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The Push to Paperless MRO Management

Moving to paperless MRO management systems is a win-win for all involved


(Credit: Swiss-AS)

There is no doubt that ERP (Enterprise Resource Planning) software has revolutionized the business world, with its ability to centralize, rationalize, and clarify the integrated operations of any company. This is why ERP platforms have been tailored to meet the needs of the MRO industry, to provide these companies with more efficient and cost-effective operations, and customers with faster service and better price clarity.

Given the MRO industry's historical reliance on paper-based documentation — both for managing repair projects and accessing OEM information to do the repairs — moving the industry away from paper is not an easy task. However, thanks to the sophistication of MRO software-based management systems as they now stand, the push towards a paperless future is well underway.

How Capable are Paperless MRO Management Systems?

The possibility of a paperless future begs a question: Are today's MRO management systems truly capable of handling all aspects of this very complex business sector digitally?

According to Chris Clements, Senior Sales Representative with Swiss AviationSoftware Ltd. (Swiss-AS, maker of the MRO software solution AMOS), the answer is an unequivocal 'yes'. "Any decent MRO software solutions on the market should be capable of enabling paperless processes and generally are," said Clements. "AMOS has been used paperlessly since 2016 and continues to support customers in their drive for digitalisation."

Saravanan Rajarajan (Saran) is Associate Vice President of Aviation Solution Consulting at Ramco Systems. "Ramco Aviation Software has the necessary capabilities to make the process entirely paperless," he said, echoing Clement's certainty. "For example, the software can manage OEM technical documentation in digital formats, render these documents into mobile applications for mechanics' consumption and even perform dual authenticated digital sign offs."

However, software alone is not enough for MROs to go entirely paperless, Rajarajan cautioned. "For example, if the MROs' customers still need paper-based documents or if the regulatory bodies overseeing the customers do not permit digital signatures, this may lead to a mix of paper and paperless-based processes."

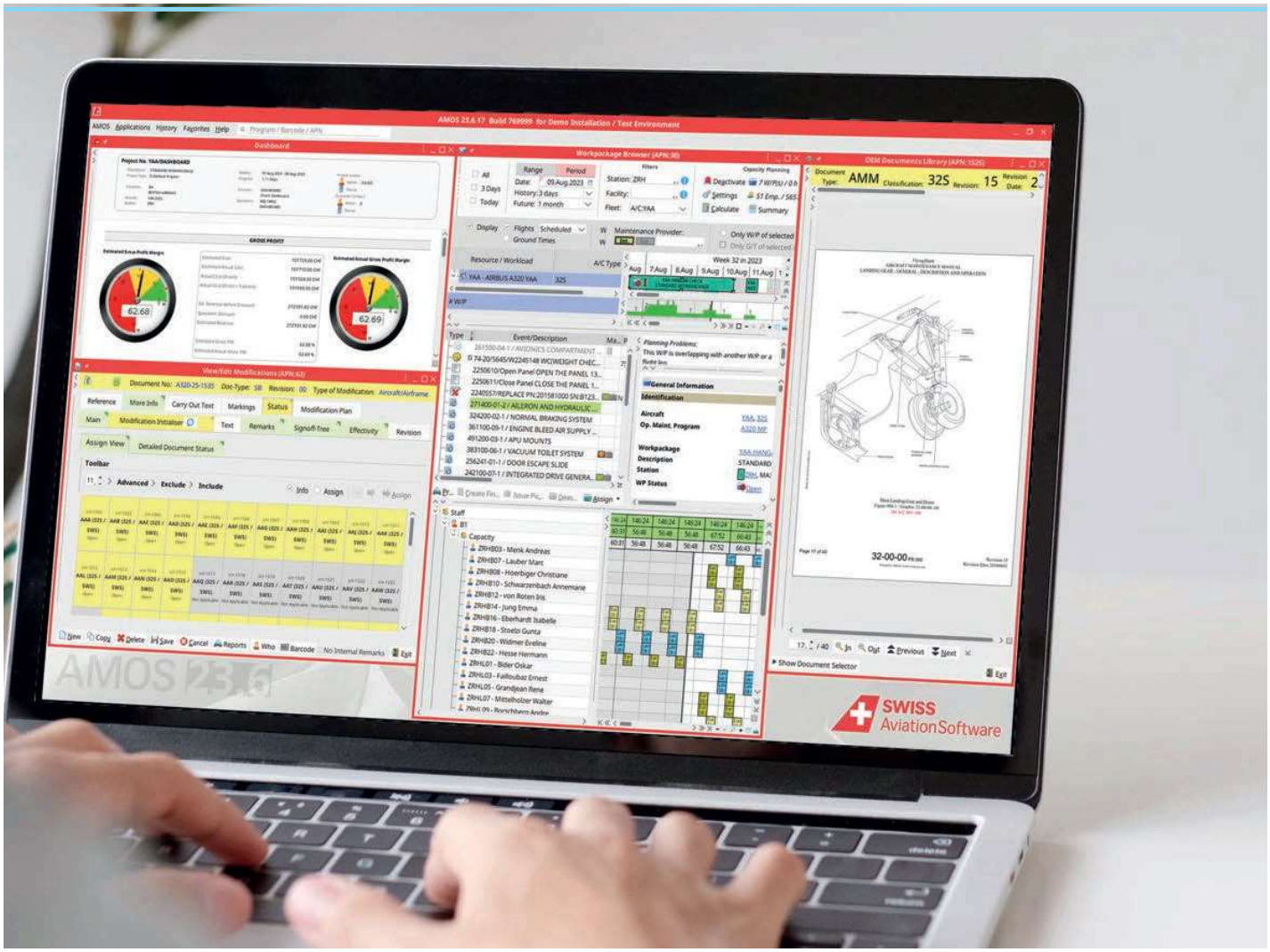
The Advantages of Paperless Management Systems

