aviationbusinessnews.com
JANUARY/FEBRUARY 2023 • VOLUME 25 • ISSUE 1

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MRO Management

MOVING AHEAD

How strong is the MRO industry in the Middle East?

FLEXIBLE SOLUTION
Strong demand and fierce competition in engine leasing

SMOOTHING THE PROCESS
MRO software companies continue to roll out innovations

LEARNING FROM HISTORY
Why investing in people will reap rewards in 2023

Maintenance software continues MRO streamlining

There have been many advances in maintenance software over the past 12 months

The state of the maintenance software sector is still vibrant, as ***Bernie Baldwin*** discovers from some leading providers

Saravanan Rajarajan
is director – aerospace & defence solution consulting at Ramco

John Stone
is vice-president of product management at Ultramain

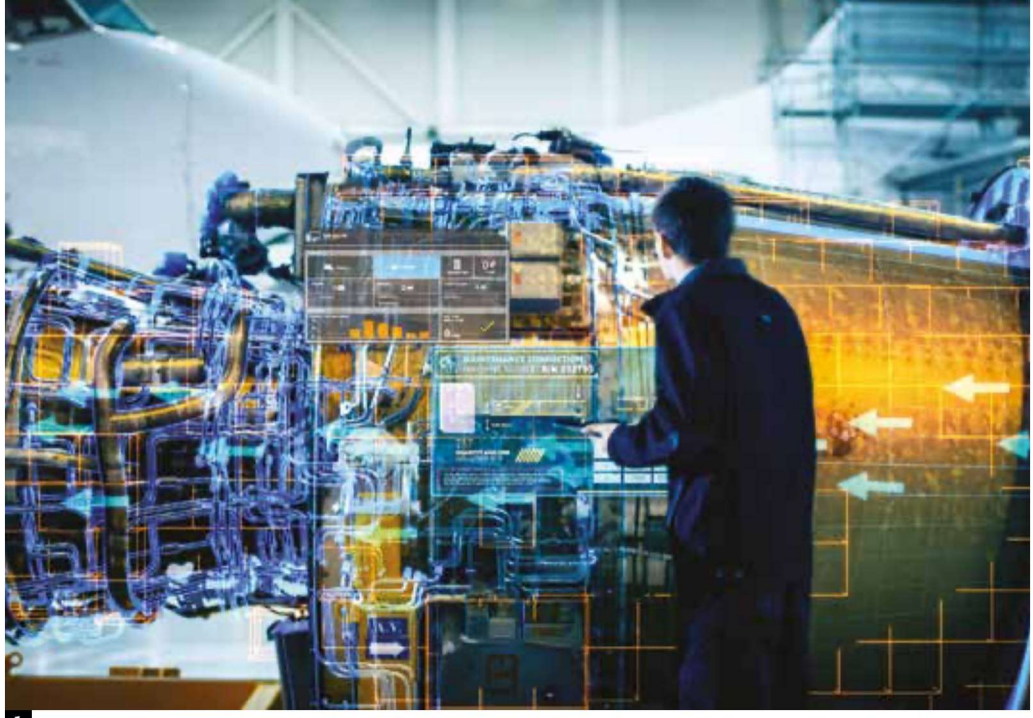
Keeping an aircraft's visit to the hangar for maintenance as short as possible, while retaining all the accuracy and efficiency demanded of the work, is a goal with which every airline and MRO provider can appreciate. For the former, it gets their aircraft back to generating revenue, while for the latter it frees up space to take on the next customer's aircraft (or the next one from the same customer).

Mechanical tools to aid the progress of an aircraft through its maintenance procedures have been around since aircraft needed care. And while information technology to smooth the process has been around for many years, the growth in the functions that maintenance software can provide has risen most rapidly in the past 20-30 years alongside the development of computing power.

Ramco Systems' complete history sits inside that period, the company having been established in 1997. Last year it celebrated its 25th anniversary of providing "multi-tenant cloud and mobile-based enterprise software" across disciplines such as payrolls, ERP, logistics and, of course, MRO for aviation.

Coming out of that anniversary year, Saravanan Rajarajan, director – aerospace & defence solution consulting for Ramco Systems, has been able to take a holistic view of the market, observing the major advances in maintenance software over the past 12 months, both within his company's own products and ideas seen elsewhere.

"We are witnessing the need to improve workforce productivity at all layers of a maintenance organisation. Since last year our research and development (R&D) focus has been aligned to address this need and we believe that it will continue in the next year as well," Rajarajan reports. "To be more precise, we are augmenting our product capabilities with intelligent automation by leveraging workflow rules or machine learning algorithms as deemed effective and in compliance with the regulatory needs.



1. Competition in the maintenance software market has been intense for some time
2. One focus area for Ramco is improving the user experience while interacting with the maintenance software through natural language processing capabilities

"The entire process of inducting, right from PDF-based work packages and planning to the shop floor are automated by leveraging OCR (optical character recognition) and user configurable rules."

