

By James Careless

# SOFTWARE A MUST FOR KEEPING TRACK OF SPARE PARTS





**M**anaging spare parts inventories in the aviation MRO sector is an extremely challenging task. In particular, accurately predicting which parts will be needed and maintaining a sufficient supply of them is an operational necessity. At the same time, keeping just the right levels of parts in inventory to meet demand, while not carrying excessive stock, is a financial imperative.

Factor in the still-unpredictable nature of parts failures, long lead times for obtaining specialized components, and the risk of counterfeit and/or stolen parts entering the supply chain, and managing spare parts inventories is no easy matter. But one thing is certain: without effective spare parts management, accurate tracking data, and processes in place, MROs can struggle to ensure that vital parts are available when needed — resulting in costly Aircraft Out of Service (AOS) situations along with money being lost by them and their clients.

It is for these reasons that spare parts management software solutions are so vital to the aviation MRO industry. Whether sold to MROs by companies such as Component Control, ePlane, Satair, and TRAX, or used by MRO suppliers such as APOC Aviation to make parts acquisition fast and easy, spare parts

management solutions for MROs make all the difference in keeping their customers in business.

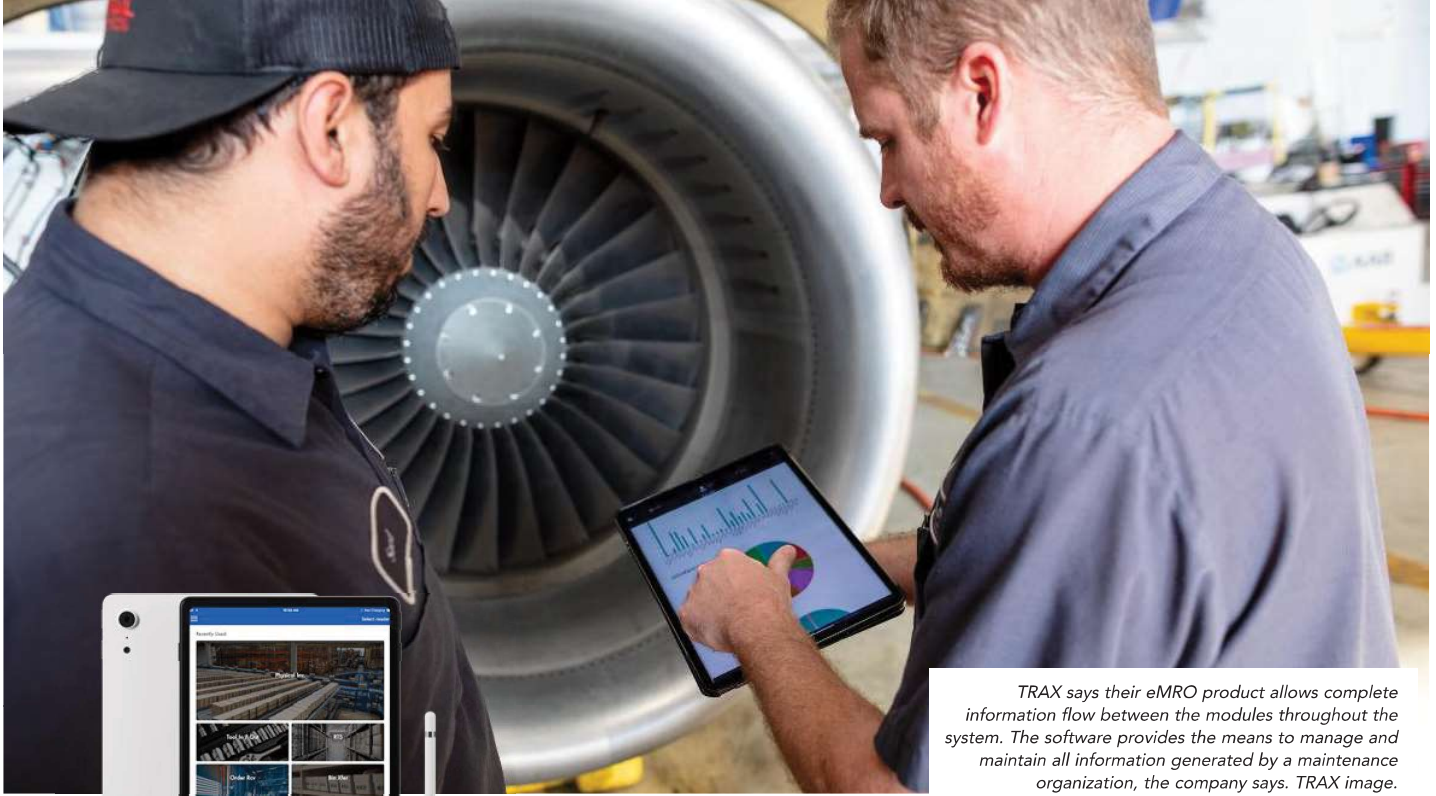
## Spare Parts Management is More Difficult Than Ever

Ensuring an adequate and available supply of spare parts has been a constant problem for the aviation industry. “It is a large problem, and it’s been large forever,” said Daniel Tautges, senior vice president with Component Control.

