Clock watching

Losing precious minutes on the ground when running on a tight schedule can disrupt an entire day of flying. ***Aimée Turner*** reports on some of the best diagnostic MRO tools to keep airline fleets earning their keep

One of the key challenges faced by airlines is the need to keep aircraft in peak condition while minimising downtime and maintenance costs and improving flight efficiency. To achieve this, the MRO industry has been actively exploring decision-making solutions to support predictive maintenance.

Diego Pugliese, director, customer care engineering centre at Embraer Services & Support, says its AHEAD (Aircraft Health Analysis and Diagnosis) tool is an ideal candidate. Intended to help airlines implement predictive maintenance, it uses data analysis to identify potential issues before they become critical.

"AHEAD works to prevent unexpected failures and reduce the risk of delays and cancellations by monitoring key indicators such as the 'OOOI' movements – Out of the gate, Off the ground, On the ground, and Into the gate," he explains.

The system also gathers maintenance and CAS (Crew Alerting System) data, dispatch condition and overall aircraft system trends such as engine parameters, pneumatics, hydraulics, landing gear, navigation and instruments, detecting anomalies and identifying patterns that could indicate potential issues down the road.

"For example," Pugliese says, "if a hydraulic reservoir level is decreasing below normal levels, the maintenance team can schedule maintenance on an overnight for that system specifically, thus avoiding interruption of the revenue flight.

"This not only reduces downtime but also saves costs by avoiding unnecessary maintenance, enabling specific needs according to usage based on each individual aircraft."

Peter Isendahl at Lufthansa Technik says a key product, and one that was approved last year by EASA for Tech Ops at Wizz Air, is the business's Aviatar electronic technical logbook (eTLB), which allows pilots to see the aircraft status on their cockpit iPad at any time.

"It connects remotely to AMOS or any equivalent maintenance & engineering system and gives the pilot a real-time overview of the technical and maintenance status of the aircraft," he says. "In case the pilot or cabin crew finds a discrepancy, they can type it into the eTLB and get an approval from the maintenance control centre to go ahead or organise technical support."

Isendahl says the tool can easily demonstrate its ability to diagnose maintenance requirements accurately to boost aircraft availability and reduce costs. For example, on a fleet of 50 A320s, Aviatar Predictive Health Analytics can

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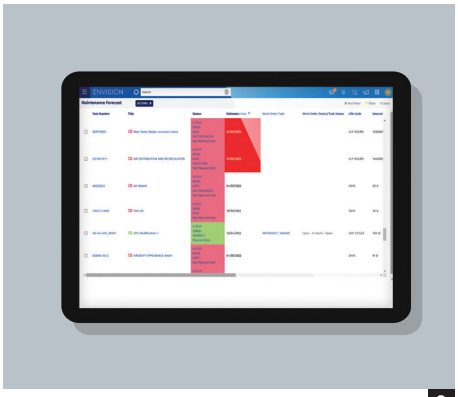

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save US $1.5 million every year, helping to avoid delays and interruptions.

David Purfurst, Rusada's global pre-sales director, champions the business's Envision software solution which manages airworthiness, maintenance and flight operations. "Our airworthiness modules allow users to keep aircraft fully compliant and ready to fly through the management of the aircraft configuration, its serviceability and associated tech records," he says.

"Operators can then use this data to forecast and schedule maintenance events based on the aircraft's flying hours or predetermined timeframes. When an aircraft undergoes corrective action, our maintenance modules can then be used to plan and execute this at a more granular level, and bring the aircraft back to a serviceable status."

Historical data

Purfurst says Envision's forecasting functionality allows operators to apply a daily average utilisation against each individual aircraft or use historical data with set parameters to determine maintenance schedules. This allows operators to plan maintenance activities well in advance, so they can avoid periods of high aircraft utilisation and to coordinate fleet maintenance.

Envision can also integrate with ground station and onboard systems to receive fault codes which can be incorporated into the aircraft's data set so planners have even more information.

John Stone, vice president, product management, at Ultramain says its electronic logbook (ELB) offers aircraft status on mobile devices at all times.

3

Additionally, fleet-wide status dashboards display the status on the web-based ELB ground system. Ultramain also tracks, updates and displays this information on dashboards that operate in browsers on desktops and mobile devices.

Ultramain also provides planning and scheduling capabilities that allow operators to optimise their plans and resource scheduling to accomplish checks in the most optimised way at the best time. Operators can make the most of hangar visits to optimise the yield for each on-wing component, taking into account maintenance due dates.

