Predictive maintenance
How the technology can help address future challenges in MRO

Smartwings controls parts better
An App to manage supply chain and stock

A better view of what is happening
Digital twins help keep track of asset condition and progress in processes

A smarter supply chain
Changes in MRO make working together more important
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How much time is lost in MRO processes while engineers and technicians are waiting for a part or parts? Of course, labor can be re-deployed to another job but every hour that an aircraft is on the ground, waiting for a part, both the MRO and the operator are losing money and, in the operator’s case, possibly reputation if it affects schedules. The traditional solution is to hold huge stocks of parts in an inventory that could run to over $1 million for each aircraft in service with vast warehouses on premium rate land near an airport in order to house it near to where it might be needed. So, a vicious circle in which the way to avoid one cost is to incur another. Fortunately, a convergence of technology developments is introducing some quite different, more efficient and reliable, and less costly alternative solutions.

Digital capability and big data are introducing the ability to be pre-emptive in maintenance but still get the optimum use from any part because we know that a service or replacement action can be scheduled at a time convenient to the operator and not simply based on operational hours. Also, for parts and materials, new technologies are making the timing of deliveries much more need driven than simply stock level driven, so that inventories can be reduced while reliability of availability can be improved. And, in order to better track the progress of any job, digital twins and location-based process monitoring are the third technology helping to revolutionize MRO.

Our white paper from EXSYN on predictive maintenance explores the technology behind this new approach, the contribution of new generation aircraft to generating the huge quantities of data needed and the possibilities that it will bring about to enable airlines and operators to make much more efficient use of every asset while improving the quality of their service. A case study from Smartwings tells how an airline with a number of MRO arrangements and locations has managed to establish full control over its supply chain and spare parts. Then, from IBM we see how digital technology can not only improve the supply chain but also bring OEM’s, airlines and operators, and MRO’s together for mutual benefit. And, from IFS, we learn a lot more about digital twins and how they can contribute to the better management of assets from airframes and engines to the smallest components.

As always, we also have our regular round-up of news and technology developments with regular features such as ‘MRO Software Directory’. Altogether Aircraft IT MRO is the convenient way to keep up with a fast paced technology environment.

Ed Haskey
The World’s Leading Aviation IT Conference for MRO/M&E and Flight Operations Solutions returns to Miami in 2019 bigger and better!

For further information contact Stephen Keeble – stephen@aircraft-commerce.com +44 1403 230 888 • http://www.aircraft-commerce.com/conferences/Miami2019/default.asp

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54 MRO Software directory
A detailed look at the world’s leading MRO IT systems.
New vendors join the Aircraft IT MRO Vendor Panel

It’s always a pleasure to welcome new vendors to the Aircraft IT MRO Vendor Panel. It is the inputs from our Vendor partners, that ensure that Aircraft IT remains always up to date and relevant for the MRO professionals we serve.

APSYS
For more than 30 years APSYS has been engaged in risk management. As an Airbus subsidiary the business serves customers worldwide in working with them to determine leading risk management standards. Deeply rooted in aerospace engineering, APSYS’s experts are involved throughout the entire lifecycle of an aircraft from design to in-service operations, guaranteeing reliable and safe aircraft operations (Product Assurance and Safety).

ROTA Technology
With MRO systems projects and support spanning both the military and commercial markets ROTA brings proven experience to all sides of aviation. The team has been embedded for years in the business functions they support in both military and commercial markets. Specializing in system implementations and upgrades ROTA brings deep knowledge of aviation business processes, integrated into custom built software, to provide not only all testing documentation but also leave customers with a full manual of SOPs moving forward.

Welcoming the new vendors to the Panel, Aircraft IT COO, Scott Leslie commented, “The ever-growing resource of expertise on our Vendor Panel will ensure that users of the Aircraft IT websites and eJournals will always benefit from the most up-to-date information with which to inform their market searches and decisions.”

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In mid-February 2019, Flatirons Solutions’ was proud to announce that the CORENA Fleet solution is now being used in production for Airbus A220 (also known as Bombardier C Series) aircraft operating in revenue-producing flight operations.

Airline customers use CORENA Fleet for the revision and viewing of maintenance information for diverse aircraft, engines, and components — including the Pratt & Whitney PW1500G engine used for the A220. The solution is used by tens of thousands of aircraft maintenance technicians, work planners, and authors to provide the technical information needed to keep thousands of Boeing, Airbus, Embraer, and Bombardier passenger aircraft flying.

Unlike competing technical information management solutions, CORENA Fleet is an Original Equipment Manufacturer (OEM)-independent software solution used by airlines to take control of their technical information. CORENA Fleet allows airlines to make Customer Originated Changes (COCs) to OEM maintenance content to reflect their proprietary best practices. The solution also reconciles airline changes against follow-on content revisions provided by the OEM that occur over the long service life of the aircraft.

“We are proud to support our customers in their adoption of the A220,” noted CORENA Fleet solution principal and former Chief Pilot John Badger. “By supporting the latest aircraft alongside mature fleets, we help customers to optimize their maintenance operations in ways that drive improved efficiency and lower costs.”
Willis Lease Finance Corporation (WLFC) and FLYdocs announced in late February 2019 that they have joined forces to develop a pilot program demonstrating the use of blockchain technology on an open source data sharing platform for aircraft, engine and component records.

The cutting-edge development attempts to be the first real use of a blockchain and artificial intelligence (AI) solution for managing commercial aircraft, engines and component transitions.

The sharing economy created by this new cloud-based platform would present an opportunity to decentralize data exchange, eliminate silos and create a transparent environment for collaboration, with added value distribution for airlines, industry partners, vendors, manufacturers and regulators. Users of the platform can expect reduced friction in the transfer of assets, purchases, leases and sales of aircraft. An added benefit of this collaborative ecosystem will be the provision of anonymity in the data, allowing for complete trust between users, so they drive their own big data analysis initiatives rather than relying on the OEM or third-parties.

Charles F Willis, Chairman & CEO of WLFC, noted: “The fundamental goal of this pilot project is to provide increased data integrity, record immutability and security to the aviation industry. Blockchain and its associated technologies will cultivate a marketplace for the sharing of technical and performance information in a cost-efficient and transparent way. Although Willis Lease and FLYdocs are acting as the architects for the development of this communal platform, users will be able to access the wealth of data and resources autonomously.”

The new platform will have significant potential to change the way data is shared and driven within the aviation sector. WLFC and FLYdocs will, therefore, be extending an invitation to technology partners to join the pilot project. The pilot is already utilising the expertise of Microsoft Gold Cloud Partner and One-Tier Cloud Service Provider, United Data Technologies and might open up to more partners as the development moves forward. Participation in the project may include benefits such as complimentary use of services, influencing the product roadmap and being a part of an innovative initiative that could change the face of aviation.

Read the full story on Aircraft IT Website
PTC and IFS Partner to deliver powerful field service management and aerospace & defense solutions that optimize people and parts

In late February 2019, IFS, the global enterprise applications company, and PTC announced they have entered into a definitive agreement for a strategic collaboration expected to increase value for customers who differentiate their brand on service excellence and asset readiness across verticals like A&D, heavy industrials and high tech. The collaboration represents the coming together of two influential leaders, PTC with Servigistics, the industry-leading service parts optimization solution, and IFS with best-in-class solutions for field service management, aerospace & defense asset management and aviation maintenance.