Another focus area for Ramco is its desire to improve the user experience while interacting with the maintenance software through natural language processing capabilities. "Ramco's 'Mechanic Anywhere' mobile app for mechanics enables the shop floor to go paperless. We have recently partnered with Alan AI [a conversational AI platform] to enable conversational capabilities during the snag rectification process in aircraft maintenance," he adds.

John Stone, vice-president of product management for Ultramain (the company), reports that ULTRAMAIN (the product) is now at Version 9 in its development as a web-based, paperless M&E/MRO software solution. "ULTRAMAIN is an ever-evolving product to ensure that it remains current with the latest technology trends and needs of the industry, thus we release new capabilities quarterly," he explains.

"ULTRAMAIN is a web-based application suite allowing us or customers to host: mobile mechanic offline mode enhancements to ensure business continuity when there is poor or no connectivity; enhanced built-in help in the form of 'Just-in-Time' training videos to reduce training overheads and help users better understand areas of the software they use less frequently; and mobile inventory-based stocktaking to reduce overheads and improve the accuracy of stocktaking."

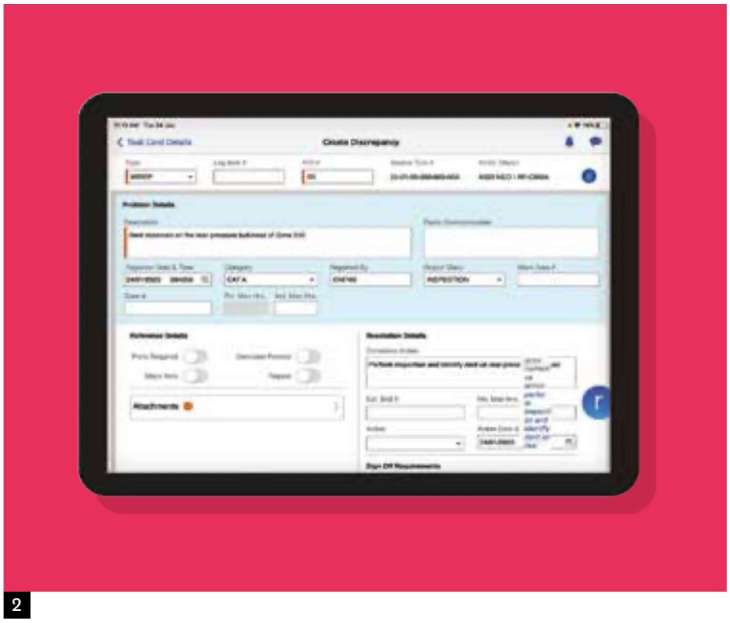
Stone says that ULTRAMAIN "also hosts the sales management application to better serve the needs of our customers that provide third party services and reduce the costs associated with maintaining a separate sales management system".

In many areas where developments have been considerable, a time is often reached where gains tend to reach a plateau, meaning far more effort (and money) has to be expended in order to achieve a significant improvement. Stone therefore muses on the evolution of the maintenance software and how much software can create further efficiencies and effectiveness in maintenance operations and management.

"Software must account for all the various elements needed to put a maintenance plan together, such as required labour including skills, qualifications, teams, labour hours needed, parts, tools, hangars, required conditions (on trim pad, on jacks and so on) and other constraints," he begins. "It needs to provide users tools to build a plan from prior experience. Effective planning software needs to support task flow planning considerations such as zones, panel opening/closing, crafts and the like. It needs optimisation algorithms to optimise task sequencing and the overall check accomplishment. Finally, it needs to allow users to see the plan using easy-to-understand visualisations."

With an optimised plan in place, software also needs equally powerful scheduling capabilities to order/reserve parts, schedule labour, reserve hangar slots and specialised tools, and do it

"We are witnessing the need to improve workforce productivity at all layers of a maintenance organisation"



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1. Data can be harnessed to create a better communication channel between the operator and MRO
2. ULTRAMAIN's 'Mobile Mechanic' signoff

far enough in advance to achieve the scheduling goals, Stone emphasises. "It needs capacity modelling capabilities and to provide digital task cards to engineers electronically for use on mobile devices (tablets and phones) without the need for paper anywhere in the process," he continues.

"The software also needs to provide for electronic signoffs, annotations, shift handoffs, stamping and all else that can be done on paper task cards to be on electronic task cards. It needs to inform managers of work accomplishment in real-time. It must ensure that only current and qualified engineers and mechanics are assigned to tasks, perform tasks and sign off tasks."

The IT has to ensure each planned task and finding (NRI) is billed per customer agreements. If new work requires customer approval before executing, the software alerts for this and provides support for achieving customer approvals quickly and efficiently, Stone adds. "Upon work completion it needs to calculate immediately correct billing to quickly send to the customer along with all post execution 'paperwork' in a form that customers desire. After check completion, the software needs to analyse work execution based on the plan to create and refine more accurate future plans," he remarks.

