MRO
Management

Key elements

Component maintenance demand grows as parts availability falls

In the know

Maintenance planning and scheduling software is constantly evolving, with increased use of real-time data and artificial intelligence alerting users of upcoming maintenance events and advising when and where maintenance should be scheduled. *Mario Pierobon* reports

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Continuous improvement is necessary for the upgrade of maintenance planning and scheduling software. The incorporation of feedback from customers and users is achieved in various ways by aircraft maintenance software developers. This relationship with customers allows these companies to keep on top of emerging needs and understand where to focus research and development.

Customer relationship management

Indeed, there are multiple ways to feed ideas into product roadmaps, but the most important is feedback from customers. That's according to David Purfurst, global pre-sales director at Rusada, the creator of MRO software platform Envision.

"Sometimes it may just be a case of re-configuring the system or adapting its workflows, but if new functionality is needed our development teams will fully investigate the requirement and the proposed solution to ensure that any

change to one area of the system does not negatively affect others," he says.

"Another key avenue for us is new advancements in technology, which can allow us to build functionality that was not possible or practical before. This includes new methods of integrating with third party systems, allowing us to bring data from different sources into Envision and manipulate it new ways".

Ana Malešević, product owner at Swiss AviationSoftware (Swiss-AS), now a 100 per cent subsidiary of Lufthansa Technik and the developer of MRO software solution AMOS, says the Swiss-AS team consists of experienced individuals in both maintenance management and information technology.

"Despite extensive in-house knowledge, we believe that close collaboration with customers makes a huge difference in bringing a solution that will support our customer base in reducing costs and increasing efficiency while still maintaining the highest standards of reliability and safety," she says.

"Regular collaboration with different stakeholders through workshops and webinars, as well as up-to-date knowledge of industry trends, allows us to create a product vision that will not

only reflect our customer needs and meet their expectations but also anticipate future needs on the market."

India-headquartered enterprise software company Ramco Systems has its own platform for planning and scheduling, which leverages its own set of logics and algorithms. This gives customers the opportunity to configure the number of maintenance tracks and manage individual maintenance visits for the specific business objectives of cost and yield optimisation, points out Saravanan Rajarajan, director of aviation solution consulting at the company.

"Our platform has the ability to create multiple 'what-if' scenarios and comparison representations based on variable parameters like aircraft utilisation, capacity constraints, alternate schedules, Hr/Cy per day and span by set of requirements," he reports.

"Comparative output representations of the impact on the desired objectives and impact to the merging with running production plans help the user in firming up the final plan. Any observations or deviations inputted by users are then leveraged for correction in the plan and used for future iterations by our artificial intelligence and machine learning (AI/ML) capabilities."

Emerging needs

According to Malešević, like in many other sectors, digitisation is also transforming the aviation industry, therefore increasing the need for modern technologies that will support organisations on their way to digital transformation. "In addition to our AMOS software and our mobile solution, we are also extending our product portfolio with 'AMOSeTL', which brings AMOS to the flight deck by digitising the paper tech log as well as 'AMOSmobile/STORES', which allow storemen to carry out daily tasks within a store through a mobile device," she says.

Together with digital transformation comes an increased need for more efficient, seamless exchange of information between different customer types, with a goal of improving efficiency, cutting costs and minimising human errors by simplifying administrative

> ## "Software has to dynamically adjust to the production floor realities for monitor flow and trace tracking"

tasks and supporting the exchange of best practices and solutions, observes Malešević.

"To support this, we are currently working on the realisation of 'AMOScentral' which, by spanning a virtual cloud over all AMOS instances, will allow each AMOS customer to individually open its platform and collaborate to the desired extent with other members of the AMOS community and beyond – all with the guarantee of privacy due to the end-to-end encryption of data," she affirms.

Digitisation not only impacted the aviation business by bringing efficiency and different opportunities to manage information, but also to process it for more advanced purposes such as optimisation and automation of different maintenance processes – from events and resource planning to material management, highlights Malešević.
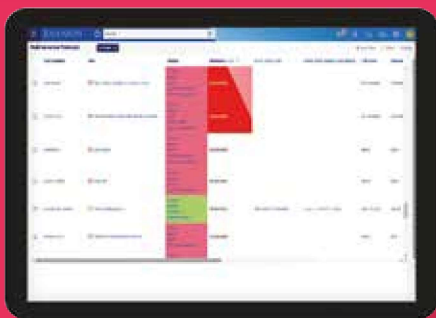
"In aviation, the word 'optimisation'

is quite tricky, given that optimum for one organisation might not necessarily mean optimum for another," she states. Even though the basic principles remain the same, the solution in her opinion needs to be scalable to reflect different organisational needs as well as easily maintainable for any additional change that needs to be considered.