IFS and PTC will integrate PTC’s Servigistics® Service Parts Management solution with IFS Field Service Management™, IFS Applications™, and IFS Maintenix™ solutions. The integrated offering will allow companies to increase equipment uptime and service part availability as well as improve service delivery and execution efficiency. “We are excited to partner with IFS to integrate our solutions and pursue new frontiers of innovation in connected service delivery,” said Leslie Paulson, General Manager, Servigistics Business Unit. “Having the right part in the right place at the right time has never been more important. We’re pleased to be working with IFS to enable companies to differentiate their service and maintenance operations.”

In today’s fast-paced experience economy there is no margin for error when mission-critical equipment is down. Organizations focused on delighting their customers must be capable of avoiding downtime when possible through smart, connected products and IoT platforms like the ThingWorx® industrial IoT platform, and, when necessary, restoring equipment uptime quickly and efficiently. Dispatching the right technician, or the right parts, and getting them to the right location is imperative and ensuring the availability of critical service parts is paramount to first-time fixes and delighted customers.

Adan Deroche, Assistant Director Customer Care Operations, Sysmex America Inc. said, “We have experienced value from Servigistics and IFS independently and are excited to explore how these benefits can synergize.”

Read the full story on Aircraft IT Website
Malaysia Airlines takes off with AMOS

Implementation project staffed with ‘future leaders’

At the beginning of March 2019, Swiss-AS was extremely proud to officially communicate the successful go-live of AMOS at Malaysia Airlines. The national carrier of Malaysia signed for AMOS at the end of September 2017 and went live with AMOS just 14 months later while now managing more than 100 end-to-end processes with AMOS.

Malaysia Airlines undertook a strategic project to transform and optimize the entire organization. The AMOS implementation was considered as one of the major milestones in this process. The industry-best practice-processes that became possible via AMOS were fully adopted to render the maintenance division future-proof. With the implementation of AMOS, team spirit was fostered beyond departmental boundaries.

In addition, the implementation project was combined with an internal people development program. All of the ‘business experts’ (AMOS key users) were involved in this program, with the goal to develop their leadership skills and to position them as future leaders in championing AMOS competency and continuous improvement all over the organization. This was part of the overarching goal of ensuring internal capability development and retention in Malaysia Airlines.

AMOS is used by around 2,000 employees in the technical and financial division where the knowledge building process presented a challenge. This was superbly managed via use of different training methods available to the carrier. Large user groups, such as maintenance and stores’ staff, were trained by internal trainers who successfully completed the Swiss-AS Train-the-Trainer certification. More specialized trainings were directly performed by Swiss-AS to promote an in-depth knowledge transfer to the business experts.

Digital transformation on-going

The organizational transformation within engineering and maintenance does not end with the AMOS go-live. The airline is already looking to implement paperless solutions, such as Swiss-AS' e-signature solution, to further digitalize the maintenance and engineering operations and provide a platform to connect data across the organization.

The carrier also plans to enhance the provision of maintenance services to third parties. In selecting AMOS, Malaysia Airlines has taken a forward-thinking decision since AMOS allows for an MRO to successfully handle maintenance activities for their customers.

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own as well as third-party aircraft. The current focus of Malaysia Airlines lies on complying with the implemented AMOS processes to benefit from the expected gain in operational efficiencies and developing the capabilities to perform maintenance activities for third-party operators while using the features of AMOS.

“As a full-fledged airline, Malaysia Airlines can take full advantage of the broad functionalities of AMOS. With the implementation of AMOS the digital transformation process of the carrier’s engineering/maintenance activities has been launched,” stated Ronald Schaeuffle, CEO of Swiss-AS.

Malaysia Airlines presents itself
Malaysia Airlines is the national carrier of Malaysia, offering the best way to fly to, from and around Malaysia. The airline carries up to 40,000 guests daily on memorable journeys inspired by Malaysia’s diverse richness. Malaysia Airlines embodies the incredible diversity of Malaysia, capturing its rich traditions, cultures and cuisines via its inimitable Malaysian Hospitality across all customer touch points.

Since September 2015, the airline has been owned and operated by Malaysia Airlines Berhad. It is part of the Malaysia Aviation Group (MAG), a global aviation organization that comprises different aviation business portfolios aimed at serving Malaysian air travel needs. Via an alliance with oneworld®, Malaysia Airlines offers superior connectivity with seamless journeys to 1,000 destinations across 150 plus countries, and access to over 650 airport lounges worldwide.

Swiss AviationSoftware and AMOS
AMOS is a comprehensive, fully-integrated MRO software solution being developed and distributed by Swiss AviationSoftware. Swiss-AS, a 100% subsidiary of Swiss International Air Lines, has more than 170 customers worldwide and belongs to the industry-leading MRO software providers. The loyal customer base includes pure operators of all sizes, major low-cost, regional and flag carriers, large airline groups and MRO providers. In the Americas and in Asia, AMOS is distributed through a partnership with Lufthansa Systems.

“With AMOS, Malaysia Airlines is looking ahead to bring airworthiness, operational and financial control to an enhanced level. The aim is to bring long-term benefit from process and organizational efficiencies. I would like to thank the team for working tirelessly to ensure the project completed quickly and seamlessly. We are confident that with AMOS’ reputed and robust system, the baseline for Malaysia Airlines’ digital roadmap for engineering and maintenance activities has been established,” said Izham Ismail, Group Chief Executive Officer of Malaysia Airlines.

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Manta Air goes live with ENVISION

Manta Air, the Maldivian domestic airline, announced at the beginning of March 2019 that it has gone live with Rusada’s maintenance management software, ENVISION, after a successful deployment.

Manta Air is the newest airline to serve the Maldivian domestic market, having successfully commenced operations last month. The carrier operates a fleet of ATR72-600’s with several DHC-6 Twin Otter’s set to join in the coming months. From its base in Malé it serves the destinations of Kudahuvadhoo, Ifuru, Dharavandhoo, and Thimarafushil.

Rusada’s expert implementation team successfully deployed 8 of ENVISION’s modules in just four months, providing Manta Air with the key information and insights needed during the launch phase of an airline.

Ismail Rasheed (Immak), Director, Engineering & Maintenance at Manta Air said: “Manta Air is looking set a new standard of air travel within the Maldivian aviation industry, providing an unrivalled passenger experience alongside a dependable and punctual service. To do this we require a robust and integrated technology platform to manage our information. We chose ENVISION due to the system’s intuitive and user-friendly interface combined with the confidence and experience of the Rusada team.”

Julian Stourton, CEO at Rusada said: “Manta Air are embarking on an incredibly exciting journey, and I’m thrilled that Rusada will be there to support them along the way. Our knowledge and experience of airline operations proved instrumental in securing this contract, and we were immediately able to demonstrate this during a smooth and speedy implementation. I look forward to further developing our mutually-beneficial partnership over the years to come.”

Kuwait Airways takes off with AMOS, the world-class M&E software solution.

Kuwait Airways will further improve their engineering and inventory service levels and prepare for the next phase of their fleet renewal by implementing the state-of-the-art MRO system AMOS, which provides functional richness and advanced technology, paired with Swiss-AS experience and a proven track record of successful implementations.
Air Tanzania selects ADSoftware MRO IT solution

In early March 2019, the Tanzanian flag carrier, Air Tanzania, announced that it has started implementation of ADSoftware’s solution to manage its fleet of Bombardier Q400, Boeing 787 Dreamliner and the new A220 (formerly known as CS300). The move is part of an overhaul of the operator’s maintenance processes and will facilitate its efforts to optimize operations. The fleet is one of the newest on the African continent, Air Tanzania being the first African operator and the fifth airline globally to receive the A220.

