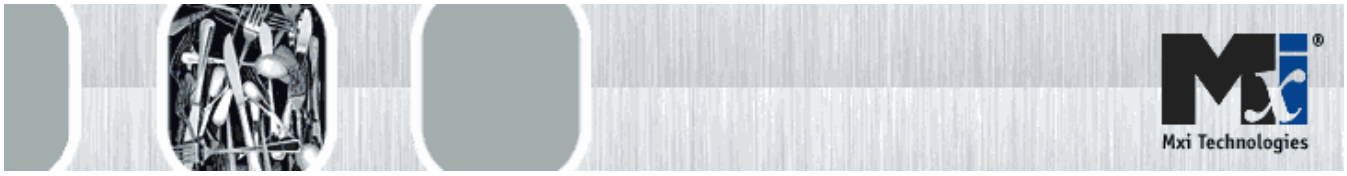

Automating Maintenance Planning

The right IT system can help MRO providers better prepare for unplanned events.

By Henry Canaday
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INFORMATION TECHNOLOGY ASSISTS AIRCRAFT MAINTENANCE planners in several ways. First, IT can convert the unplanned reactions to surprises, both on the line and in the shop, into well-planned actions that reduce expensive downtime and costs. Second, IT allows the regular planning of maintenance events to be conducted and communicated much more rapidly and efficiently. But automating maintenance planning often has been difficult, time-consuming and expensive. Managers must consider a complex web of processes and other IT systems to do it well and make the transition pay off.

Economizing on labor, materials, hangar time and downtime requires "making the unpredictable predictable," says Sabre VP-Solutions Management Ilia Kostov. To achieve this, Sabre can integrate maintenance control on day-of-operations with its Systems Operations Control used by 200 airlines. Maintenance problems detected inflight can be broadcast to the ground, where "the mechanic is waiting with the right part and right solution," he explains.

Digitized fault-isolation manuals recommend solutions, prepare work packages and requisition materials. These reactions work now but will expand as new aircraft types arrive with robust health monitoring systems. Kostov estimates planned reactions increase ontime performance by 5%-10% and reduce labor requirements by 20%.

Sabre's system also monitors component reliability, automatically alerting managers when MTBR falls outside warranty limits. Kostov says operators can increase warranty claims 30% with this tracking. Expensive surprises occur during major maintenance such as heavy checks and off-wing engine overhauls. Inspections discover more work than anticipated and the need for additional engineering or parts.

"No matter how well you initially plan, you will have to revise the plan," emphasizes Realization Technologies VP-Strategic Services Sridhar C. Most carriers and shops still use spreadsheets, experience and judgment to counter these "within-event" surprises. Realization software helps keep work on schedule more precisely and uniformly. The application inserts time buffers at strategic points in the plan for heavy maintenance. As work proceeds, it sets priorities for mechanics based on how much buffer time has been used. The tool helped Delta Air Lines' engine shops increase throughput by 25%, from overhauling about 40 engines per month to consistently producing more than 50.

Major maintenance events are planned by following definite rules in the most economic manner. The critical tradeoff is maximizing the amount of work done during checks while minimizing downtime. The decision process must be handled by an experienced planner, not a set of equations. But the balancing act is accompanied by an immense number of requirements, constraints, processes, specifications, orders, packages, transactions and other messages. By digitizing and organizing all this, IT economizes on planning time and effort. Carriers may use internal systems, enterprise resource planning systems like SAP and Oracle or purpose-built applications like Mxi, Trax, AMOS and Sabre's Ramco.

Swiss Aviation Software's AMOS, used by 60 airlines and shops, gives planning staff all the information necessary to schedule major events and optimize work packages for these events. It shows when maintenance actions are required, checks availability of parts, manpower and facilities, links with shift planning and indicates future flight schedules. Planners usually forecast over the short, medium and longer terms, for example the coming week versus C checks over the next 12 months. Swiss-AS CEO Ronald Schaeuffele says AMOS's longer-term planning functions will be refined further and eventually allow users to simulate, store and schedule engine overhauls.

Sending work packages to third-party shops is another critical planning task. Swiss recently agreed with Lufthansa Technik on electronic exchange of this data and is talking to three other maintenance providers to connect their systems to AMOS.