"However, what is certain is that process automation is a growing business imperative for increase in efficiency and improvement of accuracy," she says. "In addition to the existing 'Line Maintenance Automation' solution, our 'Planning Automation' project will

1. Ramco Systems' platform leverages its own set of logics and algorithms
2. There is an increased need for more efficient, seamless exchange of information
3. Rusada's software enables operators to adopt a predictive approach to maintenance

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bring to the user advanced technology for handling of different processes, considering ultimately the constraints of the whole ecosystem."

Connected aircraft are driving the development of new functionality in maintenance planning and scheduling software, observes Purfurst. "These are the onboard systems in place on new generation aircraft that capture real-time data and seamlessly send that information to maintenance planning and schedule solutions such as Envision," explains. "Our system can then combine real-time data with that of the operator's past, enabling them to adopt a predictive approach to maintenance."

As to emerging maintenance planning and scheduling software needs, Rajarajan affirms that Ramco expects to have an uptake of intelligent automation and reduction in manual intervention for planning and scheduling functions.

"We will be seeing extensive automation on task and access panels sequencing, automatic assignments of the rostered staff with right skills to tasks and non-routines, as well as proactive identification and mitigation of bottlenecks due to capacity, labour, parts and tools," he says. "We are seeing that the maintenance planning and scheduling software has to dynamically adjust to the production floor realities for monitor flow and trace tracking."

In the aviation domain, the information flow between the execution and scheduling system has to be timely and precise. This calls for the maintenance planning system to work with multiple input feeds from other systems such as the actual availability of the mechanics available on a particular shift, or the actual backlog and wait times in a particular shop feed from RFID-based readers, points out Rajarajan.
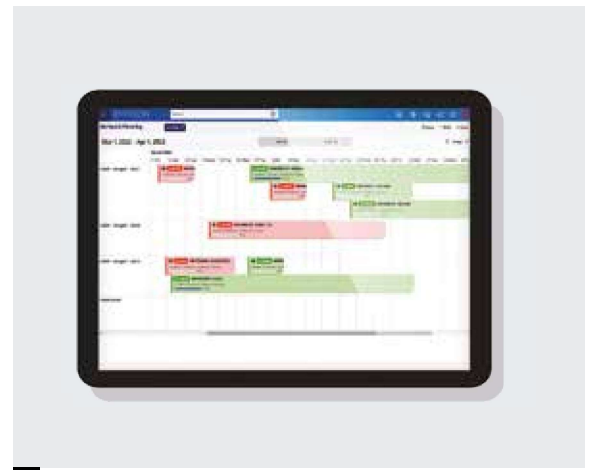
"Our planning and scheduling platform has the necessary API to receive inputs from external databases like maintenance and engineering project requirements, maintenance execution data for ongoing checks, aircraft and component time and cycle data, station requirements, capacity and limitations," he says. "The data is processed through the platform to derive the optimised results."

Future upgrades

Rajarajan says the effectiveness of planning and scheduling software is in its ability to leverage data and the right algorithms to produce quality output. "This is aided by the latest developments in processing the high volume of dynamic data feeds and analysing the data with sophisticated statistical tools," he says.

"The scope of planning is also stretched for life cycle optimisation that minimises the total cost of ownership for particular asset or at the sub fleet level

– there is opportunity for improvement by leveraging the ML platforms with continuous closed loop feedback from the planners."

Swiss-AS is working on bringing predictive maintenance data as well as more advanced constraints such as weather conditions to be considered during the automation process, according to Malešević. "In the long run, we can expect simple, efficient digital processes where the user will be not only relieved of the strain by repetitive well-known tasks but also guided in making the best possible solution based on the latest operational changes," she says.

The inclusion of real-time data into maintenance planning and scheduling software, coupled with the use of AI, will allow aircraft maintenance software not only to alert of upcoming maintenance events but also to advise when and where maintenance should be scheduled, according to Purfurst. "This is done by taking a whole host of supporting information into account, such as periods of high aircraft utilisation, maintenance events of other aircraft in the fleet, and even the terms of the aircraft's lease agreement," he concludes. Ⓜ

1. Close collaboration with customers makes a huge difference to the success of scheduling and planning software
2. Envision currently helps manage more than 2,000 aircraft