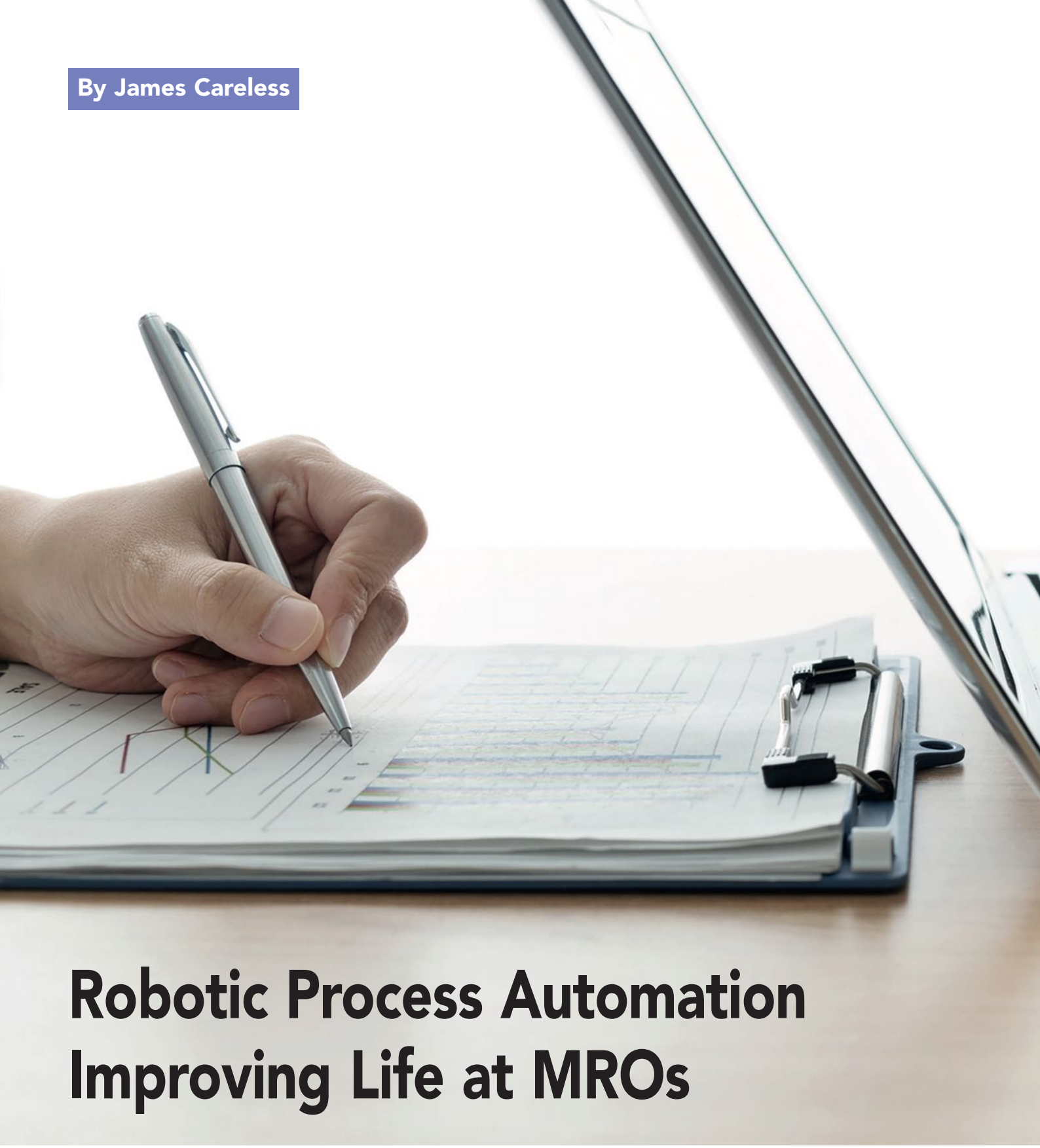
By James Careless



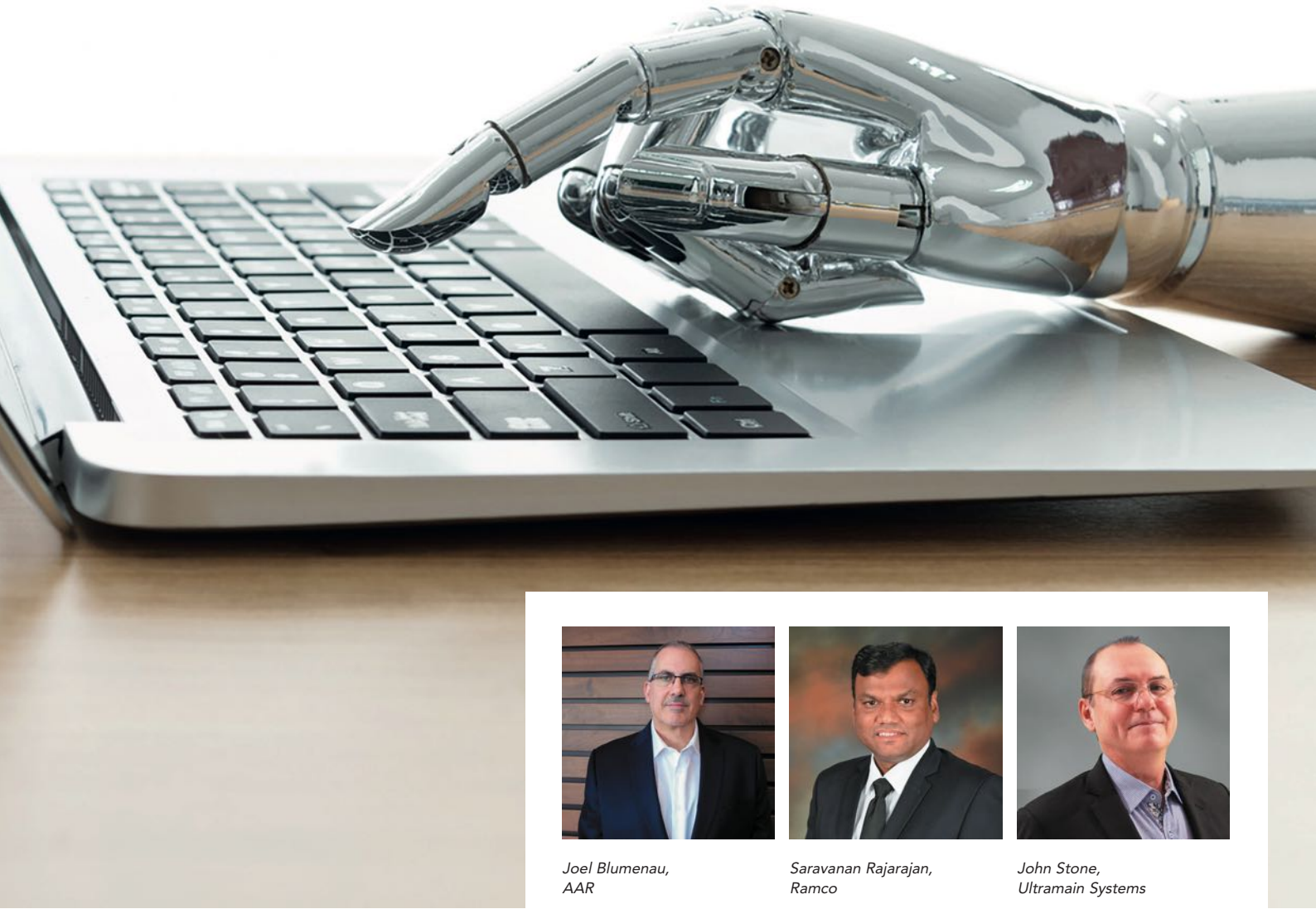
Robotic Process Automation Improving Life at MROs

The term robotic process automation (RPA) has a nice science fiction ring to it. In the MRO context, RPA conjures up images of aircraft being serviced by automated robots zooming back-and-forth across the shop floor, all working with maximum efficiency, productivity, and safety.

