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New Trends in CAMO Software

The MRO sector has not just been digitalised,
it is also being digitally revolutionised

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chain issues



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New Trends in CAMO Software for Airlines

The aircraft MRO sector has not just been digitalised, it is also being digitally revolutionised

By David Dundas

Digitalisation is the process of leveraging digital technologies to change a business model and improve processes, which can result in, among other things, greater efficiency. It is a great deal more than just converting analogue information into a digital format (that is digitisation) and involves fundamentally integrating digital data and technologies into all areas of an organisation and which is capable of considerably enhancing operations. The MRO sector of the industry is being

transformed by digital technology, and in particular, CAMO (Continuing Airworthiness Management Organisation) teams are being asked to do more, faster—while proving continuous compliance and controlling of costs and carbon emissions. The newest wave of CAMO software responds with cloud-first architectures, tighter OEM data integrations, AI-assisted planning, paperless tech logs, and built-in cybersecurity controls aligned to new EASA Part-IS requirements. Together, these trends are reshaping how airlines plan maintenance, manage records, and demonstrate airworthiness. We approached Aero NextGen, EXSYN Aviation Solutions, FL Technics and Ramco Systems for their take on the latest developments in CAMO software for airlines.

Cloud-native CAMO systems are clearly gaining ground. So, what benefits and challenges are being witnessed with the move away from on-premises solutions?

Cloud-native CAMO is becoming the default for operators who need speed, resilience, and connected oversight. The immediate win is agility. Teams can configure AMP variants, approvals, and task libraries without the long change cycles that defined on-premise eras, which means adding tails, opening a line station, or harmonising workflows now happens in days rather than quarters. Just as important, cloud architectures expose real-time airworthiness and AD/SB exposure



Monica Badra, Founder, Aero NextGen

“On the hangar floor, mobile-first execution has become the norm: technicians and CAMO engineers can capture findings, apply e-signatures, and update component records at the point of work, improving data latency and quality. The hardest work is often change management—because governance, not code, determines how sustainable the new model becomes.”

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across fleets and partners through event-driven APIs and role-based dashboards. That visibility translates directly into better right-time decisions, tighter audit trails, and fewer surprises at the flight line. Monica Badra, the founder of Aero NextGen explains further: "Enterprise-grade security—zero-trust controls, regional redundancy, immutable backups—has raised the bar to a level that's hard to replicate in a server room, and continuous patching eliminates the "version lag" that once created both cyber and operational risk. On the hangar floor, mobile-first execution has become the norm: technicians and CAMO engineers can capture findings, apply e-signatures, and update component records at the point of work, improving data latency and quality. The hardest work is often change management—because governance, not code, determines how sustainable the new model becomes. Finally, cost transparency matters: subscriptions, storage, premium support, and integration effort can surprise organisations accustomed to depreciated hardware." She then concludes that: "For leaders navigating that landscape, a curated starting point accelerates outcomes. Aero NextGen's ERP Finder helps CAMO and MRO teams quickly shortlist aviation-grade, cloud-native platforms matched to fleet size, regulatory jurisdictions, and integration needs—reducing selection risk and getting value into operations faster while staying regulator-ready."

Sander de Bree, CEO at EXSYN Aviation Solutions feels that where CAMO is concerned, the move to a cloud-native model could have been swifter, like other industry sectors. "The shift to cloud-native has been underway in CAMO for some time, but the industry is still catching up compared to other sectors. The benefits are clear: scalability, seamless updates, stronger integrations, and the ability to collaborate across organisations without the friction of VPNs or remote desktop setups. For airlines, lessors, and MROs, this translates into faster access to reliable data and reduced IT overheads. The challenge, however,

is cultural. Many organisations remain hesitant to let critical safety and compliance data leave their own servers, even though cloud providers often exceed their own IT security capabilities. Another challenge is connectivity in operational environments, if a solution is purely cloud-native without offline support, it risks creating bottlenecks in line stations or remote bases. The future will be hybrid: cloud-first, but with smart offline functionality where needed," he tells us.