There are a range of advantages associated with MROs moving to paperless management systems as much as they can.

A case in point: "A fully paperless system allows the software to be used on mobile devices for work accomplishment instead of using paper task cards," said John Stone, Vice President of Product Management with Ultramain Systems, whose ULTRAMAIN M&E/MRO software addresses a broad spectrum of aviation maintenance needs. "It enforces desired MRO operational practices with employees in compliance with your procedures and regulations, where the use of paper does not," he said. "As well, paperless software ensures uniformity of job execution and automates recordkeeping, and makes sure that the individuals assigned to specific tasks are fully qualified and current to perform them."

Using paperless systems on mobile devices also allows an MRO's electronic task forms to be fully structured, uniform, and understandable, Stone observed. "Gone are the days of data entry clerks interpreting hand scribbled entries, as well."

Andrew O'Connor is Head of Products with OASES, whose OASES management software



supports national carriers, large third-party maintenance providers, and independent operators across more than 50 countries. "Today, in many cases, engineers are noting down their aircraft inspection and maintenance activities on paper, then returning to an office to key it in," said O'Connor. "Making this both electronic and mobile improves accuracy and saves time. [In addition], accessing manufacturers' handbooks electronically from anywhere saves time and adds to efficiency. It also ensures that users are always consulting the latest versions versus inadvertently consulting an out of date, paper-based version."

Besides enabling the use of mobile devices in MRO management, the digital infrastructure associated with paperless systems drives the centralization and universal access of all OEM documentation associated with the aircraft being repaired. The same is true for the data generated during the repair jobs, plus the tracking of technician hours, materials used, problems encountered and remedied, and the information required to build this work back to the client.

"Maintenance activities heavily rely on information from various data sources, such as OEMs' technical documentation and customers' work scope documents," Rajarajan said. "MRO management software can seamlessly ingest these documents and prepare for the downstream process of sequencing tasks, planning resources, parts, and tools, and finally rendering to the shop floor in mobile applications. This increases operational efficiencies by reducing the time and effort required to process the technical contents."