The realities of RPA are a little less futuristic than this. Still, real-world RPA is delivering some significant improvements for the MROs who use this technology and making life better for their humans as well.

What is Robotic Process Automation (RPA)?

The "process" in the term RPA refers to software processes. Once this distinction is made, "RPA is exactly what it sounds like: The use of software robots to automate repetitive processes across systems," said Joel Blumenau, AAR's senior director of strategy, planning, and innovation. (AAR is a global aerospace and defense aftermarket solutions company with operations in over 20 countries that has been employing RPA for some time.) "Typically, these processes are carried out by humans and involve efforts such as data gathering and entry. The RPA bot is designed to



Joel Blumenau, AAR

Saravanan Rajarajan, Ramco

John Stone, Ultramain Systems

free up precious human time for more value-added activities that a robot could not accomplish, such as relationship management, strategizing and personalized sales activities."

In a practical sense, RPA is a workflow tool that automates repetitive, routine, and replicable tasks in order to perform them efficiently, accurately, and without direct human intervention. "When applied in the right process flows, RPA can improve operational efficiencies by speeding up the process," said Saravanan Rajarajan, associate vice president - solution consulting with Ramco Systems (a global enterprise software provider). "Ramco Aviation Software leverages RPA tools to streamline the MRO work packaging process and enable repair order automation for its clients."

Ultramain Systems, maker of ULTRAMAIN M&E/MRO software, also uses RPA to make life easier for MROs. "More than just automation, RPA enhances data integrity by performing real-time validation, ensures records transition seamlessly through their life cycle, and optimizes compliance workflows — reducing manual effort and minimizing errors," said John Stone, the company's vice president - product management. "At Ultramain Systems, we have integrated AI and RPA utilities into ULTRAMAIN, allowing MROs to streamline operations and improve regulatory compliance.

Our live, production-ready RPA technology also helps ensure faster, more accurate record processing with intelligent workflow automation, plus optimized resource allocation that enables personnel to focus on high-value tasks."

How RPA is Being Used by MROs

Dr. Kenneth Low, ST Engineering

Robotic process automation has the potential to be applied across all aspects of MRO administration. As such, it is not surprising that the companies interviewed for this story have found many useful ways to employ RPA in their operations and products.

A case in point: Singapore's ST Engineering (a solutions provider whose products include the MRO sector) is using RPA to improve the procurement process for MROs. "When procuring materials and parts, information such as stock quantity, lead time and price are crucial for decision making, which also has to take into account logistical details including airway bills and shipping time," said Dr. Kenneth Low, head of innovation & sustainability with ST Engineering's Commercial Aerospace division. "When sourcing for parts, we use RPA to automate and aggregate part listings found on OEMs' and suppliers' websites. This allows us to compare and choose the most cost-effective option, saving time that otherwise would be spent on painstakingly gathering information. It also provides us with greater visibility over parts in transit."

ST Engineering also uses RPA to retrieve information from maintenance task cards, whose content can span hundreds of pages. "Previously, our technicians had to spend hours reading task cards line-by-line to transcribe them into documents, a tedious process which could lead to mistakes," Low said. "Today, when airlines send over task cards, RPA extracts the information into a web form that is easily retrievable by our technicians, reducing the time taken for this process by 90% as well as eliminating the risk of human error."

According to Ramco's Rajarajan, RPA bots are vital for ingesting client task cards (aka work cards) into an MRO's Enterprise Resource Planning (ERP) platform efficiently and accurately. "Third-party MROs normally receive work packages from airlines, which are mostly in the XLS and PDF formats," he explained. When humans are used to input the data from these cards, it can be hours or even days before the resulting work orders can be issued to the production floor.

When RPA bots are used to ingest this data, the time delays fade away. This is because the RPA bots automatically extract task numbers from the PDF work documents and compare them with Tally sheets for validation. The RPA bots also compile lists of the parts and tools required to do the jobs, and check on their availability and locations in stock. The result? "With automation, the lead time to process these steps has been reduced by 70-80%," said Rajarajan.