Where major benefits are concerned, Viktor Kondratjev, Head of Continuing Airworthiness Management Unit at FL Technics sees the move away from capital investment in infrastructure as a major boon. "Cloud CAMO systems offer major benefits over on-premises solutions, including scalability, reduced IT overhead, real-time collaboration between CAMO and 145, and better integration with analytics and predictive tools. It's worth mentioning, cloud solutions remove the need for heavy infrastructure investments. However, challenges remain. Data security and sovereignty concerns must be addressed, along with regulator acceptance of cloud-stored records. Legacy system integration, staff training and adoption, and dependence on reliable connectivity can complicate transitions. Costs may also creep upward over time if not managed. Overall, cloud-native CAMO delivers agility and efficiency but requires careful planning around compliance, culture, and integration," he advises. In support, at Ramco Systems, Saravanan Rajarajan, AVP & Head of Consulting – Aviation, Aerospace & Defense also highlights the cost advantages of cloud-based software solutions: "As aviation organisations modernise their digital backbone, cloud-native CAMO systems are emerging as a preferred choice. The key driver is lowering the Total Cost of Ownership (TCO) by eliminating on-premises hardware, thereby reducing IT maintenance costs. Cloud based systems bring in scalability and flexibility in tandem with fleet growth, employee growth and shift patterns,

or seasonal maintenance loads without heavy IT investments. Cloud based software are continuously upgraded ensuring compliance with airworthiness regulations."

How predictive maintenance and reliability analytics are being integrated into CAMO decision-making.

Predictive tools are beginning to find their place in CAMO, but they are not a replacement for reliability engineering. The real value today comes in targeted areas, systems with strong baselines or high operational impact, such as pneumatics or flight controls, where early detection directly reduces AOGs and extends component lifespans. Sander de Bree expands on this: "For CAMO teams, predictive insights work best as a "second opinion," layered on top of established reliability processes. The challenge is trust: if data is inconsistent or opaque, predictive outputs won't be acted on. That's why transparency and clean data matter more than model sophistication. Looking ahead, predictive will evolve into a natural extension of daily engineering workflows, but only for those operators who invest in data continuity and use predictive to complement, not replace, human judgment." On top of this, Viktor Kondratjev sees the outcome moving away from reactive decision-making processes. "Integration typically happens through real-time data streams from aircraft systems into reliability dashboards within the CAMO software. These dashboards flag emerging reliability trends, enabling engineering teams to incorporate predictive insights into maintenance planning and AMP review



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boards. As a result, operators achieve more efficient maintenance scheduling, reduced operational disruption, and improved fleet reliability, shifting from reactive to risk-based maintenance strategies aligned with reliability programmes,” he says.

Predictive maintenance has shifted from an engineering side-project to a core CAMO decision engine. The inflection point is integration: reliability analytics are no longer siloed in data science tools—they’re being embedded directly into AMP optimisation, task card authoring, and maintenance planning windows. Monica Badra further suggests that: “Two changes made this real. First, event-driven integration has closed the loop between prediction and execution. When a model flags rising vibration on a specific bearing class or abnormal EGT margin drift, the CAMO system can automatically propose a task adjustment, generate a reliability review, or create a gated work package for the next maintenance opportunity—complete with material reservations and skills coverage. Second, regulators have become more comfortable with evidence-based programs. CAMO teams are packaging model lineage, data quality metrics, and decision logs alongside traditional reliability reports, making it clear why a task was advanced or a shop visit plan was altered. Traceability—not algorithmic novelty—is what earns approval,” concluding that: “For organisations upgrading their CAMO stack, vendor selection determines how smoothly this works. Look for platforms with native feature stores, streaming ingestion, and closed-loop workflow—where a model

event can trigger planning, materials, and task changes with full auditability.”

With aircraft leasing still dominant, how are digital records and standards (e.g., ATA Spec 2500) helping with transitions and audits?

Leased fleets make digital record-keeping essential. Standards like ATA Spec 2500 are critical in providing structure to data exchange, particularly during transitions where aircraft move between operators and lessors. However, in practice, adherence to standards is still inconsistent. Operators often face situations where the data format is compliant, but the content is incomplete or not quality checked. Sander de Bree has identified that “The real trend is towards structured, lifecycle-long digital records where every maintenance event, compliance item, and modification is captured and exchangeable in a standardised way. This reduces the manual workload of transitions, accelerates audits, and minimises disputes about airworthiness status. The next step will be greater adoption of blockchain-like validation layers to ensure data integrity across stakeholders.” Saravanan Rajarajan, meanwhile, takes the view that: “Paper-based records often delay transitions and complicate airworthiness validation. Modern CAMO systems now maintain digital aircraft records: digitised logbooks, task cards, AD/SB compliance, and component traceability, accessible through secure cloud repositories. Standards like ATA Spec 2500 provides a structured digital format for exchanging aircraft maintenance records between operators, MROs, and lessors. This ensures data are interoperable, verifiable and auditable and reduces the lease return duration from months to weeks.”