With these changes the operator needed a solid partner for its maintenance information System. A thorough selection process led to the selection of ADSoftware solution, Airpack. The main advantages were the comprehensive set of functionalities offered, the user friendliness of the software and the tailored implementation service with an aircraft data expert dispatched on-site soon after contract signature.

Frederic Ulrich, CEO of ADSoftware, shared his reaction to the decision: “We are proud to stand by Air Tanzania in their long-term strategy. The personal involvement and determination of both teams has been remarkable. I am confident that this will become one of ADSoftware’s best user stories in the near future.”

Air Tanzania is operating more regional routes and soon long-haul flights will start with the state-of-the-art 787 Dreamliner. In this context, ADSoftware will insure that all the tasks related to the maintenance program are properly centralized and performed while giving a user-friendly platform for all the departments to work together.

Mr Ladislaus Matindi, CEO of Air Tanzania commented “More than two years ago we started a modernization plan that led to complete fleet renewal and the acquisition of new and modern aircraft such as the Q400, the A220 and the 787. As we made these incredible changes, we also needed to modernize our Maintenance Information System and pick the best provider. ADSoftware presented the best solution in terms of prices, features and adaptability. Their experts were readily available to start the project and come to our facilities. Our team is looking forward to start working with their solution.”
QAZAQ AIR signs up for Rusada’s ENVISION

QAZAQ AIR, the young regional Kazakh airline, announced in mid-March 2019 that it has signed up for Rusada’s maintenance management software, ENVISION. QAZAQ AIR has carried over 800,000 passengers since its launch in 2015. Utilizing a fleet of modern Bombardier Q400’s, the carrier serves multiple destinations across Kazakhstan including Astana, Atyrau, Uralsk, Aktau, and Zhezkazgan.

Rusada will now work closely alongside QAZAQ AIR to deliver a seamless and timely transition to ENVISION, allowing the carrier to focus all their efforts on day-to-day operations. This is the company’s first customer in Kazakhstan and expands their presence in the CIS region.

John Wainwright, Technical Director at QAZAQ AIR said: “We are delighted to be working with the Rusada team and eager to go live with ENVISION. Being a web-based solution means the software is truly device-agnostic, and this is crucial for us as we look to transition to a state of digital MRO. We are at a critical point in our history as we look to add two additional Q400’s to our fleet in the coming months, so I’m glad we will have a sophisticated technology platform in place to support our continued growth”.

Rusada CEO, Julian Stourton said: “We are extremely proud to have been chosen by QAZAQ AIR as their maintenance technology partner. Like ourselves, the carrier is experiencing a sustained period of growth, and that doesn’t happen by accident.

“Our ambitions and ways of working are in complete alignment, which gives me great confidence of a successful and longstanding partnership”.

AIRCRAFT IT MRO • MAY-JUNE 2019 • 14
Startup carrier Canada Jetlines launches with eMRO

In keeping with its mission to provide Canadians with ‘the best value in air travel with a focus on safety and reliability’, startup ultra-low cost carrier Canada Jetlines announced in mid-March 2019 that it has selected the web-based TRAX eMRO software as its ERP maintenance solution. “TRAX’s products provide the means to manage and maintain all information generated and allows for complete information flow with leading-edge tools for customization that will enable Jetlines to maintain an efficient process and tight cost control as a result,” said Phillip Larsen, Vice President of Maintenance.

Jetlines is set to fly across Canada and offer non-stop service from Canada to the United States, Mexico and the Caribbean. The carrier plans to fly some 27 routes, including to unserved or underserved markets by other airlines, such as Hamilton, Ontario to Halifax, Nova Scotia. Delivery of two Airbus A320s are expected by early 2nd quarter of 2019, with long term plans to expand to 24 aircraft. The sister aircraft have a high-density seating configuration of a single class seating capacity of 180 seats. An Airbus A320 fleet was selected based on its fuel-efficient narrow-body framework, making it an ideal choice for Jetlines to start operations with.

The TRAX eMRO software is a web-based, device-agnostic ERP product that will keep its users connected from where ever they work. It is a complete system with complete information flow. The numerous system modules cover technical, maintenance, materials, financial, and quality management to help reduce downtime, provide access to real-time data, and ensure full regulatory compliance.
Hawaiian selects TRAX eMobility apps

Founded 89 years ago as Inter-Island Airways, Hawaiian Airlines (HA) has been an integral part of life in Hawaii for generations. It started in 1929 with their 8-seater Sikorsky aircraft and a Bellanca monoplane that offered sightseeing service for $5 per person. Hawaiian now has a fleet of 65 Airbus and Boeing aircraft, with 10 each of Airbus A321neo and Boeing 787-9 aircraft on order. It is the 10th largest commercial airline in the U.S. with 28 destinations. The airline names its individual aircraft after birds found in Polynesia, as well as Polynesian constellations historically used to navigate to the Hawaiian Islands.

HA has had its eye on going paperless for a while now and announced in mid-January 2019, plans to deploy the full suite of TRAX eMobility solutions using a phased approach. The suite includes the LineControl, AeroDox, QuickTurn, TaskControl, EZstock, VisualCheck, CabinLog and PilotLog iOS apps easily accessible using iPads. These apps are supplemented by the web-based interactive dashboard apps used by Crew Chiefs, Controllers and others to view production and manpower data, tasks, deadlines and non-routine issues, as well as make job assignments.

Susi Goering, Senior Manager of Technical Operations Processes & Technology, explained that HA issues out an iPad Mini to their mechanics, which then have the option to store it at work in charging lockers, or take it home after their shift. In addition to eMobility, the iPads have many other apps to facilitate communication between mechanics and enable team members to do their job in a streamlined manner. "HA is looking forward to benefitting from the reduced and eliminated travel times of our mechanics, specifically in the maintenance environment. Team members will be able to view manuals, sign off work, order parts, or contact their leads without leaving the aircraft they are on," Goering noted.
Airbus Helicopters’ Partnership with Rusada Enables Digital Pipeline

Airbus Helicopters’ maintenance information system Fleet Master, which is powered by Rusada’s ENVISON, was demonstrated by the OEM at this year’s HAI Heli-Expo.

As well as announcing several new customers, Airbus performed daily live demonstrations of their HCare connected services range, of which Fleet Master is a key component. Superior Helicopters became the first HCare Infinite customer in North America and the National Police Air Service (NPAS) of the United Kingdom signed a global support contract for their fleet of 19 helicopters. The NPAS helicopters are managed by Airbus Helicopters UK, which also utilizes ENVISION.

For approved service centers and small to medium-sized fleet operators without a dedicated maintenance information system (MIS), Airbus Helicopters and Rusada offer Fleet Master, a turnkey homegrown solution powered by ENVISION, that seamlessly exchanges maintenance data with Airbus systems. The competitively priced system is available to operators of Airbus helicopters and maintenance organizations with Airbus approval.

Recognizing that companies may have multiple approvals and operate multiple different helicopter and aircraft types, the system is fully capable of managing diverse fleets.

Capable of linking with aircraft data systems, Fleet Keeper, the Airbus e-techlog, Orion documentation, spares ordering and able to provide data analytics extracts, FleetMaster is a key component in the new digital pipeline offered by Airbus Helicopters to the rotary wing community.

Today, more than 600 helicopters are sharing data with Airbus Helicopters. They represent just about every helicopter type in Airbus’ range — H125s, H130s, H145s, H155s, H175s, H215s, and H225s, among others — performing a wide variety of missions including emergency medical services (EMS), public services, tourism, training, private and business aviation, oil & gas, and search and rescue.