Hangar-level work execution is another area of increased digital adoption, he added. "Ramco's Mechanic Anywhere mobile app enables mechanics to access technical documentation, book

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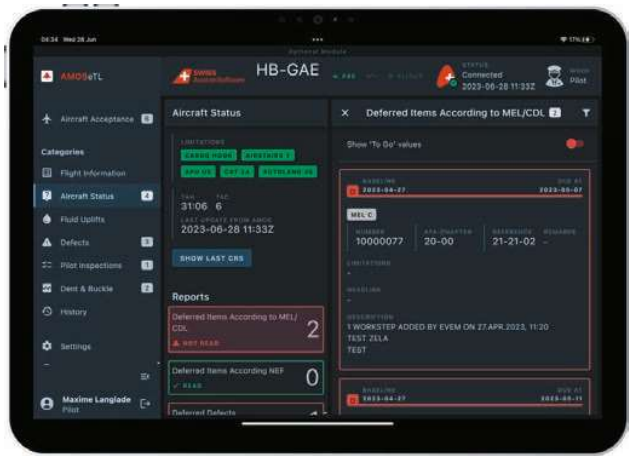


AMOSeTL: Real-time aircraft status and defect management for seamless digital workflows. (Credit: Swiss-AS)

Right: AMOSmobile/ EXEC: Empowering technicians with mobile tools for efficient, paperless maintenance execution. (Credit: Swiss-AS)

time, report findings, record measurements, and request parts and tools from the place of work. With the required regulatory approvals, task cards can be closed and signed off digitally. This considerably decreases the nonproduction hours, thereby increasing productivity."

So far, we've seen that paperless systems make it possible to add mobile devices to the documentation chain, while improving the quality of overall data and knowledge management throughout the MRO itself. In contrast, paper-based systems are disconnected, inefficient, harder to keep up to date, and far less accessible.

Then there's the fact that paper is just, well, paper! In other words, paper is a physical medium that has weight and takes up space. Electronic data does not, while the machines that manage and store it are far less demanding of physical space than filing cabinets and folders full of paper.

"Going paperless is great for the sole reason of removing the need to manage paper," said Rob Mather. (He is Vice President of Aerospace and Defense with IFS, a maker of enterprise software that specializes in aerospace and defense, as well as several other sectors.) "When you migrate to a paperless environment, you no longer need warehouses, you no longer need to buy paper, and you no longer need to buy printers. As a result, you're reducing total costs just by virtue of going paperless."

"When you consider the time saved by paperless technicians who no longer have to congregate around the docs office to collect their assigned taskcards or queue at a kiosk to start booking their time, you can expect productivity improvements from Day One," Clements said. "Additionally, thanks to direct data entry being done by technicians, less time is required to correct text or request entries that have been transcribed incorrectly. All of these 'small' reductions translate into more hands-on time on the aircraft with the same working shift without any reduction in quality and safety — in fact, quite the opposite."

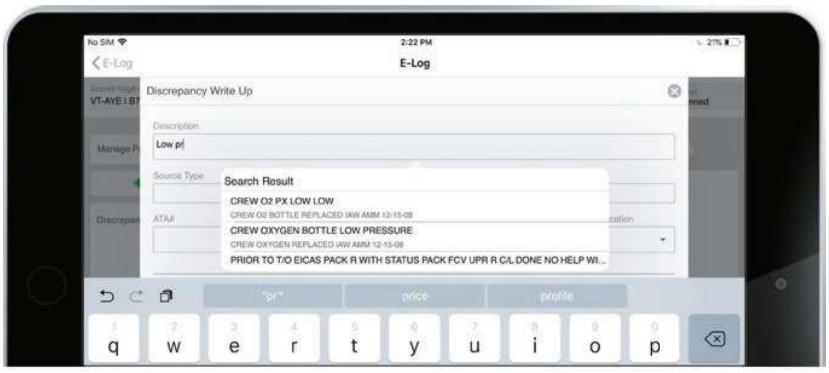
The Result: A Better-Run MRO

Individually, the benefits of going paperless are impressive in themselves. But when you put them all together, the cumulative benefit is a better-run MRO.

"If you organize your company around paperlessness and mobility, you can actually completely change the way you do business in order to be far, far more efficient — because you're doing all of the records in real time," said Mather. "For instance, you can maximize the technician's productive time by moving a bunch of processes off their plate into supporting roles. So for example, if a technician is writing the record of the fault and they say, 'I need this part', or 'this part was removed', you can integrate that process into a parts request. By just filling in that form, they've already requested the material."

