

Maintenance software packages have already made a huge difference to the running of MRO businesses, but there are more benefits on the way

Maintaining **MRO Benefits** from **Software Applications**

Contrary to popular belief, information technology has been at the forefront of the MRO sector for several years
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The onset of the coronavirus pandemic has meant many airlines and MRO firms have re-evaluated processes and tools for aircraft maintenance
STUART BAILEY/ BRITISH AIRWAYS

Information technology systems that manage complete MRO businesses – from operational tasks in the hangar to backroom processes in purchasing accounts – have been making procedures more efficient and delivering reduced costs for several years now. For airline maintenance departments and third-party MRO providers alike, they have delivered considerable benefits.

The good news for those MRO practitioners is that the creators of maintenance software are continuing to add functionalities and swifter processing to their applications. Following the onset of COVID-19 this year, those advances could prove to be crucial.





According to Dan Dutton, vice president research and development for aerospace and defence at IFS, whose product IFS Maintenix competes in this market: "It's impossible to ignore the operational impact [that] COVID-19 has had on aircraft maintenance," he remarked. "The requirement for strict social distancing measures and limited workforces means airlines and MRO organisations have had to rethink the tools, processes and infrastructure involved in aircraft maintenance. A solution to any part of the complex business processes involved can make

a huge difference to help protect the futures of commercial airlines and the safety of people. Three IFS product innovations have been made available during this period to do exactly this."

In early 2020, IFS unveiled one of the industry's first electronic technical logbooks, called IFS Maintenix eLogbook. "The issue with a paper-based logbook is that all the information sits outside an airline's core maintenance system. Pilots and maintenance teams have to wait until they are physically at the aircraft to see the most recent updates to a [jet],