Julian Stourton, CEO at Rusada said: “Airbus Helicopters gave a terrific demonstration of their HCare suite at Heli-Expo, with some outstanding services on display and numerous contracts signed. I’m proud that Rusada is able to play critical part in their success and look forward to further strengthening our partnership.”
IDMR’s Technical Documentation Management System, InForm, has been designed to play a central role in the long-term survival and proliferation of technical documentation. InForm, written from the ground up as an airline document management system, will allow you to author and maintain virtually any document. Technical Documentation Management is now on aviation executives agenda’s worldwide.

Technical documents are the primary source of aircraft, engine, and component reference InFormation which are constantly changing. On-going revision’s and updates by manufacturers, vendors and airline personnel add more complexity in controlling these documents. Failing to follow manufactures, vendors, and regulatory agencies approved maintenance repair and overhaul procedures can result in poor quality control or worse non-compliance fines.

Without a centralized approach to Technical Documentation Management, these important documents are usually stored in multiple places, version control is lacking and in many cases different automated tools are used to create and maintain record keeping, perpetuating a process that is extremely time consuming and in most cases inaccurate.

InForm offers a Technical Document Management Solution that provides a single repository for storing electronic documents received from outside sources such as manufactures, vendors, and internal personal. IDMR offers airlines, manufacturers and third-party maintenance providers the industry’s most technically advanced, web centric, fully customizable, easy-to-use, all encompassing, mission critical and affordable suite of Technical Documentation Management solutions.

At the beginning of April 2019, leading Aviation IT solutions provider Ramco Systems announced the successful implementation of Ramco Aviation Suite V5.8 at Saudi Rotorcraft Support Company (SRSC), Riyadh, Saudi Arabia to accelerate organization-wide digital transformation. The go-live witnessed the successful implementation of Ramco’s complete Aviation Suite with modules for MRO Sales, Maintenance, Supply Chain Management and Finance, bundled with complete HCM including Payroll.

SRSC, a joint venture by Alsalam Aerospace Industries, Boeing and Saudia Aerospace Engineering Industries (SAEI), offers MRO services to Saudi Arabia’s fleet of over 360 military and commercial helicopters, helping reduce turnaround times and costs, thereby increasing aircraft availability in the Kingdom. Before the partnership with Ramco, payroll processes, finance processes and procurement processes were carried out manually. Ramco helped build SRSC’s technological foundation ground up, deploying its Aviation Suite V5.8 to boost operational efficiencies and streamline their processes.

Neil R. Bevan, CEO, Saudi Rotorcraft Support Company (SRSC), said “We remain aligned with the Kingdom’s National transformation program to develop our defense industry and attract talent. Going digital is the crux of the transformation, and Ramco’s software has helped us in every step of the way,” adding, “With the regional MRO market predicted to grow to US$240 billion by 2037, SRSC is well positioned to take advantage of the growth by leveraging upon its technological edge”.

Virender Aggarwal, CEO, Ramco Systems, said, “To provide safety and quality service to one of the largest combined helicopter fleets in the Middle East is no mean feat, and Ramco is honored to be supporting SRSC in that mission. Our modular approach enables us to add new enhancements to SRSC’s system seamlessly, and ensure they adapt swiftly and thrive in the age of digital disruption.”

Ramco Aviation Software is trusted by 22,000+ users to manage 4,000+ aircraft globally. With 75+ Aviation leaders onboard, Ramco is the solution of choice for several large airlines plus top heli-operators and multiple MROs around the world.

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At the beginning of April 2019, leading Aviation IT solutions provider Ramco Systems announced the successful implementation of Ramco Aviation Suite V5.8 at Saudi Rotorcraft Support Company (SRSC), Riyadh, Saudi Arabia to accelerate organization-wide digital transformation. The go-live witnessed the successful implementation of Ramco’s complete Aviation Suite with modules for MRO Sales, Maintenance, Supply Chain Management and Finance, bundled with complete HCM including Payroll.

SRSC, a joint venture by Alsalam Aerospace Industries, Boeing and Saudia Aerospace Engineering Industries (SAEI), offers MRO services to Saudi Arabia’s fleet of over 360 military and commercial helicopters, helping reduce turnaround times and costs, thereby increasing aircraft availability in the Kingdom. Before the partnership with Ramco, payroll processes, finance processes and procurement processes were carried out manually. Ramco helped build SRSC’s technological foundation ground up, deploying its Aviation Suite V5.8 to boost operational efficiencies and streamline their processes.

Neil R. Bevan, CEO, Saudi Rotorcraft Support Company (SRSC), said “We remain aligned with the Kingdom’s National transformation program to develop our defense industry and attract talent. Going digital is the crux of the transformation, and Ramco’s software has helped us in every step of the way,” adding, “With the regional MRO market predicted to grow to US$240 billion by 2037, SRSC is well positioned to take advantage of the growth by leveraging upon its technological edge”.

Virender Aggarwal, CEO, Ramco Systems, said, “To provide safety and quality service to one of the largest combined helicopter fleets in the Middle East is no mean feat, and Ramco is honored to be supporting SRSC in that mission. Our modular approach enables us to add new enhancements to SRSC’s system seamlessly, and ensure they adapt swiftly and thrive in the age of digital disruption.”

Ramco Aviation Software is trusted by 22,000+ users to manage 4,000+ aircraft globally. With 75+ Aviation leaders onboard, Ramco is the solution of choice for several large airlines plus top heli-operators and multiple MROs around the world.

Read the full story on Aircraft IT Website

INTERACTIVE Click here for full product details
AD SOFTWARE appoints new sales director

AD SOFTWARE, the France based CAMO and MRO software editor, announced in early April 2019 that it has reinforced its international sales team with the appointment of Christobal Henner as Sales Director in charge of Sales and Marketing strategy and customer relations.

This appointment is in response to AD SOFTWARE’s growing portfolio of customers and the recent partnership with ATR which led to increased visibility for AD SOFTWARE and additional solutions available to aircraft operators around the world. AD SOFTWARE has been providing MRO, CAMO and Supply Chain IT solutions for aircraft operators, MRO shops and CAMO organizations for 20 years. It has 60 customers worldwide and enjoys a strong and positive reputation in the industry. The company needed additional resources to face the growth and facilitate interactions with prospects and customers.

Christobal has over 10 years’ experience in promoting IT solutions and MRO services to airlines around the world. He lived and worked in the USA, Brazil, France and South Africa for extended period of time and is now based at AD SOFTWARE headquarters near Geneva. His previous position was General Manager at HiFly Marketing in Cape Town. There he managed a Sales Team promoting different solutions to African airlines from flight safety software to C-checks. Before that he was in charge of Flight Data solutions and MRO sales at Safran Electronics and Defense in Dallas, Texas.

Commenting on his new position, Christobal Henner said, “I am proud to take the helm of Sales activities at AD SOFTWARE. I’ve known the people and the products for almost ten years and I was always impressed by the quality of what I saw. Recent successes such as the partnership with ATR have put AD SOFTWARE among the top MIS vendors in the world. Airlines and helicopter operators are on the lookout for challengers like us with a different and pragmatic approach to their issues.”

When he announced the new arrival, Frederic Ulrich, CEO of AD SOFTWARE explained, “With the amount of interest and requests we are getting we needed a high-level profile that could lead customer relationships and prospect qualification to a new level. Christobal’s international experience and business acumen have already generated interesting results.”
FLYdocs launches Aviation Asset Management Platform

In early April 2019, FLYdocs, the aviation data and digital records management solution provider, announced the official launch of its new Asset Management Platform at MRO Americas 2019. In leading the digital innovation charge in aviation software, FLYdocs is taking a huge step forward in helping lessors and airlines realize the full benefits of embracing a paperless future.