Meanwhile, AAR's most recent RPA implementations have been in very manual and repetitive activities handled by their sales and administrative teams, such as responding to part requests and email inquiries. "This effort includes the generation of purchase orders and other internal documentation via our main Enterprise Resource Planning (ERP) system," Blumenau said. "Eventually, we want to roll RPA out for more MRO complex tasks in our digital ecosystem, Concourse."

As for Ultramain Systems? "ULTRAMAIN includes built-in RPA management tools, enabling customers to modify existing automation processes or create their own to fit their unique operational needs," replied Stone. By providing an RPA builder in its software, ULTRAMAIN allows MROs to implement automation instantly, adapt processes on demand, and tailor automation to align with their specific maintenance environments. "This self-sufficient approach ensures customers can achieve automation benefits faster while maintaining control over their MRO digital transformation," he said.

Many, Many Benefits

We have already seen how RPA can speed up the intake and processing of MRO-related data — reducing errors as it does so while delivering and sharing results faster than any human can. The beneficiaries of these improvements include MROs, their customers, and the suppliers that support them. In fact, everybody benefits when data input is handled far more quickly and accurately than ever before.

But the benefits of robotic process automation don't stop there. According to John Stone, improved data ingestion, processing, and distribution allows an MRO to work faster yet better on behalf of its customers. This means that aircraft get fixed faster and more accurately. In turn, customers get their aircraft back sooner, allowing them to resume making money for their owners and operators rather than sitting on the shop floor.

RPA also allows MROs to "tighten up" the scheduling of their personnel and workspaces, and the allocation and replacement

RPA can help MROs with scheduling personnel and workspaces, as well as the allocation and replacement of parts and tools being used. Ultramain images.

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of parts and tools that they use. These improvements can reduce labor costs without compromising quality. They can also ensure better compliance with industry and government standards due to the inherent consistency built into automation. RPA also makes it easier for MROs to provide updates to customers on the progress of their work orders. Such transparency keeps customers happy, and more likely to return the same MRO for their next job. The takeaway: "By leveraging ULTRAMAIN's RPA capabilities, MROs not only streamline internal operations but also deliver faster, more reliable service to their customers, ultimately enhancing competitiveness in the industry," Stone said.

"Repair order processing involves multiple steps, which are mostly manual and prone to errors," agreed Ramco's Rajarajan. "As well, the right workflow design involves integrating tasks performed by RPA bots and tasks that must be done only by qualified persons due to sensitivity to safety, regulations, or commercial exposure. For example, unserviceable units removed from aircraft can be screened automatically by RPA bots based on predefined attributes like parts, capability, warranty, and supplier contracts. All told, smart screening and automation have the potential to reduce the repair order processing effort by 70%."

The bottom line: Utilizing RPA for any of the following three objectives — productivity enhancement, improved customer experience, and efficient scaling — can yield benefits. "In one of our customer deployments, an RPA bot that auto-created purchase orders improved productivity by 60%, and it was able to scale to manage their operations even when the number of PO transactions had increased five-fold," Rajarajan reported. "No additional investment was needed for training the RPA or increasing the number of procurement personnel."

RPA Challenges and Solutions

Clearly there are a tremendous number of benefits associated with deploying robotic process automation at MROs. But making it happen isn't as simple as clicking on an icon with a mouse. "Automation often involves making disparate systems communicate data efficiently without any loss of data integrity between systems," said AAR's Blumenau. "This can present challenges along the way that require solutions unique to the systems involved. We have had our share of those challenges, of course, but with a good implementation team putting their heads together, a solution can always be found to keep the efforts progressing."

"While robotic process automation (RPA) offers significant benefits to maintenance, repair, and overhaul (MRO) operations, its implementation does come with challenges," Stone noted. "However, ULTRAMAIN has taken steps to mitigate these issues and ensure a smooth transition for customers." For instance, integrating RPA into existing MRO workflows can be complex, especially in environments with legacy systems or highly customized processes. To address this challenge, ULTRAMAIN software comes with modular, configurable RPA bot tools that allow MROs to start small and scale automation gradually.