Schaeuffele acknowledges that the advantages do not outweigh implementation costs for airlines that will remain very small but estimates that larger carriers save "millions" through smart automation. AMOS also saves money by automating reports for regulators and new owners of aircraft that an airline is phasing out. Air Transat began implementing AMOS for line maintenance, A checks and some C checks on 14 Airbus widebodies in January 2007, going live the following October. Project Leader Julien Methot says planners now schedule work packages by simply right-clicking on items to bring up all the needed data. AMOS alerts planners when a plan conflicts with resources or allowable downtime. Planners receive electronic notice of completed work instantly rather than in the six days required by paper.

Methot expects major savings in man-hours when AMOS adoption is complete. After 12 months, the application will identify slow-moving parts, allowing further cost reduction. It links with the carrier's SAP corporate database, cutting financial clerk time in half. He predicts further efficiencies as AMOS's resource and staffing tools are exploited fully. The Spec-2000-compliant system will tap directly into e-commerce exchanges, saving time and man-hours.

Paperwork Prevention

Simply cutting paperwork is one major advantage of leading systems. Planners spend 2-3 weeks just assembling paper documents--manuals, airworthiness directives, service bulletins--for a C check, according to Trax MD Chris Reed. "We have it all preloaded. Push a button and it is there in three minutes. It is a massive manpower saving."

One Trax customer with a hundred aircraft saves $300,000 annually in preparing materials for maintenance, according to Reed. The airline has six planners, compared with 22 at a similar-sized but unautomated carrier. Reed estimates that Trax reduces planning efforts by 20%-30% and document-preparation burdens by 40%. Gains should increase as aircraft become smarter. Trax is working with Jetstar Airways to integrate its tools with the 787's health monitoring system. "The 787 will tell you when it is sick," Reed says. "That will pop up on the screen as something that has to be done."

All systems continue to evolve. Virgin Blue Engineering Business Operation Manager Simon Anderson is very happy with Trax but working with the firm to improve long-range forecasting and material-resource planning. He also wants to enhance his ability to cost jobs sent out to MRO shops.

Specialized applications focus on specific tasks. Total Engine Support's Engine Fleet Plan and Costing helps plan engine maintenance by showing engine condition, utilization, life limits and regulatory requirements. EFPAC

gives planners richly detailed data with which to plan overhaul schedules. TES Operations Director Luis Davila says planners thus can budget for engine overhauls within 5%-10% of actual invoice and EFPAC saved one airline $7 million per year, including spare-engine costs, by helping to optimize removals.

Sometimes IT solutions providers team up to provide more complete packages. Last month, Korean Air selected the Oracle Complex Maintenance, Repair and Overhaul ERP solution with the Enigma InService MRO solution to facilitate the maintenance of its entire fleet encompassing all data related to airframe, engine and component maintenance, including technical publications, service bulletins, parts catalogs, schematics and best practices. "Enigma is responsible primarily for the content delivery component [and] CMRO is responsible for all the other things," says Enigma VP-Marketing and Business Development John Snow. According to the companies, Korean Air represents the first joint win for the Oracle-Enigma relationship.

Chris Spafford, a partner at Oliver Wyman, agrees with the potential benefits of MRO automation: "It can help optimize MRO programs; it is a tool to provide transparency and make better decisions. It can save staff time. Inventories can be reduced by 10% or more." But along with gains, he sees problems and disappointments, saying, "MRO software promises significant benefits but more often than not we see it underutilized or not fully utilized." He attributes this to airlines' failure to do upfront needs analysis, planning and system architecture. "It ends up taking twice as long and costing three times as much, so they get fatigue and pull the plug on implementation."

Spafford says few major MRO conversions are completed in a year, and getting all users up on a new system may require up to three years. Legacy data must be migrated, a heavy burden due to volume and regulatory requirements for data validity. Many software modules must be installed because these feed the planning module or help execute plans.

He urges carriers to focus on six basic processes: 1) planning and prediction, 2) configuration management, 3) technical records, 4) engineering and regulation, 5) the supply chain and 6) dealing with the MRO market. "You must know what you already have, and what each application can provide," he emphasizes. For each process, an airline can choose an existing system, new in-house development, a best-of-breed solution or a comprehensive package from an ERP or purpose-built application. One way to ease difficult choices is for a carrier to obtain software from its MRO provider(s). This might even become a requirement for shops bidding on some work. "This is not a critical area for IT investment, so an airline may simply pick a critical supplier and get their system," Spafford predicts. For example, Lufthansa Technik now offers manage/m, an application that automates many maintenance functions for work outsourced to the global provider.

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