Within the cloud-based Asset Management Platform, lessors have instant access to the most business-critical information regarding the contractual obligations of their lessees to ensure ongoing compliance. Additionally, users can also tap into the data they need to manage and protect the value of their aircraft and engine portfolios throughout the term of the lease. Airlines not building up external Maintenance Reserves benefit from being able to more accurately predict Maintenance Event Intervals/Cost and budget for them through their own internal accruals.

Key features of the FLYdocs Asset Management Platform include:
• Asset management, to track the history of every major assembly, including utilisation, shops visits and engine/APU LLP snapshots;
• Lease management, capturing essential core lease data, including contractual terms and events, to effectively manage lease compliance throughout its life;
• MR and EOL compensation, to record current MR and EOL rates along with their escalation process, while MR claims are managed, and MR funds are tracked;
• MR and EOL compensation forecasting, encompassing advanced event forecasting (interval, timing and cost) and cash flow predictions;
• Reporting and Dashboards, utilizing advanced reporting and mobile-optimized dashboards for managing a portfolio interactively in real-time;
• Event management, including automated reminders of critical events such as insurance schedules, annual rate escalations, and utilization reporting.

“One of the largest challenges for lessors and lessees has been the inability, using current software, to accurately forecast maintenance reserves and end-of-lease compensation, which can have a major impact on business health and asset value,” commented Mark Hadfield, FLYdocs’ Head of Asset Management. André Fischer, CEO of FLYdocs added “This deep integration of lease, asset, records and financial data provides unrivalled control over their assets and operations.”

Read the full story on Aircraft IT Website

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Conduce Group
IFS recognized as a leader in IDC MarketScape for SaaS and cloud-enabled EAM vendors

IFS, the global enterprise applications company, announced in early April 2019 that its extended capabilities for enterprise asset management (EAM) has been positioned as a Leader in the IDC MarketScape: Worldwide SaaS and Cloud-Enabled Asset-Intensive EAM Applications 2019 Vendor Assessment*. With its beginnings in EAM solutions over 35 years ago, IFS has evolved its robust offering to serve industries including aerospace & defense, energy, utilities, oil & gas, and mining.

After a thorough evaluation of IFS’s strategies and capabilities, the IDC MarketScape has positioned the company in the Leaders Category in this report for SaaS and cloud-enabled asset-intensive EAM applications. The research study notes the following strengths in IFS’s suite of technology:

- **Project and asset life cycle:** IFS’s EAM software includes deep functionality for managing the whole project and asset life cycle, with an advanced dynamic scheduling and optimization engine plus a mobile solution.
- **Full enterprise functionality:** IFS offers a full enterprise offer for asset management including integrated finance, supply chain, HR, manufacturing, project, quality, HSE, and service management features and functions.
- **Deep expertise in aviation:** IFS Maintenix Fleet Planner helps planners more effectively generate long-range plans for heavy maintenance activities, allowing them to choose the best plan to maximize aircraft availability, including the ability to run “what if” analysis and compare plans.

“We are enormously proud of being positioned as a Leader in this report, which I believe is a testament to our tireless efforts to always improve and challenge the norms,” IFS Chief Product Officer Christian Pedersen said. “The asset-intensive industries that we serve are among the most heavily regulated and stringently monitored in the world, which means that digital transformation and disruptive technologies must be deployed with a steady hand, always guided by customer feedback and deep industry expertise. The recognition from the IDC MarketScape energizes us in our work to develop solutions that lead the way in defining the future of asset management.”
Deployment of electronic technical logs (ETLs) in electronic flight bags (EFBs) is highly desirable but can take time. CrossConsense, which makes the ETL Crossmos, sold the intellectual property rights to its ETL software to Boeing in 2018. The airframe OEM plans to integrate CROSSMOS with its airplane health management and other tools. Meanwhile, CrossConsense is working with a number of its own potential ETL customers.

“We developed the eTechlog to accommodate the needs of all aircraft operators, for all fleet types,” explains CrossConsense CEO Udo Stapf. “During the last couple of months, we have signed new contracts with increasing interest in Crossmos from airlines.”

At the same time, integration of ETLs with analytic applications could be very important to operators that plan to go fully paperless in the future. So, “together with Boeing, we see unlimited possibilities not only to integrate into already existing software solutions, but also to integrate into avionics and aircraft systems to enable data capturing, including real-time fault reporting, directly from the airplane itself.”

Thus Boeing announced in mid-March 2019 that it plans to use Crossmos as the foundation of its new Boeing Mobile Logbook and has laid out a long-term roadmap integrating Crossmos with airplane health management, maintenance performance toolbox, STREAM, Jeppesen FliteDeck Pro and Jeppesen Aviator.

Before the Boeing deal, Swiss International Air Lines went live with Crossmos in January 2016 and Edelweiss went live in 2017. Also, CrossConsense has now signed its own contracts with Aegean, AeroLogic, Air Dolomiti, Alitalia, Brussels Airlines, Lufthansa, and Lufthansa CityLine, all of which are expected to go live this year or next.

Implementation can take time; an un-customized version of Crossmos can be implemented in two months. But airlines have their own procedures and usually want tailored implementations, which take a year to achieve. Carriers must decide on hardware, train users, manage changes and work with regulators, all of which take time. Nevertheless, Stapf is seeing indications that many more airlines will adopt ETL software in the future.

Boeing plans to release an iOS version of its Mobile Logbook in the fourth quarter of 2019. And CrossConsense is working on a new Check page in Crossmos. Pre-flight checks have been included in Crossmos from the beginning, but now there will be other checks such as daily checks, weekly checks, departure checks, and special cabin checks.
In early March 2019, Vistair Systems, a leading provider of aviation management software, announced the opening of its North American operations from its base in Texas. The new North American base will look to expand its reach in the region, and build upon its existing relationships which already includes Delta Air Lines, and will be led by Captain Bart Roberts, an experienced aviation professional with a career spanning over 30 year in the aviation sector.

Based out of Grapevine, Texas, Bart as Chief Operating Officer for North America will be looking to develop the Vistair US team in the coming months. His experience spans both military and commercial aviation with leadership roles ranging from Chief Pilot and Managing Director Flight Operations, at American Airlines, through to his services experience with the US Navy as Commanding Officer of a squadron and retiring at the rank of Captain and VP Flight Operations at JetBlue. Bart also managed to complete a stint in the Dallas police department earlier in his career.

Bart Roberts, COO, Vistair North America commented: “Vistair has long had a great reputation for their airline document management system, DocuNet, alongside formidable safety management technology, and so the opportunity to join the company and lead a North American operation was an easy decision to make. It has been a great pleasure working with and alongside a number of iconic North American airlines during my career, so I really believe that there is a great opportunity, through my new relationship with Vistair, to support the delivery of added-value flight operation’s services in this market.”

Bart will work with Vistair’s Business Development Team led by Dominic Clarke and the respective heads of product development, David Hedley, Vistair’s CTO and DocuNet product lead, plus Matthew Spindler, Product Director SMS. Dominic Clarke, Chief Commercial Officer, Vistair commented: “Vistair has long understood the importance of the American aviation market so being able to recruit someone of Bart’s experience and calibre was critical to our plans. Bart is an exceptional and unique aviator with experience of both commercial and military flight operations, plus he is well respected throughout the industry. Vistair is extremely lucky to have him and we look forward to working with him to support our North American operation.”

With over 40 aviation clients worldwide Vistair is in a great position to support both new and existing clients in developing their DMS and SMS solutions.