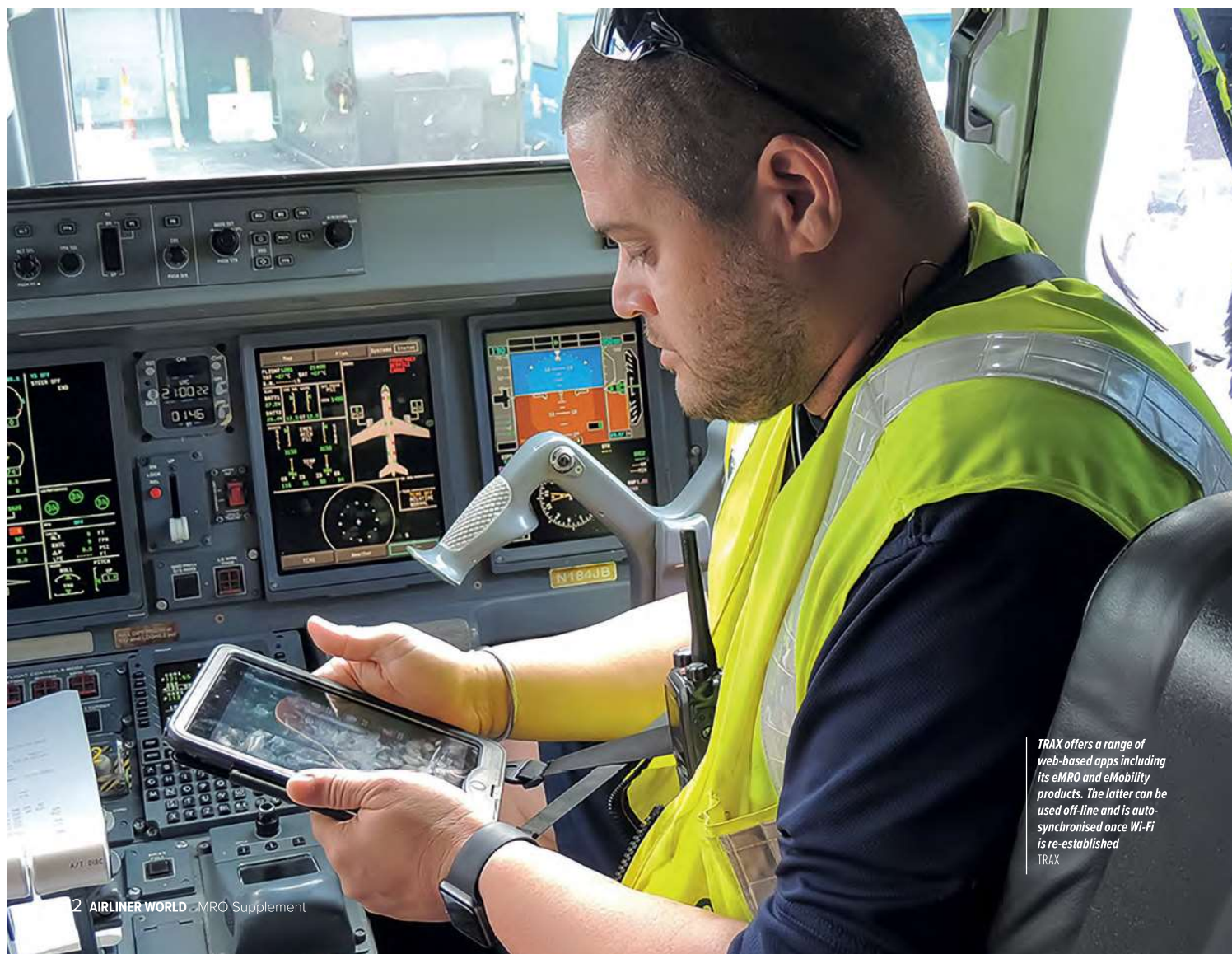


including the faults from the inbound flight. This naturally causes delays," Dutton noted.

"IFS Maintenix eLogbook integrates the core maintenance system and the logbook through a tablet or smart device and makes that information available to all day-of-operations personnel, from pilots to maintenance technicians," he continued. "This truly digital logbook minimises the time it takes to report and repair issues from an inbound flight, decreasing turnaround times, increasing pilot maintenance collaboration and boosting safety by

ABOVE • IFS has introduced an electronic technical logbook called Maintenix eLogbook. By replacing traditional paper-based methods, it's available via smartphones and tablets and reduces delays and increases pilot-maintenance collaboration
AMERICAN AIRLINES

ABOVE LEFT • Australian flag carrier Qantas has been a pioneer in paperless-based methods for more than a decade
FLICKR/ALLEN WATKIN



TRAX offers a range of web-based apps including its eMRO and eMobility products. The latter can be used off-line and is auto-synchronised once Wi-Fi is re-established
TRAX



Air Asia is one of the biggest names in commercial aviation sector within the ASEAN region
AIRBUS

flagging compliance concerns in real-time."

The introduction of IFS remote assistance followed, rather appropriately timed as remote working and social distancing has become commonplace. "Lockdown has fast-forwarded many businesses to see the benefits and adopt the solution," Dutton said. "Through merged reality, team members can collaborate over distances, see information in a common view, and share information in context of that common view. With the proliferation of smart devices and maintenance

software applications available on mobile, the result is merged reality – when the real and virtual world are mixed and objects from both can interact – and this is becoming more and more of an option for task instruction and sign-off."