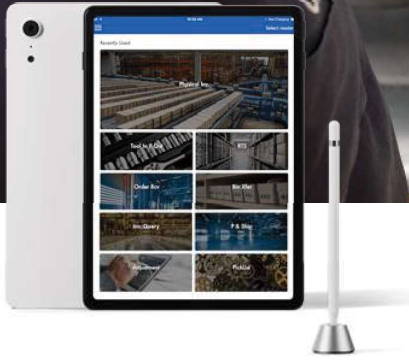
“Managing spare parts inventory is a significant task, especially given the global scale and complexity of the aviation industry,” agreed Hardi Jamil, APOC Aviation’s vice president of component sales. “It involves balancing the needs for immediate availability of critical parts, the costs of storing and managing these parts, and the logistical challenges of distributing them worldwide. As fleets and technologies evolve, so does the complexity of managing these inventories.”

Then there’s the sheer volume and complexity of aviation spare parts that have to be sourced, stocked, provisioned, installed, and replaced. But that’s not all: “Spare parts inventory management is a substantial task in industries like aviation where the accuracy and availability of parts are crucial to daily operations,” said Jeremy Cole, director of technical business development with ePlaneAI.





TRAX says their eMRO product allows complete information flow between the modules throughout the system. The software provides the means to manage and maintain all information generated by a maintenance organization, the company says. TRAX image.



TRAX's EzStock app is a materials management application that allows users to perform common inventory transactions through handheld iOS devices, and radio frequency scanners. Users can complete transactions at the point of use on their wireless device which results in real-time transaction processing, improved data accuracy and increased productivity, TRAX says. TRAX image.

"Managing these inventories involves handling tens of thousands of parts across multiple locations and requires precise coordination to ensure that parts are available when needed without excessive stock that ties up capital."

"This is why spare parts management is essential for avoiding AOS events and delays in scheduled maintenance and keeping aircraft in the air," said Miguel Sosa, TRAX's vice president of software development. "In particular, a streamlined supply chain is crucial for aviation operational efficiency."

Sosa then makes a very valid point: "Maintaining optimal stock levels isn't just about avoiding excess inventory or stock outages; it's about making informed decisions that impact the bottom line," he noted. And he is correct: When it comes to cost-effective spare parts management, it really is all about the bottom line, because inventory sitting unused for any unnecessary length of time is money left sitting on a shelf.

"As such, the biggest challenge in managing spare parts inventory is creating a synthesis of actual and forecasted usages based on real-time data," said Sosa. "It is for this reason that TRAX developed eMRO as an enterprise solution that fully integrates the maintenance program planning with the necessary supply chain requirements."

Unfortunately, the challenges associated with spare parts management have become more daunting since Covid-19. The reason: "The airlines are flying older aircraft, either because they can't get new products out of Boeing or they've had issues with the Maxs," Tautges said. This means that there is more demand for older parts, some of which are in short supply.

"On a global scale, inventory levels in our industry are still low compared to pre-Covid," said Dr. Sascha Horatzek, Satair's vice president of supply chain. "With the continuous lack of aircraft capacity in the market, the pressure on spare parts availability has drastically increased. Everyone knows that a single missing part can keep an aircraft grounded."

## Detecting Stolen Parts and SUPs

No part? No business. It's safe to say that not having the part in stock will lose you money. However, the situation gets trickier when you think there is a part in stock, only to discover it was stolen from somewhere else or — worse yet — belongs to the family of Suspected Unapproved Parts (SUPs). This is why managing spare parts using a sophisticated IT solution can make their detection straightforward and reliable.

One thing is certain: These uncertified, untested counterfeits are such a threat to aircraft safety, that the FAA and EASA have dedicated individual web resources to their detection. "The FAA is committed to discovering and removing Suspected Unapproved Parts (SUP)," said the FAA website. "This page lists the Unapproved Parts (UP) confirmed cases, the SUP cases under investigation, and the Stolen Parts cases according to Safety Information Bulletin (SIB) No.: 2017-13R1, issued: 24/10/2018," the EASA page declared.

"SUPs are a critical safety concern in the tightly regulated aviation industry," Sosa said. "Worldwide, OEMs, MROs, airline operators, and regulatory agencies are taking renewed steps to safeguard against rogue parts. This is why the Trax eMRO solution aims to improve part tracking and documentation."