Read the full story on Aircraft IT Website.
Latest contract for Commsoft sees OASES supporting seaplanes

Commsoft was delighted to announce in mid-April 2019 that Jet-Ops FZE has chosen OASES, Commsoft’s industry-leading MRO IT system, to support its current fleet of five Cessna 208 Caravan seaplanes.

Based in Dubai, Jet-Ops specialises in the management and leasing of seaplanes in the UAE and operates Passenger Air Transport flights and Aerial / Scenic Tours as its current core business, with market trading provided by Seawings LLC. Strategically located to provide aircraft management services for clients across Middle Eastern and European operational bases, Jet-Ops holds UAE Air Operator and EASA Aircraft Training Organization Certificates with own Part 145 AMO and CAMO, and has the expertise to provide management services for various aircraft types, including Cessna, SAAB, Piper, Beechcraft and a number of others.

For Commsoft, this represents an exciting new addition to the global OASES community which currently consists of more than 130 aviation operations in over 55 different countries, from national and regional carriers to business aviation and charter operators to cargo specialists, leasing companies and independent MROs.

Combining technical sophistication with an intuitive user interface, OASES is structured in a modular format to provide maximum flexibility and scalability. Jet-Ops has selected the Core, Airworthiness, Planning, Materials, Line Maintenance Control and Production modules. Work has already begun on both the server procurement process and data assessment with training and on-site implementation set to start in early May.

Nick Godwin, Commsoft’s Managing Director, commented: “Not only is this our third major contract win in 2019, it also represents a first for us in terms of supporting seaplanes. We’re delighted that Jet-Ops has chosen OASES and we’re looking forward to working closely with them to ensure an early and successful implementation.”
AeroSoft Systems Inc. is proud to announce a major agreement and project launch with Endeavor Air

In early March 2019, AeroSoft Systems Inc. was proud to announce a major agreement and project launch with Endeavor Air. This is a multi-phase project to enhance Endeavor’s existing PMI implementation with WebPMI, DigiDOC, DigiREPORTS (B.I. tool) and DigiPLAN (Logistics support) — all secure web-based applications. WebPMI will be integrated with customized JobCards in DigiDOC’s digital content repository. All Maintenance Technical manuals (SGML, XML, .PDF and other formats) will be available via DigiDOC on browsers and mobile platforms.

Endeavor Air, a wholly owned subsidiary of Delta Air Lines, is the world’s largest operator of Bombardier CRJ-900 aircraft. Flying as Delta Connection, Endeavor operates 154 regional jets on nearly 800 daily flights to more than 140 destinations in the United States, Canada, and the Caribbean. Headquartered in Minneapolis, Minn., Endeavor has hub operations in Atlanta, Detroit, Minneapolis, and New York City.

Air Chathams selects Rusada’s ENVISION

The New Zealand regional airline, Air Chathams, announced in mid-April 2019 the choice of Rusada’s software ENVISION as its information management solution.

Air Chathams operates regional passenger and cargo services between the Chatham Islands and mainland New Zealand. The airline serves destinations such as Auckland, Wellington, Christchurch and Whakatane using a diverse fleet of over 15 aircraft, including an ATR 72 recently acquired from Air New Zealand. The airline has selected 8 of ENVISION’s modules, including Flight Operations, Fleet Management and Base Maintenance. Rusada will begin implementing these immediately, with the first aircraft expected to go-live at the end of May.

Craig Emeny, Owner of Air Chathams said: “Our continued growth has resulted in the need for a robust solution to manage our ever-increasing volume of data. After seeing ENVISION firsthand and spending time with the Rusada team, I am very much looking forward to starting our partnership.”

Julian Stourton, CEO at Rusada added: “I am thrilled to welcome Air Chathams to the Rusada family. This is our third new regional airline this year. Read the full story on Aircraft IT Website

INTERACTIVE Click here for full product details

Enterprise Location Intelligence Solutions
Airline & Aerospace MRO & Flight Operations IT Conference — AMERICAS — Miami, FL, USA, 11th & 12th June 2019

The world’s leading aviation IT conference for MRO/M&E and Flight Operations solutions will be held in Miami

Aircraft IT would like to invite you to attend the World’s leading aviation IT conference dedicated to MRO/M&E and Flight Operations IT Solutions: the Airline and Aerospace MRO/M&E and Flight Operations IT Conference for the Americas region in Miami. This 2019 conference features:

- **Conference Agenda Highlights**: Digital and Paperless Aircraft Maintenance & Flight Deck; e-Signatures; Aircraft Connectivity; Big-Data and Predictive Analytics; Mobile Line Maintenance; eTechLog; EFB Case Studies; Fuel and Operational Efficiency; Aircraft Connectivity; MRO Software Selection and Implementation; Cyber Security; Integrated IT Solutions; Digital and Paperless Aircraft Manuals: Using Test Data to Optimize Solutions; Latest Innovations, Advanced Weather Data, plus lots more.
- **Demo** the solutions from 50+ leading MRO / M&E & Flight Operations IT Software and Hardware Vendors
- **Pre-Conference Digital Transformation in Aviation Workshop**: Learn about the different digital technologies trending in aviation, new technologies, the benefits of working with agile technology, and how to implement this to drive digital transformation.

**CONFERENCE OVERVIEW**
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key issues relating to the development of IT and its key use for aircraft maintenance and flight operations. It provides a one-stop solutions for airlines, aircraft operators and Independent MROs, in just 2 days to discover more about how new technology can streamline and increase their operating efficiency as well as reduce costs dramatically. The conference provides three great opportunities:

- **Software Demos:** A large exhibition area allows airlines, aircraft operators and MROs the opportunity to try out and demo the major software and hardware systems from the world’s leading vendors. The solutions you will be able to demo include:
  - MRO/M&E: Fully integrated MRO / M&E systems, ERP Integrated Software, Paperless Systems, Supply Chain Management Solutions, Digital Documentation Management Solutions, Paperless Manuals, Documentation Scanning Solutions, Mobile/Tablet solutions for the Hangar, etc.

Click here for a full list of exhibiting IT vendors and to learn about the software you will be able to demo at the conference. 50+ IT and hardware vendors are exhibiting their Solutions in 2019.

- **Agenda of Presentations:** A 2 day agenda of presentations, given by industry experts and the IT users themselves, will discuss the latest key issues and trends in this rapidly developing sector of the industry. Case studies, vendor showcases and interactive workshops are included to ensure that delegates receive key, varied and fresh information.

- **Network with your peers:** 400+ key executives from airlines, operators, MROs, OEMs, IT Vendors, Regulators and Consultants from across the Americas zone and beyond will be in attendance allowing for exceptional networking and the exchange of ideas.

Click here to find out more about the conference.

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**VISTAIR**

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[www.vistair.com](http://www.vistair.com)
In late April 2019, Guernsey-based Aurigny Air Services Ltd announced that it has chosen OASES, Commssoft’s industry-leading MRO IT system, to support its fleet of Embraer, ATR and Dornier aircraft.

Wholly owned by the States of Guernsey since nationalisation in 2003, Aurigny connects Guernsey with destinations in the Channel Islands and U.K. flying scheduled and occasional charter services. One of the longest serving regional airlines in the world, established in 1968, Aurigny has just been voted best short-haul airline by consumer magazine ‘Which’.

Implementation of OASES will begin shortly and the system will be shared by Aurigny’s sister company, Anglo Normandy Aero Engineering. Combining a technical sophistication with an intuitive user interface, OASES is structured in a modular format to provide maximum flexibility and scalability. Aurigny has selected the Core, Airworthiness, Planning, Materials Management, Production and Line Maintenance Control modules which will be accessed through Commssoft’s Private Cloud service.