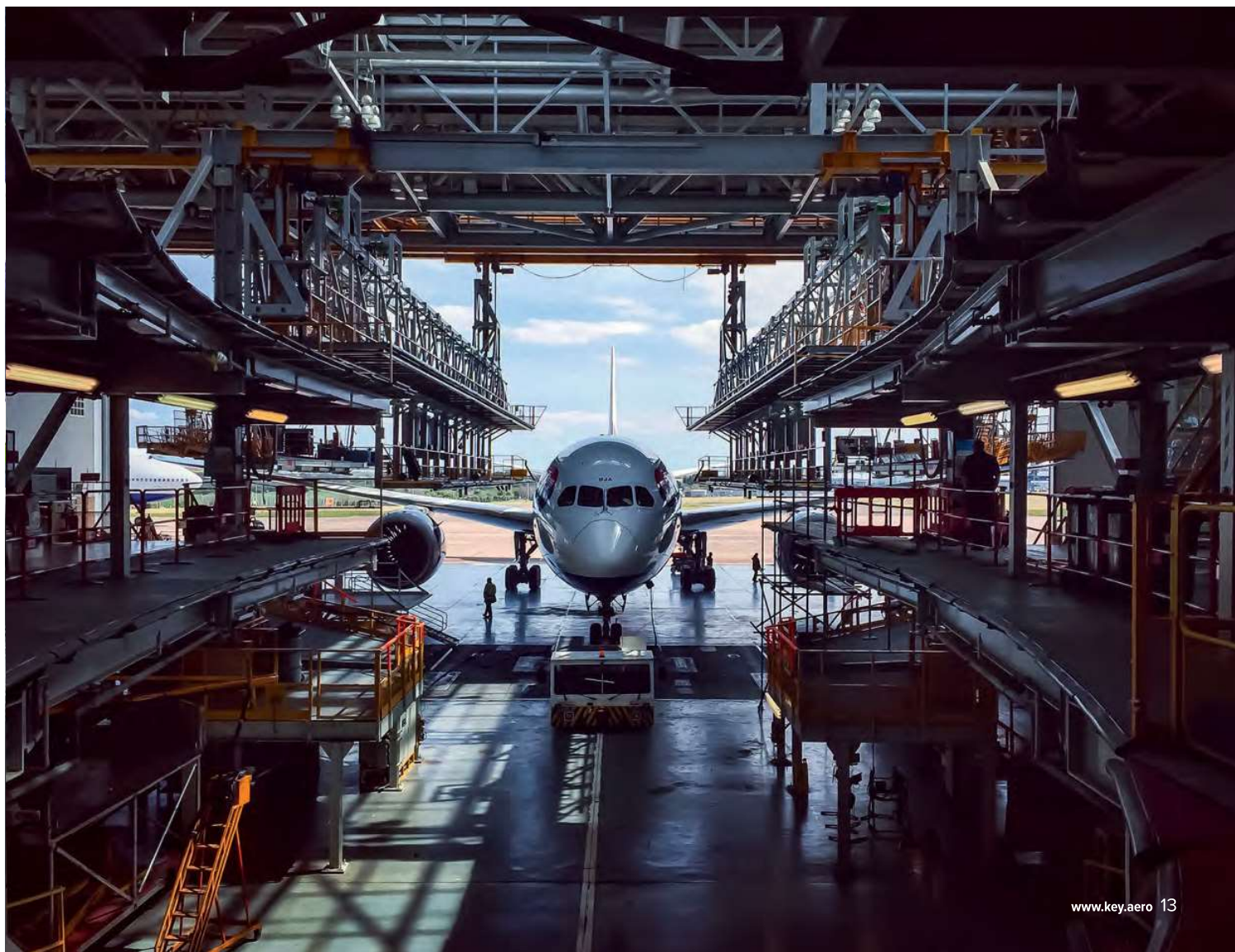
IFS's third enhancement – also part of the remote push – is electronic signatures, which are now being explored by airlines, MROs and regulators as a viable way to remotely sign-off key maintenance tasks and removing the need for inefficient paper-based sign-off. The IFS Maintenix

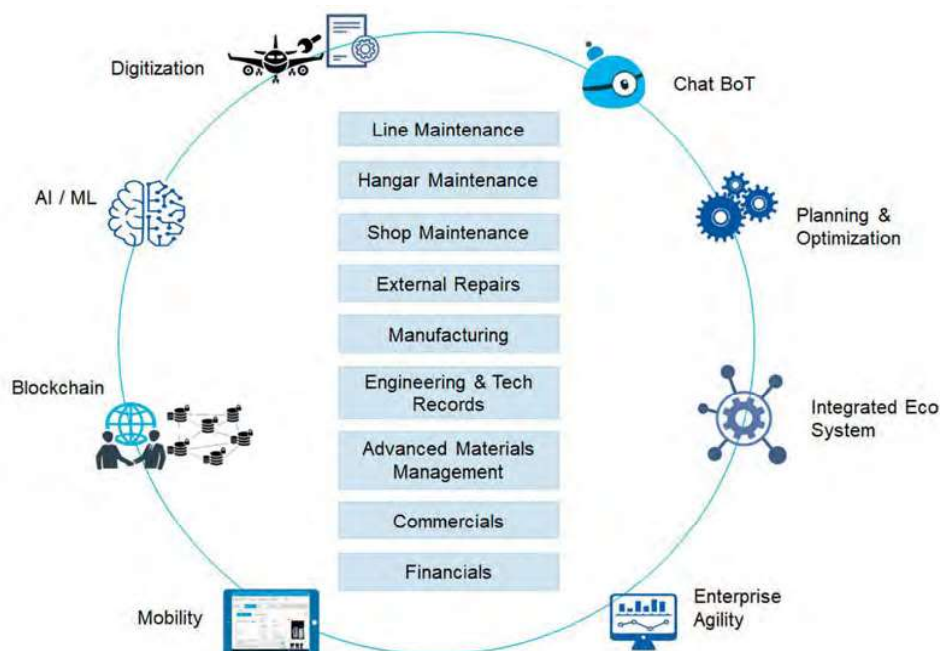
In addition, IFS has also developed its Maintenix e-signature solution allowing remote signoffs by engineers. This is especially useful during the pandemic while workforces remain in smaller numbers
BRITISH AIRWAYS