Stolen parts come with their own risks, including falsified documents attesting to their condition and operational lifespans, and the liability costs that could occur if they fail in service. As a result, "counterfeit and stolen parts both pose serious safety risks," said Jamil. "This is why APOC deploys stringent procurement processes, rigorous vetting of suppliers, and advanced tracking systems that ensure part authenticity and legal procurement."

Cole agrees. "Counterfeit parts pose safety risks, potentially leading to critical failures. Stolen parts involve not only financial loss but also security breaches," he said. "Addressing these issues requires robust tracking systems, stringent quality checks, and secure supply chain management."



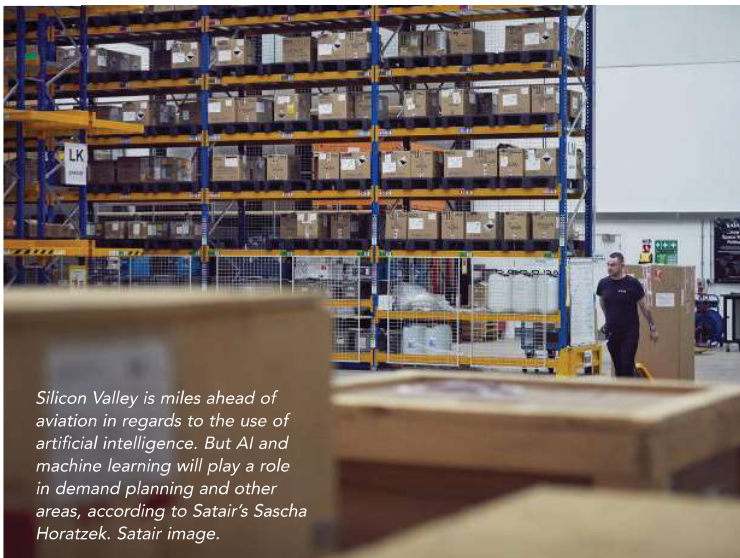
# MOBILIZING MAINTENANCE

Real-time maintenance information,  
anytime, anywhere





APOC's Hardi Jamil says software solutions with features like real-time tracking, demand forecasting and logistics planning are crucial for parts management. APOC image.



Silicon Valley is miles ahead of aviation in regards to the use of artificial intelligence. But AI and machine learning will play a role in demand planning and other areas, according to Satair's Sascha Horatzek. Satair image.

As a wholly-owned subsidiary of Airbus “counterfeit parts are not an issue at Satair,” said Horatzek; “thanks to us being integrated into Airbus’ quality assurance system and Satair procuring new parts from the same qualified production suppliers. However, we can experience issues stemming from out-of-production aircraft where parts supply is more difficult by nature compared to in-production aircraft.”

### IT to the Rescue

Given the sheer scope of aviation spare parts management, relying on information technology (IT) platforms to address them is the only sensible approach to take. There’s just no way that a paper-based or even a spreadsheet solution can accurately and systematically handle this volume of ever-changing information. It requires a sophisticated IT solution to do the job properly.

Fortunately, there are several sophisticated software solutions available for spare parts management, including ERP (Enterprise Resource Planning) systems, SCM (Supply Chain Management) software, and specialized inventory management platforms. “These tools offer features like real-time tracking, demand forecasting and logistics planning,” said Jamil. “APOC also integrates IoT (Internet of Things) and other technologies to

improve traceability and inventory accuracy.”

As an ERP software vendor in the aviation aftermarket space, Component Control is in the right position to provide such solutions to MROs. “When you think about ERP, that’s really everything from finance to procurement to inventory to purchasing to selling warehousing,” Tautges said. “So every aspect within the company is driven by our software. The result: We have about 1,700 customers in 66 geographic locations all over the world. They’re either distributors, ROS, completion centers, or they’re OEMs.”

Of course, ‘knowing’ what part to keep where, and when to deliver it to who, is the magic of these IT systems. Now Tautges calls it a “science” — but whatever it is, the ability to provide such timely data is the bread and butter of the software companies who develop the algorithms to predict these things.

A case in point: “The primary challenges of stocking aviation spare parts include forecasting fluctuating demand, managing stock levels effectively, and avoiding both overstock and stockouts,” said Cole. “This is where predictive analytics and AI (artificial intelligence) driven tools like ePlaneAI enhance forecasting accuracy, allowing MROs to anticipate parts needs based on usage patterns and historical data. This technology helps maintain optimal inventory levels, reducing carrying costs while ensuring parts are available when needed.”

APOC also uses “predictive analytics to forecast these needs accurately,” Jamil said. “The goal is to minimize inventory costs while maximizing service levels, avoiding both surplus stock and parts shortages, which can lead to operational delays.”