That's not all: "The enablement of digitized management of OEM documents, customer work packages, and automated planning of task sequencing, tools, and resources will reduce indirect man hours by eliminating the manual-intensive process," Rajarajan said. "Meanwhile, the adoption of mobile tools on the shop floor considerably reduces non-production time by cutting down the time spent moving around to access technical documentation, and checking stocks."

"Once implemented, paperless processes will bring immediate benefits for all affected users with regards to real-time data and the removal of the paper report generation, which in itself is time consuming and has a cost associated," Clements agreed. "The back-office



Decision Assist for Mechanics by Leveraging Machine Learning

Ramco Aviation Software Decision assists mechanics by leveraging machine learning. (Credit: Ramco)

staff in Production Planning, Procurement, and Commercial all stand to benefit when their processes and exchanges are digitized and integrated into their primary tool, which in Swiss-AS' case is AMOS."

"As well, MROs can be more efficient as they are reducing their basic data entry efforts as well as reducing the need to rework such data," said O'Connor.

All told, a paperless management system will make an MRO function better than it did before. But it isn't just the company that benefits from this Improvement: it's the MRO's customers. A better-run company repairs their planes and engines faster, commits fewer errors due to an enhanced information flow, and can answer customers' questions intelligently and usefully when they call up to find out what is happening with their repairs.

"If you have access to real-time information coming off the aircraft, you know exactly how far it is in the work package, how much has been accomplished, and what problems have been found," said Mather. "As a result, you have greater predictability, and that increases customer satisfaction. It also increases the capability of the MRO organization to plan through an online portal where they can interact with customers. This speeds up approvals and keeps matters clarified with customers, because it's all there on the screen in black and white. So there isn't a battle with customers at the end of the day: They've got information about everything that's happening with the aircraft and they can see exactly all the records."

(Credit: Ramco)

Ramco Aviation Software has the necessary capabilities to make the process entirely paperless"

Saravanan Rajarajan, Associate Vice President of Aviation Solution Consulting at Ramco Systems