e-signature solution has gone live with several customers sites following authorisation by the various major regulatory bodies.

Like IFS, TRAX's managing director, Chris Reed, also advocates solutions that mobilise maintenance. "It's an essential requirement in today's aviation environment. The gold standard for productivity is to be able to connect and work from anywhere," he said. "In the past 12 months, TRAX has seen explosive growth in the adoption of our web-based eMRO and eMobility suite of apps by our existing and newly implementing customers. According to our clients, mobilising maintenance means tremendous savings.

"Operators have discussed the need to go paperless for years. Now they are increasingly moving from plans to action," he added. "One differentiator that leads customers to select the TRAX eMobility suite is that the apps are truly off-line capable. Work can be entered into the system off-line and automatically be synchronised when Wi-Fi or cellular connection is back in range. This helps provide real-time information and transactions," Reed explained. >>





During the pandemic, aircraft being parked or returned from lease has greatly impacted the global MRO market, Reed continued. "With the original forecast for MRO spending in the Asia Pacific region dropping 59% in 2020 [per consultants Oliver Wyman], maintenance providers are seeking ways to streamline their operations and boost revenue," he said.

"In response to our customers' practical needs at this time, TRAX has developed the eContent Control web application to facilitate easy access to aircraft records. It is a robust tool for aircraft records management, airworthiness verification and aircraft or engine sales.

"The app delivers a high-volume, high-accuracy optical character recognition

Through Ramco Systems' Aviation M&E MRO suite, it incorporates artificial intelligence and machine learning capabilities
RAMCO AVIATION

Management consulting company Oliver Wyman originally estimated that MRO spending in the Asia Pacific region would drop 59% this year
AIRBUS

[OCR] solution that can transform massive volumes of unstructured and image-based documents into fully searchable [Adobe] PDF and PDF/A assets. It facilitates the rapid and successful return of leased aircraft, engines, APUs [auxiliary power unit] and landing gears. Reporting is available in multiple formats such as export to [Microsoft] Excel or using the Spec 2500 electronic data exchange standards," Reed stated.

Investment in agile development through microservices/web enablement technologies – giving enhanced speed, flexibility, customisability and access to the customer – has been a focus for Commsoft, according to the company's senior consultant, Nick Godwin. "We've also added mobile technologies and

dashboards/interfaces giving better alignment to business processes and workflows, especially in a paperless realm," he said.

"There has been significant investment in logistics functionality as well as maintenance costs management functionality. Additionally, we've improved on-boarding services to better recognise each customer's different environment and support needs. Speed and agility in implementation are key to ensuring engagement and true business value generation and also safety," Godwin emphasised.

Elsewhere, this year Ramco Systems has launched version 5.8.9 of its Aviation M&E MRO Suite. Saravanan Rajarajan, head of consulting and pre-sales, Ramco Aviation Solutions, commented: "This now delivers industry-differentiating capabilities in advanced materials management processes and functions, capable of supporting specialised inventory technical management [ITM] value chains.

"This module will benefit multiple business models of ITM – as a standalone business, as part of an integrated, complete, mixed MRO service offering and as an owned asset in-house maintenance model. The new release encompasses artificial intelligence and machine learning [AI/ML] capabilities," he added.

"Ramco Aviation Software 5.8.9 introduces several new 'hubs' which strengthen the user experience to address all functions for any role under a single umbrella. The hubs unveiled include fixed assets, demand management, component reliability and customer order management. On the mobility front, multiple features are now added to 'Ramco's Anywhere Apps' which allows advanced mobile functionality on the go – a key feature of the aviation suite," said Rajarajan.