Another aspect of diagnosing maintenance requirements is Ultramain Aircraft Health and Reliability Management (AHRM), which provides analytics tools to identify failure patterns and frequencies. Pilots can also select standardised fault codes with just a few clicks on their ELB which greatly improves correlation accuracy for fault analysis used for maintenance planning.

Stone points out that Ultramain is a paperless system and that technicians use it on mobile devices to do their work both on the line, in the hangar and workshop. "Because there is no paper," he says, "data is captured electronically as work is accomplished, with no after-the-fact data entry from paper, no dependence on OEMs for correlations that are three months behind, or any other reasons for delays in obtaining accurate usable data."

Another innovative solution is Trax's eMRO and eMobility web applications that allow airlines to plan, schedule, execute and report aircraft maintenance. Again, the software aims to streamline processes and improve operational efficiency, while providing real-time visibility into activities and costs.

While its range of features, including electronic task cards, digital signatures, and photo attachments, make it easy for maintenance personnel to complete tasks on the go, Trax eMobility is also an offline-capable mobile solution that allows personnel to access and update maintenance information from anywhere, even in areas with no network coverage, allowing technicians to continue working at the gate even when connectivity is lost. Transactions automatically synchronise when back in network range.

Mobility solutions

Omar Santos, Trax's vice president, global services & support, says eMobility is a great example of how mobile add-ons can improve the maintenance process's efficiency. "With these apps," he says, "pilots can report defects during a flight, which are then transmitted through the

1. Ultramain's electronic logbook offers aircraft status on mobile devices at all times
2. Envision's forecasting functionality lets operators plan maintenance well in advance
3. Lufthansa Technik's Peter Isendahl says Aviatar can drastically reduce costs

1. Operators and maintainers are being encouraged to switch from paper-based systems to increase efficiency
2. The range of features in Trax's eMobility software makes it easy for maintenance personnel to complete tasks on the go

THERE IS MORE INTEGRATION BETWEEN SOFTWARE SYSTEMS IN USERS' IT INFRASTRUCTURES

aircraft's onboard Wi-Fi system to a technician on the ground. The technician can then review OEM manuals, access tools, and even order potential replacement parts in advance, reducing the need to return to the hangar to access manuals or get parts."

But is the performance of such tools reaching the limit in terms of improving efficiency and how can these products evolve to meet an airline's MRO changing requirements?

Rusada's Purfurst says the leaps seen in early MRO solution development will not be so significant going forwards, although greater efficiencies will be possible. "What does slow those efficiencies is the adoption of new features, such as paperless processes and electronic sign-off, that usually require the operator or maintainer to adapt their ways of working," he warns. "Resistance to change is something we see frequently, and is understandable, but these changes are the only way to significantly improve efficiency."

Despite that hesitancy, Rusada is seeing a swift adoption of cloud-hosted solutions, an option available to all Envision users, as well as more integration between different software systems in users' IT infrastructure. "This is giving the organisations much more visibility over their operations as they link from one function to another," he says.

Trax's Santos believes that, while already technologically advanced, the current performance of software applications still allows room for advances and increased efficiencies. "Our development roadmap includes continuing to integrate Artificial Intelligence (AI) into our products," he says.

Trax has incorporated AI into its web-based eMRO enterprise software product, as well as its eMobility suite of mobile apps, in a bid to increase its paperless maintenance offerings. Some of its AI solutions include voice recognition, predictive analytics, RFID, biometric security and optical character recognition (OCR), and the business is engaged with AI development companies to leverage their expertise in these game-changing technologies.

The Trax technology roadmap also features various functionalities such as blockchain part records, machine learning, augmented reality and remote visual inspection.

"The most challenging of these is the development of blockchain part records due to multiple factors including lack of adoption within the aviation industry, lack of security, tight budgets preventing implementation, lack of interoperability between systems and no regulatory oversight," says Santos.

The biggest factor here, he believes, is the unwillingness for many competing operators to share data. "Trax anticipates that these constraints will recede as airline's MRO operations begin to see the benefits and embrace these new technologies," he says.

Lufthansa Technik's Isendahl says the Aviatar approach will remain customer-centric and that the business is committed to working closely with airlines, MRO and leasing companies to develop new use cases especially since newer aircraft will be delivering more data to be analysed.

"Our Aviatar predictors and other digital solutions are developed to make it easier for the users in digital tech ops," he points out. "The idea is to reduce the amount of work, not to increase it. It must be as easy as using a smartphone and therefore user experience design is key to all our Aviatar applications, which follow a plug & play logic. Often, they are so intuitive that only minimum training is required."

For Ultramain's Stone, timely accurate data will remain the foundation of superior analytics. "The capabilities of Ultramain are certainly not reaching a limit for improving efficiency as we have powerful new capabilities in development at this time," he promises.