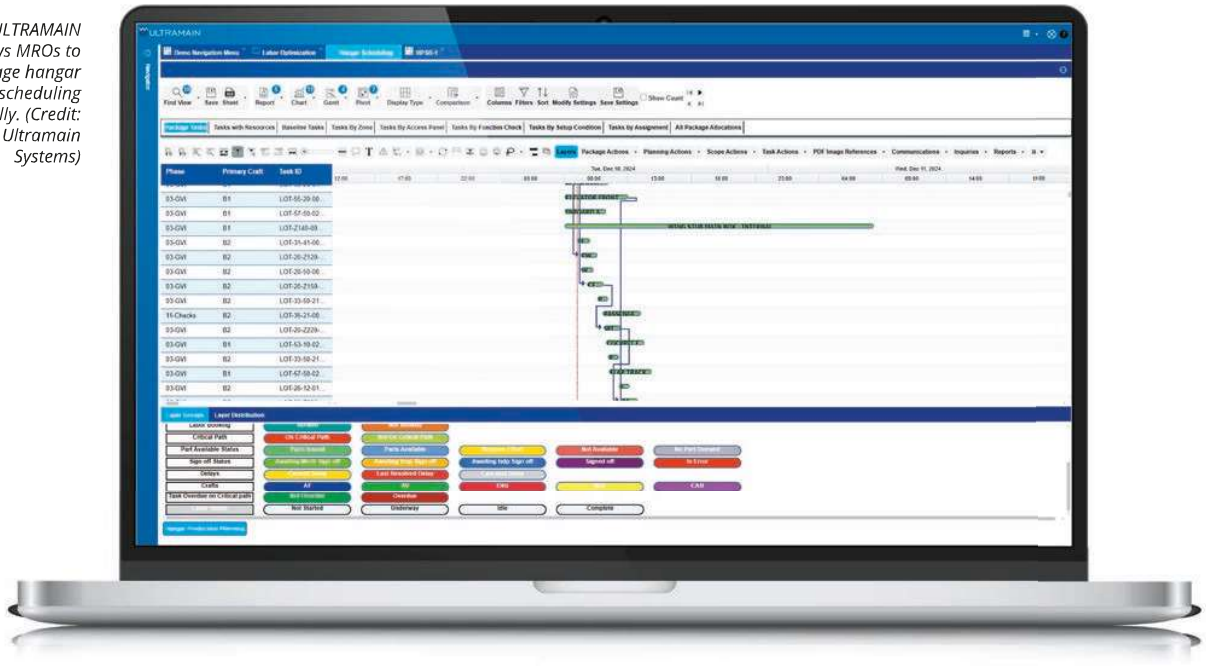
What It Takes to Move to Paperless

So far in this article, we have outlined the many benefits associated with MROs going paperless. Now's the time to splash a little cold water on the process: Even for the best organized companies, moving from paper to digital documentation requires organizational changes, process adjustments, and even some regulatory approvals. So it's not just about implementing software and tossing paper into the recycling bin. To make the transition to paperless in a successful and enduring manner, MROs need to adapt their workflows —- and sometimes their organizational structure!

So where to begin? Well, before an MRO starts asking for bids from ERP software vendors, senior management needs to decide what they want to achieve from the process. Are they just trying to get rid of paper, or are they looking for a more fundamental transformation to improve how their company does business and better integrate it with the digital world beyond their doors? These are questions that need to be asked and answered first, because it is difficult to successfully navigate a journey if you don't know what your final destination is.

"It's very important to create a vision around what you're trying to accomplish and what the benefits are going to be because certainly in some ways you're adding complexity," said Justin Daugherty, Maxa's Senior Director of Aerospace Solutions. (Maxa provides Data Analytics Automation and AI/ML solutions to support many industries, including aerospace.) "As well, you might slow down some phases of executing your maintenance by doing digital, but then in other ways you're going to speed it up and you're going to make people's lives significantly easier and better and faster. This is why calling attention to that broader vision and setting those expectations right out front is really important. At the end of the day, you need to get buy-in from the people who are going to be executing maintenance while using these systems."

"There are not many barriers to transitioning to paperless systems," noted O'Connor. "The most important thing is that the MRO



ULTRAMAIN allows MROs to manage hangar scheduling digitally. (Credit: Ultramain Systems)

organisation buys into the project and accepts the principle that paper-based solutions are going away."

After the vision has been spelled out, it's time to talk to the vendors. Then, once the right software system is being selected for the company, it will need to work closely with the successful vendor to analyze the process of moving from paper to paperless, to develop an end-to-end plan for doing so, work out the schedule for the implementation and to buy hardware, install and debug the system and ready it for deployment, and finally to train the staff to be able to use it.

There will be lots of little details that will have to be addressed during this process. For example, "to fully embrace paperless and, in turn, mobility, electronic signatures have to be adopted," Clements said. "This is a challenge in itself, and requires that an MRO management system such as AMOS is capable of supporting the necessary processes."

In particular, "you need to be able to prove rather that the signed digital record is the record and it hasn't been altered," said Mather. "In order to do that, you need a certain degree of security process control and encryption. With encryption, you actually need to have a digital signature file that is irrefutable to prove the validity of that document, in order to truly be paperless in this scenario. Not every system has that capability: That's a key differentiator."

As for AI

As advanced as they are now, there's no doubt that paperless MRO management systems can always be improved. This is why the makers of these systems are constantly pursuing advances and updating their products.

Not surprisingly, artificial intelligence (AI) is on their radar. But not everyone thinks AI is a Magic Bullet.

On the positive side, "we do see technologies like AI having a very significant role to play in MRO offerings," said O'Connor. "As such, OASES is currently exploring such technology for areas such as predictive maintenance, such as using AI to look at historic trends in component replacement to align parts ordering with when replacements are actually needed."

On the negative side, an MRO needs to have its data in a centralized storage area that an AI can access and analyze. If not, the AI will not have sufficient information to make accurate recommendations. In the computer industry, the direct relationship between input quality and output quality is described by the old adage, 'Garbage In/Garbage Out'.

"AI and machine learning (ML) can only be effectively leveraged when built on a trusted, unified data source — one that integrates multiple systems of record, applies pre-calculated insights, and incorporates business logic and context," Daugherty said. "Even then, just bringing your data together into a single data lake isn't good enough for AI and ML if the data is not accurate, complete and always kept current. If you just apply an AI or ML against a flawed data lake, it's going to hallucinate."