"Along with our SMS, we have also introduced an online learning management system [LMS]. This module is fully integrated into our human resources module and work execution functionality. You can now create the course content, schedule those courses, then have the student perform them all within the application. This then connects to employees' workforce qualifications and stamps," he added. "Having this functionality in one MRO solution, as opposed to using separate systems, results in sizeable time savings for users and a reduction in administrative errors."

As noted, the use of IT software in maintenance is not new and many of its early benefits have been delivered. So, are the savings that software applications deliver to airlines beginning to plateau or is there still the potential for even more benefits to be accrued?

"The steep trajectory we witnessed in the early days is not there anymore, but there is still uphill movement," said Purfurst. "Many organisations continue to use spreadsheets and manual imports for key processes, so there are still substantial efficiencies to be gained by using systems such as ENVISION to digitise these."

"In addition, the host of emerging technologies will also lead to significant time and cost savings. Some of the easier technologies for organisations to adopt will be web-based solutions, mobile apps and data analytics," he commented.

IFS's Dutton also believed that the question really addresses how far airlines and MROs have gone in >>

"The latest version is expected to deliver reductions of 5% in inventory holding cost, 20% in repair TAT [turnaround time] and 15% in direct repair cost."

"We are continuously working with our customers to infuse AI/ML for day-to-day transactions," he added. "A few of the user cases have gone live in 'accounts payable' areas and more are in the rollout stages."

At Rusada, over the last 12 months the company has added an array of new functionalities to its ENVISION software. David Purfurst, global pre-sales director – Rusada, said: "Our new safety management system [SMS] is a continuous improvement solution that reduces hazards and prevents incidents. It protects the health and safety of employees and is integrated into everyday processes throughout the solution."

Also, in its portfolio, TRAX has developed the eContent Control app to simplify aircraft record management and can be used with Adobe PDFs and Microsoft Excel software
TRAX

Ramco Systems has introduced its 'Ramco's Anywhere Apps' for mobile functionality
IFS



Remote inspection has become increasingly popular during the pandemic. Remote digital visual inspection (RDVI) techniques allow engineers one way to look at the aircraft without having to perform any unnecessary travel
FLICKR COMMONS/AERO ICARUS



unlocking the full benefits of paperless maintenance processes. "The real value of going paperless is when it's part of a larger digitised operation, not just in isolation. Having a true electronic maintenance records system that equips airlines with situational awareness and rock-solid real-time compliance should be the ultimate goal.

"The benefits of fully-digitised maintenance operations are plain to see. Paper introduces many inefficiencies – time spent on data entry, inaccurate re-keying of information from paper into the maintenance information system [MIS] and inefficient search and retrieval. Leading commercial airlines have been implementing paperless processes for some time. IFS Maintainix customer Qantas, perhaps the leader in paperless maintenance operations, has in fact been live for over a decade," he added.

Dutton noted that the business drivers for going paperless were squarely in line with IATA's vision to "simplify maintenance operations thereby facilitating regulatory compliance and enabling new processes to reduce costs". He also noted that with IFS Maintainix product line, IFS was the first company to be certified for paperless use in line maintenance and the first to build a mobile handheld disconnected

Best of breed (BOB) MRO IT systems, including Commsoft's OASES (open aviation strategic engineering system) product, offer more optimised processes and workflows for engineering at cheaper prices compared with traditional enterprise resource planning systems
WINAIR

maintenance execution application.

"Another case in point for modernisation principles is seen in what China Airlines has been doing with IFS Maintainix for five years now. The carrier removed a patchwork of legacy systems and processes and estimates it is saving US\$3.5m a year," said Dutton.

"To accomplish this level of modernisation involves challenging the IT underpinnings of aviation

maintenance systems – not a light undertaking. Changing a maintenance IT infrastructure is not a trivial change and for that reason we expect a more realistic horizon of five to ten years before we see a large majority adopt and benefit from true paperless maintenance."

The current versions of TRAX products provide digital signatures, paperless manuals, biometric security, RFID (radio frequency identification),





barcode readers, notifications, voice recognition, off-line capability and the ability to work from anywhere. But Reed believed this is only the tip of the iceberg in the efficiencies that can be offered to his clients given today's advances in technology. "The combination of mobile solutions, data analytics, predictive maintenance and AI takes the potential gains to the next level," he said.