In addition to the above, Satair “arbitrates relevant criteria such as customer satisfaction, cash investment and turn rate,” said Horatzek. “Satair is also one of the first industry players running the full process from demand forecasting to supply planning in SAP IBP (Integrated Business Planning), which is autonomously and continuously selecting the most suitable forecasting algorithm for a given parts number in order to increase forecast accuracy. Additionally, RPA (Robotic Process Automation) is vastly used along our Forecast-to-Inventory process. In the future, machine learning (ML) and AI will certainly play a role, particularly when it comes to demand forecasting or optimization of MRP settings.”



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Satair isn't the only spare parts management solution provider interested in AI. "While TRAX already has robust and comprehensive supply chain management functionality, we are committed to leveraging AI and ML to strengthen our eMRO solution," Sosa said. "Machine learning algorithms can discover patterns and relationships within data sets that are often imperceptible to humans, thus allowing for more accurate forecasting and more economically efficient inventory management."

### To Blockchain or Not to Blockchain?

In recent years, the blockchain data recording system has been touted as a hackerproof way to recode and track aviation spare parts. For the record, "Blockchain is a secure database shared across a network of participants, where up-to-date information is available to all participants at the same time," said the McKinsey & Company website. "Blockchain is a method of recording information that makes it impossible or difficult for the system to be changed, hacked, or manipulated."

With this kind of bulletproof security, Blockchain is definitely a robust approach to spare parts inventory management. "It's a highly promising approach, offering enhanced traceability, security, and transparency," Cole said. "It can effectively combat issues like counterfeit and stolen parts by creating an immutable record of each part's history and transactions. This traceability ensures authenticity and secure transactions across the supply chain."

"Blockchain technology offers significant promise in enhancing transparency, security, and efficiency," agreed Jamil. "Its decentralized and tamper-evident ledger means it can help in tracking parts provenance, preventing the entry of counterfeit parts into the supply chain, and ensuring compliance with regulations. At APOC, we are actively exploring blockchain's potential to further secure our supply chain and logistics operations."

But not everyone is convinced that this level of high security is warranted. One reason: "For a wide application of blockchain to succeed in the aviation industry, many players would need to align, including the authorities," Horatzek said. "Nevertheless, Satair keeps observing the evolution of this technology."

He's not the only skeptic. "The benefits are clear in that blockchain can increase parts traceability, tracking of information for sales and pooling, increase the efficiency of lease returns, enhance the ease of data search (versus paper), and automate data entry, among other advantages," observed Sosa. "The major drawback, or effect on feasibility at this point, is that there is little to no development of data interchange for component sales and pooling due to the reluctance by some vendors to provide needed supply chain data."

"Blockchain is a little bit of a technology looking for a problem," Tautges quipped. However, he concedes the point that

"the custodianship and the validation of parts are a big deal. The adage goes that the part is only as valuable as the paperwork that goes with it. So I think there's a lot of value in being able to match those certifications to parts and make sure you're getting accurate information. Blockchain is a mechanism to manage the control of that and security of that."

### What the Future Could Hold

How do you improve upon an IT-based spare parts management solution that already works very well? Make it more "predictive", replied Tautges. That means using "internally driven algorithms and AI driven algorithms" to calculate and set pricing — in other words, start using AI and algorithms to predict what the value of a part is so that a standardized price can be determined.

Cole endorses this view. "The focus right now is on further integrating AI and IoT (Internet of Things) technologies to enhance predictive capabilities and automation in inventory management," he said. "Leveraging Big Data for better analytics, increasing the use of blockchain for security and transparency, and improving user interfaces for inventory management systems are key areas of development. These advancements aim to further reduce manual processes, increase efficiency, and ensure the availability of high-quality, authentic spare parts."

Jamil adds another "critical aspect" that he believes can improve these systems, but only if everybody learns to work together. "To go forward with this technology, there is a need for industry-wide collaboration," Jamil explained. "By sharing knowledge, technology, and Best Practices, companies can tackle common challenges more effectively and drive innovations that benefit the entire sector."

Horatzek is on board with improved industry collaboration. He also believes that "efficiencies in the MRO business need to be boosted. Taking the example of how Airbus works with its suppliers, i.e. fully digital and automated transactional business from demand forecast to payment: This needs to be extended to the workflows between industry partners in the MRO business. Of course, this will require a modern industry standard for M2M material management."

All told, there are many advances that can be applied to make spare parts management solutions do more than ever before, and likely will be implemented in the years to come. Who knows: Maybe someday these solutions will be able to handle all aspects of parts prediction, stocking, tracking, distribution, and billing on a proactive basis — putting an end to spare parts shortages and AOS situations for MROs and airlines alike! 