"Automating processes without proper oversight can lead to data inconsistencies or errors propagating across systems," added Stone. "ULTRAMAIN incorporates real-time data validation and integrity checks to address this problem, ensuring that automated processes maintain accuracy and compliance. ULTRAMAIN's built-in RPA management tools also allow customers to modify existing automation or create their own, ensuring long-term flexibility and scalability without dependency on software updates."

To deploy robotic process automation properly, "RPA initiatives should start by identifying the proper business process to automate and the desired target state, focusing on the workflow steps to reach it," Rajarajan said. "Areas and tasks where RPA can provide a significant impact will be the automation of data inputs, data aggregation, standard transactions, and document processing."

A comprehensive understanding of how RPA can coexist with other technologies and integrate into the workflow design will yield better results than a stand-alone deployment. As well, "workflow design should ensure seamless integration between RPA and employees with the proper handoff, status, and audit controls," he said. "As automation programs expand and grow complex, silos within the organizations can hinder performance if the business areas do not coordinate. RPA should be leveraged as a way to enhance human productivity rather than replacing it."

Noteworthy: Because robotic process automation is rule-based by nature, problems can arise when these systems interact with websites whose content has been changed. "Even minor changes such as the removal of a keyword could break the RPA," ST Engineering's Low said. "To address this issue, we have an automated status check and notification system to investigate such occurrences and reduce downtime. At the process level, we also involve our continuous improvement teams to optimize end users' processes and make RPA deployments more efficient. As RPA that constantly runs in the background may incur expensive license fees, we also evaluate if such an arrangement is necessary

for each RPA use case."

Finally, the human factor should be taken into account whenever robotic process automation is being implemented at an MRO. "The use of RPA may also spark technicians' fears of job displacement," said Low. "Early engagement of the workforce is hence crucial to address their concerns. Based on our experience, implementing RPA with workers' inputs provides confidence and assurance. In fact, a number of our technicians who were initially wary of RPA embraced the technology after they realized how the technology could help them in their work."

Advances in RPA

As technology continues to advance, so does the capability and flexibility of robotic process automation. For instance, Ultramain Systems has enhanced the self-service RPA creation tools in ULTRAMAIN, broadened the range of pre-configured RPA solutions within this software, and developed new and more efficient RPAs in collaboration with its customers. "These advancements ensure that ULTRAMAIN's RPA capabilities remain cutting-edge, adaptable, and increasingly effective in streamlining MRO operations," said Stone.

Looking forward, "future RPA solutions will go beyond rule-based automation, incorporating context-aware processing to handle more complex workflows with minimal human intervention," he said. "Automated decision-making enhancements will allow RPA to manage exceptions more effectively, reducing the need for manual overrides. RPA will seamlessly connect with a wider range of MRO systems, including inventory management, regulatory compliance tools, and third-party aviation data sources. Automated workflows will anticipate maintenance needs, flag potential issues earlier, and auto-schedule preventive tasks, reducing unplanned downtime. And RPA tools will become even more user-friendly, enabling non-technical users to build, modify, and deploy automation with simple drag-and-drop functionality."

According to Kenneth Low, "AI is becoming the next big thing, and the MRO industry may move towards a collaborative model that harnesses the strengths of generative AI and RPA," he said. "It is also possible that further advances in generative AI could phase out the use of RPA in MRO operations. Regardless, when it comes to driving efficiency and optimizing workflows, the MRO industry stands to benefit either way."

As for Saravanan Rajarajan's predictions? "Future workflows will combine technologies, including digital OCR [optical character recognition] to automate data inputs, RPA to replace manual tasks, machine learning models to interpret data, and agentic AI to make decisions and execute tasks," he said. "It's crucial to resist the temptation of blind trust in RPA and instead foster the right workflow between machines and humans that amplifies the strength of both while mitigating their weaknesses."

All told, robotic process automation is one of the best things to happen to the MRO industries in recent years — even if it doesn't involve actual robots racing around the MRO shop floor. AM