Nick Godwin, Commssoft’s Managing Director, commented: “We’re delighted that Aurigny has opted for OASES. We’re looking forward to working closely with Aurigny to ensure a successful implementation and an excellent ongoing relationship.”

John-Paul Williams, Aurigny’s Group Technical Director, commented: “We have gone through a very thorough selection process with over 10 software options presented and reviewed. We have selected OASES as it will provide all the functionality we require now and in the future. It is an established system used by many similar airlines to us in Europe, who when asked provided us with positive feedback on the implementation and use of OASES.”

Read the full story on Aircraft IT Website
FLYdocs announced at the end of April 2019 that it will be exhibiting at Leasing MRO 2019 in Dublin on 14-15 May 2019. Exhibiting on Booth D127, FLYdocs will be showcasing its full suite of products and services including the Aircraft Records Management Platform and the recently launched Asset Management Platform.

FLYdocs is already recognised as a pioneer in the digital transformation of managing aircraft and asset transitions with some of the world’s leading airlines. This is largely through the use of the FLYdocs® Aircraft Records Management Platform which helps airlines:
- Easily manage their day-to-day aircraft records and compliance requirements;
- Quickly demonstrate fleet airworthiness with automated document builds;
- Streamline processes to deliver significant time and cost efficiencies;
- Save an average of $2M USD in late penalty fees per aircraft.

With the new cloud-based Asset Management Platform, lessors and lessees will be able to accurately forecast maintenance reserves and end-of-lease compensation. The platform boasts features such as:
- Asset management to track the history of every major assembly;
- Lease management, capturing essential core lease data to effectively manage lease compliance throughout its life;
- MR and EOL compensation to record current MR and EOL rates along with their escalation process;
- MR and EOL compensation forecasting, encompassing advanced event forecasting and cash flow predictions;
- Reporting and dashboards utilising advanced reporting and mobile-optimised dashboards;
- Event management including automated reminders of critical events.

“This platform seamlessly integrates with the current Aircraft Records Management Platform, enabling a truly omnichannel experience, securely navigating between asset management and records management without ever leaving the FLYdocs® system,” said Mark Hadfield, FLYdocs’ Head of Asset Management.

Delegates attending the show will be able to get a look at both platforms and find out what FLYdocs can do for their organisation.

Read the full story on Aircraft IT Website: FLYdocs to Showcase New Aviation Asset Management Platform at Leasing MRO-Dublin 2019
Smartwings’ App helps better manage parts

Petr Barton, Operational Supply Chain Manager, Smartwings explains their in-house solution for Supply Chain Management
Supply chain is a critical element in the efficient management of aircraft engineering and MRO. In this article, I want to share with readers the story of our in-house supply chain management app that we built and use in Smartwings. But, let me first tell you something about the airline.

ABOUT SMARTWINGS GROUP
There are two brands, Smartwings and Czech Airlines, in the Smartwings Group plus subsidiaries in Hungary, Poland, Slovakia and Germany, operating scheduled flights, charter flights and private flights. In 2018, the group carried ten million passengers from 14 bases across seven countries.

Smartwings
Based at Václav Havel Airport in Prague and the largest airline in the Czech Republic, with a fleet of around 42 aircraft (mainly Boeing 737 variants: -700, -800, -900 and MAX), Smartwings is also one of the fastest growing carriers in Central Europe. It operates to holiday destinations plus dry leases to other airlines as well as scheduled local flights and business charters with a fleet of Cessna 680 business jets.

Czech Airlines
Czech Airlines is the fifth oldest airline still operating in the world with a fleet of 18 aircraft operating scheduled flights. The fleet consists of Airbus A319 and A330 as well as ATR 42 and ATR 74 types. The business is 97.74% owned by Smartwings.

AVIATION SUPPLY CHAIN MANAGEMENT APP, MATMen
Smartwings Group in-house solution and app for supply chain management is MATMen and is built in modules.

Stations Parts Management
The first module is Stations Parts Management and the idea behind this module was to reduce the communications between outstations and central stores in Prague, and to reduce the many Excel documents used for material requests, inventories and suchlike. It was developed to deliver complete parts management, to offer a full parts/logistics overview for each station and to manage and cover these functions for each station in one place. MATMen offers an overview of incoming shipments in a window showing all shipments shipped from main base to station: the outstation staff confirms delivery of parts and receives the parts into inventory. The app also shows exchanged parts that need to be returned to the supplier on time. Station staff can create a part request and have an overview of that request to check where parts for planned works are, with the option to search by work orders and the capability to receive the parts into the station inventory. They can also see the inventory and minimum levels in their station and the app offers unserviceable parts management. The main window (figure 1) shows incoming parts as they arrive at the station plus an overview of parts that they need to return to the central stores.

FIGURE 1
Station Minimum Levels
Part of the Station Management process was for the management of minimum levels so there is a Stations Minimum Levels module (figure 2)...

Parts Master Information
We also created a more detailed Parts Master Information module (figure 4)...

... for each station, it is possible to set an automatic supply process; it means that, when the available quantities fall below the minimum level, the automatic system will generate a replenishment part request and create an automatic shipment...
... with better information for every user. Parts Master Information shows details of dangerous goods, default repairs stations, remarks for each step of the material’s progress, default custom price, dimensions and any special information.

**Stores Module**

Stores module was developed to improve the efficiency of our main store (which was previously not so efficient), to reduce levels of human error and to ship parts without any delay. The storekeeper needs to acknowledge each new shipment from the logistics department that has been created in stores, and wait for confirmation and preparation. During the acknowledgement process the storekeeper or stores manager is able select which shift will prepare the parts in that shipment for effective work planning. After the shipment is prepared the storekeeper confirms that shipment is ready and waiting for shipping /customs clearance. For AOG (aircraft on ground) shipments and if working out of working hours, the stores team are able create, in their module, a new shipment which needs be shipped as soon as possible. This module produces for each shipment:

- A picking ticket;
- A Customs Invoice / Packing Slip; and
- Automatic notification for each outstation about new shipments.

The implementation of this module for daily operations across all of the Smartwings Group has facilitated a large reduction in errors plus all outgoing shipments can be effectively tracked, performance records can be created and shipping costs can be checked. There is a shipments overview with delivery status and proof of delivery for each shipment (figure 5).

**Transport Management**

This module was created to monitor cargo transport: it is fully connected into the group’s logistics module. The purpose of the Transport Management module (figure 6) is to monitor actual weight and limits of the cargos. This module also notifies the stores team when a cargo reaches the weight limit for the cargo and it is also used for our cargo transport scheduling.

**Material Return Management**

For the return from different stations of unserviceable materials and serviceable materials that are overstocked, we have this module. It overviews what material is stored on each station and waiting to be returned. The module allows each station to generate shipping documents and easily ship parts back to the main store without any delay or having to wait for information.
Automatic Repair orders
This module was introduced to speed up the shipping process for unserviceable parts to the repair shops. It has automatic repair order generation as per the default setting of the repair stations. For each part number, after receiving the parts at the main base in Prague, the system will automatically generate the repair order to allow the stores team to ship parts immediately without delay or any time spent waiting for the repair manager to create a repair order and send that back to the stores.

