available is crucial for MRO companies in order for them to provide optimised products to their customers i.e. optimised reliability analysis.

Step 2: Analyse and interpret data

Once data is available, the MRO organisation's emphasis must shift from data collection to its automated interpretation. It is therefore crucial for an organisation to build up its own capabilities for data analytics. Improved data science and analytics can be used



Approximate share of six million pages of printed maintenance documents for an aviation group per year

to interpret digital maintenance documentation and identify relevant information to support cost reduction programmes, product changes or quality improvements. With its focus on aircraft data, analytic capability is essential for interpreting available information in order to predict aircraft system behavior, trends and outcomes. By using predictive maintenance analytics, MRO providers are able to prevent unscheduled maintenance in future and help to improve the customer's aircraft reliability and availability.

Step 3: Link interpreted data

The third field of action is automating the maintenance production system by leveraging available data and analytic capabilities. The challenge facing MRO companies is to identify the level of automation in order to make standard work procedures more efficient. On long-term perspective, the combination of data analytic solutions has the potential to reduce human involvement down to the actual maintenance work. Improved processes, stock policies and enhanced enterprise resource planning are further potential efficiency levers driven by analytics. Internal studies reveal a maintenance cost-saving potential up to 45%.

MRO services are a significant operating cost item for airlines, whereas for third-party MRO providers it is their core business activity. Those maintenance organisations that do not adapt quickly to digital transformation will be affected negatively, especially at times when aircraft maintenance volume per aircraft decreases. While airlines are continuously developing digital solutions for their clients in order to increase passenger satisfaction and revenues, MRO companies are failing to exploit the full potential of digitalisation to improve their service for airlines. By following the three-stage approach presented here, an MRO organisation can benefit from digitalisation and create value for its customers.

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