"Maintenance software such as

TRAX eMRO is a prime candidate for fostering data analysis. With so many transactions entered across an operation, tremendous amounts of raw data are captured on an ongoing basis," continued Reed. "The key is transforming this data into actionable information that provides the ability to improve organisational effectiveness, lower costs and increase revenue. That is why we have developed numerous dashboards and enhanced our custom

report generation features to turn 'big data' into 'great data', namely 'usable'."

MRO software can utilise AI concepts to best take advantage of all the data that is being generated, as well as technological progress. AI has very practical applications for the maintenance sphere. "Currently the most widely discussed AI case industry-wide is blockchain part records, which TRAX is working on. But another example of AI that is extremely useful in today's environment of temporarily limited travel is remote inspection. Imagine how remote digital visual inspection [RDVI] would allow an inspector to look at objects that are at an outstation or perhaps at an aircraft parking location.

"TRAX has AI development plans that include augmented reality, blockchain part records, machine learning, predictive analytics, smart scan, remote inspection and more," Reed confirmed. "We expect these to impact greatly upon the productivity and efficiency of aviation maintenance operations and bust through any savings plateau."

In Rajarajan's opinion, the value delivered by software depends on how it can adopt new technologies thereby providing operational efficiencies. Additionally, he believed that Ramco is at the forefront for utilisation of new

According to Nick Godwin, Commsoft's senior consultant, "low labour costs" and "the social responsibility of developing aerospace technical skills and employment in the region means that the value case for IT systems is more challenging than in developed markets"
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Saravanan Rajarajan, head of consulting and pre-sales, Ramco Aviation Solutions, believes that the value of software relies on how it can adopt new technologies such as artificial intelligence
AUSTRIAN AIRLINES_PAUTY



technologies such AI/ML, bots, mobility and business analytics integrated with the product and in use at client sites. "We believe the process is continuous and as the business landscape changes the challenges and opportunities for software evolves to deliver value.

"For instance, one of the uses we are working on is a system autosuggest function that finds physical and technical discrepancies in an organisation's aircraft and automatically

suggests mechanics working on similar discrepancies as well as proposing part requirements for fixing discrepancies, based on historical data," Rajarajan said.

Digitisation of task cards either by ingesting SGML/XML file formats or by authoring is already supported by Ramco's application. "We are focusing on PDF-based task card management, centred on our third-party MRO customers. The software can split the tasks cards based on the rules and

extract the task card data as mapped. This heavy list task which is manually intensive is expected to reduce a minimum of 70% of processing time directly," he added. "From a shop floor perspective, the software will enable the mechanic to enter readings, remarks and so on, directly into the customer task cards, avoiding manual entry in physical forms."

Commsoft's Godwin explained that the best of breed (BOB) MRO IT systems, which includes the firm's OASES (open aviation strategic engineering system) product, have long provided solutions to the strict regulatory needs of compliance and comprehensive reporting to a wide variety of stakeholders, including airline management, owners/lessors and regulators alike. But he believed benefits from these systems are far from finished.

"As the speed of data processing has increased and as mobile solutions increase the accuracy of single point data entry at source, this allows – in concert with interface to operations, accounting and HR systems – much greater potential for improved decision support, predictive services and economic optimisation of seemingly conflicting data," he elaborated. "The customisation of KPIs [key performance indicators] and user dashboards with the presentation of increasingly focused data around the user, becomes the main thrust for the future.

"BOB systems offer better optimised processes and workflows for aviation engineering at a much more affordable price versus most traditional ERP [enterprise resource planning] systems, therefore generating much greater business value," added Godwin.

"Continued airworthiness management [CAMO], fleet technical management [FTM] and safety compliance are critical in all markets. Very low fares and challenging breakeven economics put heavy pressure on costs, thus any system such as OASES must be intuitive and attractive to use to ensure the engagement of local aviation staff."

As for the Asia-Pacific market, Godwin reasoned that the relatively low labour costs and the social responsibility of developing aerospace technical skills and employment in the region means that the value case for IT systems is more challenging than in developed markets. "This also increases the requirement for ease of access, low-cost training support services and close collaboration with local teams and partners in implementing sites."

Clearly there is huge value still available from maintenance software for those who have yet to fully adopt them. Those who have embraced them need not worry, though; there are many more benefits on the way. ●●●

The Asia-Pacific MRO market is expected to rebound strongly after the pandemic, with most of the demand slated to come from China and India

TRAX