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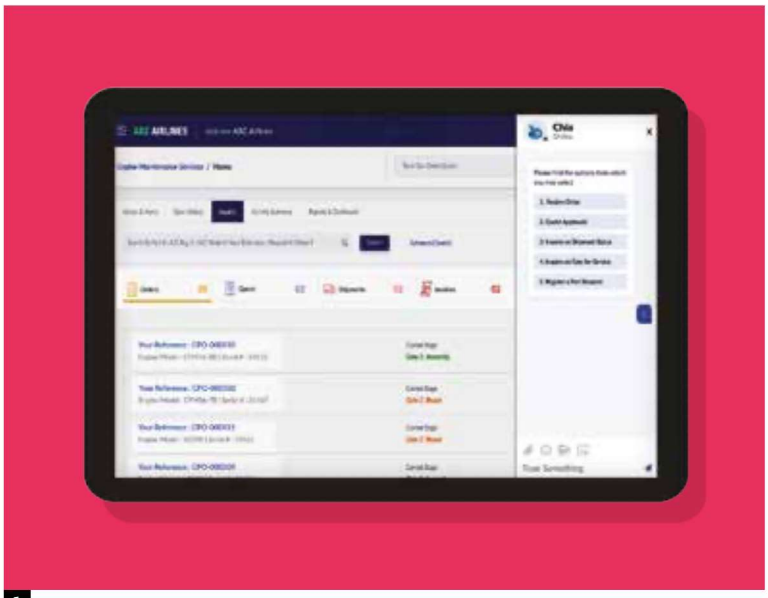
The Ultramain executive clearly believes there are still benefits available before any plateau is reached. Ramco's Rajarajan offers a similar opinion.

"We believe that there are still multiple avenues where a maintenance software package can add value – specifically in the area of collaboration, both internal and external," he confirms. "For instance, infusing full-fledged capabilities into the software for it to assimilate the OEM documents in various formats and render it seamlessly at the point of work for engineers has proved to improve workforce productivity. Ramco Aviation software is therefore capable of processing various input formats (.xls, .xml, .sgml and .pdf) of OEM documents under ispec 2200 and S1000D standards."

Another area of improvement is in enhancing efficiencies through harnessing the data and creating a better communication channel between the operator and the MRO. "This can be achieved either through establishing the data exchange API communication in compliance with SPEC 2000 Chapter 18 or by establishing the customer portal," Rajarajan adds.

"Ramco's customer portal, augmented with chatbot capabilities, provides on-demand status on out-of-scope approvals, work progress, parts tracking or even for inquiry/clarification.

1. The Ramco customer portal
2. Labour optimisation in ULTRAMAIN



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"Adoption of the customer portal has the potential to improve customer satisfaction, improve maintenance TAT (turnaround time) with reduced workload for both the parties and transparent data for operational and business reviews."

While the opinions given are confident that current capabilities still have much to offer, the maintenance software sector moves rapidly and is working on technologies which will enlarge the envelope for potential advancements. Each company has thoughts on the breakthroughs they would like to see, but which currently seem some way off.

"We believe the confluence of artificial intelligence (AI) – specifically Natural Language processing based conversational UI – machine learning, 5G and other related technologies will be game changers and will enable MROs to achieve higher operational efficiencies," Rajarajan declares. "This may involve bringing together ERP systems, EFBs, mobile and wearable technologies, embedded IOT (Internet of Things) and external systems to interlink seamlessly. We expect the intersection of these technologies to unlock some interesting capabilities in the MRO software space, thereby delivering better value to aviation organisations.

"Software must account for all the various elements needed to put a maintenance plan together"

"By embracing these technological advancements, MROs will be well poised to operate efficiently with the available resources. Leveraging our expertise of data scientists based out of our MRO Lab in Singapore, we are actively working with our customers' specific use cases, leveraging these platforms to deliver value."

Ultramain's Stone foresees technology enhancements in similar areas, but first points out a significant development in his company's product. "ULTRAMAIN is paperless, system-of-record, MRO/M&E software that renders tasking and reference documentation on mobile devices for mechanics and engineers to use as they do their work. Staff having real-time access to all the information they need, where they can record what they've done as they do their work, is a big innovation," he proclaims.

"The ULTRAMAIN Mobile Mechanic is the most mature and capable eTask card system on the market. Gone are the days of printing and handing out tons of paper and having clerks enter paper-based task cards after the fact. A paperless system affords many benefits with one being work completion awareness, as work is accomplished in real time.

"Coming at some point in the future are affordable, durable, wearable eyeglass devices on which ULTRAMAIN would display work tasking and documentation, which would free workers to use both hands all the time. It's possible that smart glasses would augment tablets or possibly they would replace them entirely – we will see. The breakthrough we would like to see is the availability of such devices."

Competition in the maintenance software market has been intense for some time. With innovative companies such as these, the bar continues to be set high. Others who deliver developments of their own are likely to remain competitors – and that can only benefit the end users.

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