To conclude this section, Viktor Kondratjev highlights a perhaps overlooked benefit of the change where digital records and standards are concerned, and that is a common language. He advises that: “Digital

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records standards like ATA Spec 2500 are transforming how CAMOs and lessors handle aircraft transitions. By standardising the structure and format of maintenance and airworthiness records, these frameworks enable faster and cleaner data exchange between operators, CAMOs, and lessors, which directly impacts record-review time during redelivery, consequently lowering costs and making the process smoother. It helps to create a common digital language across CAMO, MRO, and lessor systems, making transitions smooth and compliance verification far more achievable.”

How is your CAMO software adapting to new regulatory requirements such as EASA Part-IS (cybersecurity) or evolving airworthiness rules?

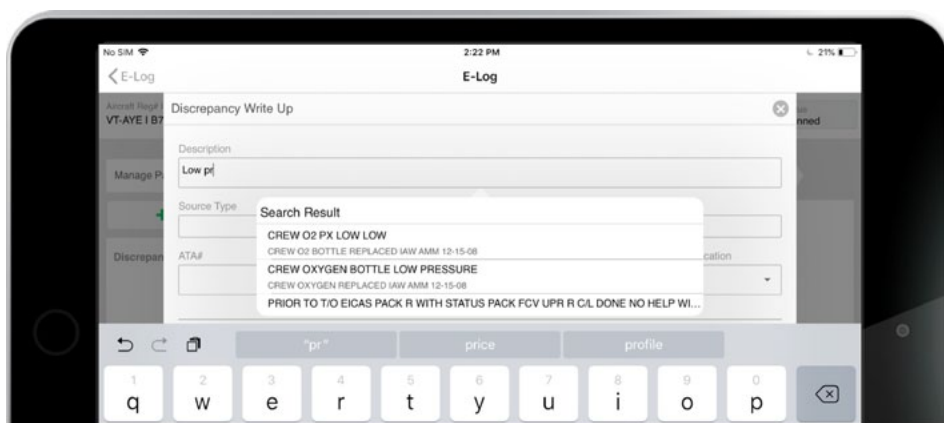
CAMO software is evolving to address new regulatory requirements like EASA Part-IS on cybersecurity and updated airworthiness rules. Vendors are introducing stronger security frameworks (encryption, access controls) to comply with cybersecurity mandates, while also aligning with authorities’ expectations for digital data protection. Viktor Kondratjev at FL Technics further explains additional means of adaptation, especially “On the airworthiness side, [where] modern platforms are built with configurable compliance modules that can be updated as rules change—supporting revisions to Part-CAMO, or other authority-specific requirements. In short, today’s CAMO solutions are shifting toward secure-by-design, compliance-ready architectures that can flex with regulatory change without forcing operators into disruptive system overhauls.” Sander de Bree points out that the software EX SYN Aviation Solutions offers is not a standalone CAMO system but a suite of modular aviation native apps that integrate with operators’ existing CAMO and M&E environments. He adds: “This modular setup makes adapting to regulatory change more practical. With EASA Part-IS, for

example, security standards are embedded in our apps by design: encryption, role-based access, audit trails, and secure data exchange are default features. Because modules can be added or updated individually, operators can align with new cybersecurity and evolving airworthiness requirements without replacing entire systems. In this way, CAMO teams stay compliant while maintaining efficiency in daily engineering workflows."

At Ramco Systems, Saravanan Rajarajan provides us with an additional perspective on the situation, explaining that: "Cloud native CAMO software needs to have built-in cybersecurity frameworks for adoption of secure cloud architectures, role-based access controls, data at rest and data in transit encryption, and compliance with ISO 27001/SOC 2. CAMO software needs to maintain digital evidence and traceability through audit-ready logs, immutable maintenance history, and e-signatures aligned with regulatory compliance. CAMO software also needs to maintain continuous alignment to Interoperability & Standards Support like ATA Spec 2500, SPEC2000."