That's right, artificial intelligence systems can hallucinate. To quote IBM.com, "AI hallucination is a phenomenon wherein a large language model (LLM) — often a generative AI chatbot or computer vision tool — perceives patterns or objects that are nonexistent or imperceptible to human observers, creating outputs that are nonsensical or altogether inaccurate."

In reality, AI hallucinations are just super-charged versions of Garbage In/Garbage Out. But they are still something that every MRO wants to avoid. This is why the makers of paperless MRO management

Ultramain Solutions

Ultramain Systems delivers true paperless MRO solutions for airlines, third-party base and line maintenance providers, and component overhaul shops. Going paperless isn't just about enabling an airline's Continuing Airworthiness Management Organization (CAMO) or allowing third-party MROs to interact with an airline's maintenance system—it's about ensuring that MROs themselves can operate independently and seamlessly in a fully digital environment. For over a decade, Ultramain Systems has been at the forefront of this transformation, offering a system that **eliminates** paper. Not just in task cards, non-routines, and supporting forms, but across the entire MRO workflow. ULTRAMAIN enables true digital merging of airline and OEM work cards, ensuring MROs can generate and complete work packages entirely in a digital format—one that aligns with customer and regulatory expectations. With ULTRAMAIN, airlines and MROs achieve a truly digital, streamlined, and compliant maintenance environment.

systems are being very careful about implementing AI in their products.

"Actually, AI isn't necessary for paperless processes," said Mather. "Our MRO management systems already have all the tools they need without AI."

Will There be a Truly Paperless Future?

"Do you foresee a future when paper will be entirely banished from MROs?" That's the last question that Aerospace Innovations posed to our experts for this article. On this point, their opinions varied

"For sure, the paperless hangar is not only coming, but in some cases it is virtually here," Clements said. "Of course, MRO customers, in the form of airlines and leasing companies, have a part to play to realise a complete digital flow of data. But MROs themselves can already reap the benefits of the paperless process and tighten up their shop floor data collection, commercial offerings and ultimately deliver ever better products in the form of 'on time' and 'on budget' results for their clients."

"Yes, I certainly see that digitalisation of the MRO industry is very doable, is efficient as a timesaver and even enhances

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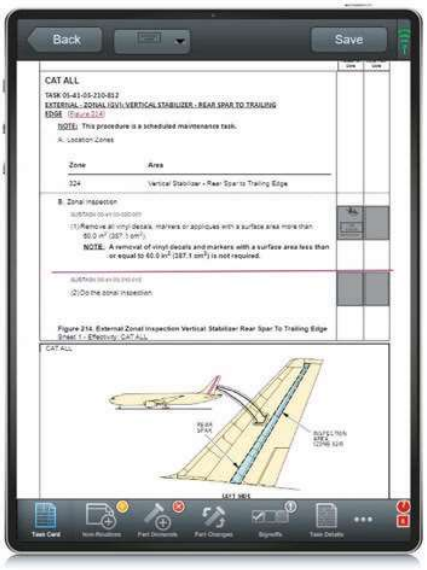

Above: ULTRAMAIN Mobile Mechanic brings an MRO's ERP system directly to the shop floor. (Credit: Ultramain Systems)

accuracy," added O'Connor.

John Stone is a bit more conservative in his assessment, but no less optimistic. "Paper part tags, bin labels and the like will still be used, but beyond that MROs who use ULTRAMAIN can operate paperlessly today," he said. "For instance, industry adoption of Spec 2000 Ch. 18 (Work Packages) is not required to go paperless, because ULTRAMAIN automatically transforms customer-provided paper-based work packages into digital work packages/task cards that allows an MRO to operate paperlessly."

Meanwhile, Saravanan Rajarajan admits to a bit of scepticism when it comes to MROs becoming completely paperless. "It is difficult to foresee this due to multiple factors, including regulatory requirements, customer-specific requirements, regional variances, and organizational adoption of paperless processes," he said. "However, MRO management system adoption rates are increasing due to competitive pressures, cost efficiencies, and younger workforces."

The moral to this story: Although paperless MRO management systems may not erase every shred of paper fiber from the enterprise, they will likely eliminate paper-based systems as a viable form of management going forward.There's just too many benefits associated with going paperless and too few linked to staying with the old ways.

By James Careless