How mobile solutions and offline-first apps are changing line maintenance workflows.

Mobile and offline-first have fundamentally reshaped line maintenance from a paperwork relay into a point-of-work operation. The change is less about devices and more about decision latency. When engineers can capture discrepancies, consult task cards, request parts, and e-sign in the moment—regardless of connectivity—the gap between finding and fixing shrinks, and with it, the risk of incomplete evidence or deferred defects that snowball into schedule disruption. At Aero NextGen, Monica Badra helps us to better understand the situation, advising that: "Three shifts stand out on the ramp. First, context travels with the technician. Modern apps package tail-specific configuration, latest AMP revisions, MEL/CDL logic, and effectivity into a single view. Barcode/QR and NFC tie components to back-to-birth records, so part applicability and life limits are validated at the point of install, not hours later in an office. Second, workflows are becoming conflict aware. Offline-first designs don't just cache forms; they track versions, user roles, and timestamps so concurrent edits reconcile safely when connectivity returns. That preserves audit integrity and avoids



Decision Assist for Mechanics by Leveraging Machine Learning

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the "duelling clipboards" problem that plagued early mobility projects. Third, the camera is now a quality tool. Structured photo and video capture—time-stamped, geotagged, and bound to a task—improve defect description accuracy, support remote engineering approvals, and strengthen the evidence pack for regulators and lessors," adding that "As line maintenance becomes a software surface, platform choice determines how seamlessly the ramp connects to CAMO. Look for apps that are truly offline-first (not just read-only caching), support tamper-evident eSign/eRecord, enforce effectivity and life-limit checks at the point of install, and integrate natively with eTechLogs, M&E/MRO, and materials."

One key advantage noted by Sander de Bree is the reduction in duplicated record keeping, as he tells us that "Mobile and offline-first solutions are bridging the last gap between the hangar, the line, and the back office. Engineers can now record findings, close tasks, and access manuals on the spot, even without reliable connectivity. Once back online, data synchronises automatically with central systems. The key advantage is reducing double work. Traditionally, engineers had to note discrepancies on paper or temporary devices, then re-enter them later into the M&E system. Offline-first apps cut this step, ensuring both data quality and time savings. For CAMO teams, this means receiving more accurate, real-time insights into the fleet's condition." Viktor Kondratjev identifies another key advantage, and that is the ability to access information 'in situ'. As he points out, "Mobile solutions are reshaping line maintenance by bringing critical CAMO and MRO functions directly to technicians at the aircraft. Instead of relying on printed task cards or returning to terminals, engineers can access work packages,

manuals, and compliance checklists on tablets or smartphones, which leads to faster turnaround times, with real-time sign-offs and task updates flowing back into the CAMO system, fewer errors, as digital task cards and barcode/RFID scanning; it also cuts down on incorrect entries and improves compliance through standardised workflows and photo attachments."

The mobile app that Saravanan Rajarajan tells us about is perhaps the ideal example of what Viktor Kondratjev is referring to in terms of information 'documentation', while Rajarajan then goes on to explain further advantages. "Ramco's Mechanic Anywhere mobile app helps mechanics book time, report findings and record measurements, request parts and tools, and access technical documents from the place of work. With the required regulatory approvals, Mechanic Anywhere can enable task and work compliance with digital e-signoff. The MRO maintenance process typically generates a wealth of data pertaining to defects, parts consumed, labour hours, elapsed time, etc. Accumulated over time, this data can be converted into a competitive advantage by leveraging AI and machine learning tools. Machine learning capabilities leverage data and advanced algorithms to derive insights. For example, when a mechanic reports a defect, the system leverages the historical records pertaining to the type of aircraft and ATA code to suggest a list of similar defects that were resolved in the past. Based on the mechanic's decision, the system prompts the resolution options, reference manuals, and parts and tools required to fix the defect. Here, the final determination of accepting the recommendations still lies with the mechanics. Our Aviation Software has brought about a 30% reduction in turnaround time, especially for line maintenance functions."

Do you see AI copilots or digital twins becoming practical tools for CAMO teams, or are they still experimental?

To conclude this article, we wanted to know a little more about the role of AI copilots and digital twins as we have been told that AI copilots and digital twins are moving from showcase demos to practical tools—but only where they're anchored to operational context and governed like any other safety-impacting system. The pattern we see working in CAMO is "narrow, explainable, and embedded." AI copilots are most useful as workflow accelerators rather than decision-makers. In practice, that means drafting AMP change justifications from recent reliability data, proposing MEL/CDL scenarios with conditions of dispatch, pre-filling task cards based on tail-specific effectivity, or converting eTechLog narratives and photos into structured defects with suggested rectification steps. The copilot's value is speed to first draft and retrieval across silos—surfacing the relevant AD/SB history, prior occurrences, and vendor repair data—while keeping the engineer in the loop. Digital twins are gaining traction where the data is richest and the impact is clearest: engine health, APU, ECS, and high failure rotatables. Twins don't need to mirror the entire aircraft to deliver value; component- or system-level twins that combine physics-based models with live telemetry and maintenance history can forecast degradation windows and recommend optimal shop-visit timing. As Monica Badra further informs, "For CAMO, that translates into scheduling leverage—

aligning opportunities with utilisation, parts availability, and slot constraints—rather than chasing reactive removals. The emerging frontier is "twin-to-workorder": model signals that automatically generate gated planning tasks with materials, skills, and approvals pre-baked, all traceable for audit. Data quality and integration debt remain the bottlenecks; twins starve without consistent sensor feeds and clean maintenance histories, and copilots hallucinate when they can't retrieve authoritative sources. The most successful programmes start with high-signal use cases—IDG health, bleed air valves, fuel pumps—and expand as confidence and connectivity grow. Direction of travel is clear: AI will sit beside engineers, not above them. Copilots will become the default interface for search, summarisation, and first-draft planning; twins will become the planning substrate for select systems where the economics justify the modelling effort." To conclude, she advises that: "For organisations assessing vendors, look for CAMO platforms with retrieval-augmented copilots (with citations), native support for model governance, and twin integrations that feed closed-loop planning—not standalone dashboards."

Sander de Bree seems to believe that currently, AI copilots could be more useful than digital twins. He feels that "Digital twins and AI copilots hold promise, but today they are still experimental for most CAMO environments. A digital twin of an aircraft can in theory provide real-time airworthiness insight, but the complexity of consolidating maintenance records, operational data, and sensor streams into a reliable twin is significant. AI copilots are more likely to make an earlier impact. Instead of replacing engineers, they will act as advisors—flagging potential compliance gaps, suggesting reliability analyses, or automating repetitive checks. The barrier is again data trust: if the AI flags an issue, engineers need confidence it is based on clean, validated data. CAMO is ultimately

about airworthiness responsibility, so AI will only succeed if it augments human judgment rather than trying to replace it." Saravanan Rajarajan and Viktor Kondratjev are perhaps of a like mind with de Bree in that AI copilots are yet to reach their full potential and are more at the assistive stage. "AI copilots are no longer just conceptual, they are incrementally augmenting CAMO operations, bringing speed, intelligence, and foresight to airworthiness management. However, they are currently assistive in nature and not autonomous. Embedded in CAMO software, copilots assist users by interpreting maintenance data, suggesting corrective actions, summarising audit findings, or generating compliance reports. AI/ML integration in fleet maintenance planning transforms traditional scheduling methods by optimising maintenance activities especially repetitive in nature like night halts and A Checks. AI-powered systems generate periodic maintenance plans by considering multiple factors such as due dates, work centre capability, capacity, fleet routing, conflicting tasks, and staffing. This approach enables planners to manage maintenance packages from long-term planning (30 days ahead) to short-term adjustments (within three days), ensuring tasks are neither prematurely scheduled nor left overdue. By learning from historical data and operational constraints, AI systems continuously improve their scheduling capabilities," says Rajarajan. "These tools are starting to support engineers by automating routine tasks like compliance checks, document searches, and reliability data analysis. They act as decision-support assistants rather than replacing human judgment, helping CAMOs manage complexity and speed up workflows. For many CAMOs, they remain emerging tools that show clear promise but require robust data governance, regulatory validation, and cultural adoption before becoming mainstream," Kondratjev concludes.



Saravanan Rajarajan, AVP & Head of Consulting – Aviation, Aerospace & Defense, Ramco Systems

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