C-CHECKS MATERIAL MANAGEMENT
We’ve seen lots of problems with materials requests every year when we’re in the heavy check season. Our heavy maintenance is fully outsourced between MROs in Romania, Hungary and the United Kingdom. With each heavy maintenance check, we have a representative from purchasing department on site. There are hundreds of emails between the MRO, the stores and the purchasing team every day and these were big problems due to the fact that all requests came from the MRO on Excel sheets with many versions. So, our second supply chain challenge was the heavy checks management and the module that was created to handle this improved several processes:
• A reduction from the hundreds of emails that had been generated daily;
• A reduction in the levels of error occurring with materials preparation;
• A single point of communication was created between Smartwings and the MRO;
• All material, requests are now available in one place.
An overview was created for each C-Check to reduce the many Excel sheets that had previously been used. Now, the purchasing people receive a request from the MRO and insert the new material request into this module. They can insert many types of material requests plus any purchase order and any exchange order whether or not the material will come from the main stores. They can also insert the work order details and the work order information, when the part is required and, when the part is shipped from the main base in Prague, the checking information is available immediately in the module.

BENEFITS
Use of the app has reduced email communications because everything is handled through one app. It is also good that we are not waiting for replies but are communicating directly via the app with everything in one place. That has been the main benefit plus we have managed to eliminate many versions of Excel and Word documents – a definite gain in the quality of work.
Currently, the app does not interface with any MRO system but we are thinking about that. In Smartwings we are considering how to achieve a connection for the parts requests and inventory from the current MRO System to MATMen. There is also the possibility that new developments will bring further benefits; for instance predictive maintenance seems to have the potential to further increase the efficiency of automatic supply replenishment.
There are certainly many future opportunities to use MATMen to improve the way that the Smartwings Group handles supply chain in support of more efficient maintenance processes.

PETR BARTON
Starting at Smartwings in 2013 as storekeeper, after two years Petr was promoted to team leader of exchange control department and then, in 2016, to Inventory Manager with responsibility for the main store and outstations supply chain. In March 2018 he was appointed Operational Supply Chain Manager to build and manage a new Operational Supply Chain department focusing on outstations’ material management, logistics activities and a 24/7 AOG Desk.

SMARTWINGS
Smartwings Group has two brands, Smartwings and Czech Airlines, plus subsidiaries in Hungary, Poland, Slovakia and Germany, operating scheduled flights, charter flights and private flights. In 2018, the group carried ten million passengers from a total of 14 bases across seven countries with a fleet of around 60 aircraft: Boeing 737 variants: -700, -800, -900 and MAX, plus Cessna 680, Airbus A319 and A330 as well as ATR 42 and ATR 74 types.
Looking for a smarter supply chain in MRO: Part 1

Nishant Balakrishnan, Lead, digital services sales for a European OEM, and Amol Salaskar, Consultant business analyst in aviation and MRO, IBM Center of Competency explain the current supply chain and inventory and the issues to which it gives rise in the MRO sector.
The number of airplanes is expected to double in the next 20 years to over 40,000 in-service by 2036. As a natural progression, the forecast is for an increase in the need for after-market services. In this bargain, the MRO (Maintenance Repair and Overhaul) market is expected to touch almost USD 180 billion during that same time.

In terms of services portfolio the MRO’s have progressed from just airframe based services to now servicing engines, complex assemblies, components repairs, and added spares parts supply also. This is made possible through multiple strategies, such as building in-house capabilities, or by the development of integrated supply chains with third party service providers and parts suppliers.

We will see the services portfolio is also offering a richer value added proposition because of the enablement of analytics, optimization, and predictive capabilities. The objective is to delight the customer while, at a fundamental level, recognizing the need to harness data capabilities to reveal potential service disruptions, plus performance degradation on components and assemblies, even before they occur.

In July 2017, Indigo, an airline with a world record-breaking ‘first’ in an order of 250 Airbus A320neo, underwent a severe schedule breakdown. It canceled over 80 flights and rescheduled many more in a period of one week, because it had to ground seven aircraft from its 138 strong fleet. The reason was not just technical failures in the engine noticed over a long period of time, but also the lack of availability for spare engines, and the logistics.

This is precursor to what will be the MRO’s offering: performance based value, i.e. a guaranteed uptime for components and aircraft. In order to achieve this, MRO’s will shift from just data analytics to prescriptive analytics computing enabled by IoT devices/sensors on the aircraft that can send (near-to) real-time (or on-demand) information on the health of the components, and are capable of

“The objective is to delight the customer while, at a fundamental level, recognizing the need to harness data capabilities to reveal potential service disruptions, plus performance degradation on components and assemblies, even before they occur.”
proposing the best possible recovery procedures. This evolution is rather well complemented by today’s technology, which allows for generation, analysis and consumption of vast amounts of structured and unstructured data, that is generated by the airplane, its installed components, the OEM (Original Equipment Manufacturer), the repair shops and the airline MIS (Maintenance Information Systems).

For an airline operation, an AOG (Aircraft on Ground) support is considered the last line of defense to overcome a service disruption, and get the aircraft back to operation and flying. The role demands technical and engineering support, yet a large part of AOG support is the organization of spare-parts. As such, we see the role of AOG support changing towards a supply chain coordinator.

A key ingredient to delivering and succeeding in such an endeavor is the performance of the MRO’s supply chain, which is the main interest of this paper. However, in order to draw some meaningful insights into the aviation MRO supply chain, we need to understand how supply chains are viewed globally. In order to do so, we draw insights from IBM’s supply chain surveys. These surveys have identified that the top drivers / criteria to successfully manage the supply chain are visibility and flexibility, a lower cost of operation, an ability to manage the business risk, and include in their scope customer satisfaction enablement / experience.

SUPPLY CHAIN TOP DRIVERS
When we speak about the supply chain, success is primarily about having the spare-part or service demanded by the customer, in the right quantity, at a right standard, at the right price and at a right time to the nearest point of consumption of demand.

In this paper we’ll visit these supply chain drivers and the challenges from an aviation MRO supply chain perspective. This paper is divided into two parts, i.e. the first part wherein we attempt to understand what these top supply chain drivers mean in the aviation MRO context, and the second part is to explore the role of technology solutions such as business analytics, advanced analytics and simulations, and cognitive solutions, to improving integration & visibility across the supply chain, gaining efficiency in operations, and finally aimed at building a superlative customer experience.

“When we speak about the supply chain, success is primarily about having the spare-part or service demanded by the customer, in the right quantity, at a right standard, at the right price and at a right time to the nearest point of consumption of demand.”
procurement, repair turn-around-time, the probability of time to failure, and the part’s criticality to the operation of the aircraft.

In this section we visit the supply chain challenges but more from an aviation MRO supply chain perspective.

Visibility and Flexibility

Today’s MRO providers are offering a basket of services. These services have been developed by augmenting in-house capabilities and/or by the integration of the supply chains with other third-party service providers. In the latter case, an MRO may outsource certain maintenance/repair tasks to other vendors.

Apart from this, a global organization means that this supply chain may be spread across multiple locations and even geographies. The ability to view and monitor the supply chain processes end-to-end can be a serious challenge. This visibility would mean the spares at not just the main base but also the forward deployment depots, in transit, at suppliers and at customer sites. From a production perspective, it refers to the parts in process of repairs at in-house repair shops or at third-party repairs.

The flexibility of the supply chain is its ability to respond to market dynamics in the most efficient manner. For this there is a need for the supply chain planners to receive real-time or close to real-time inputs from within the supply chain processes and also the customers, social networks for market changes and competitors offerings.

In the present situation or business context supply chains are not able to offer uniform and consistent service to customers i.e. airlines. This results from a lack of seamless information flow, caused by disparate systems, ageing technologies, and not so easy to interface systems: the upshot is that supply chains have lost their effectiveness.

Supply chain users in various roles have not just been missing pieces of information, but various pieces of information have also been conflicting in nature. In the aviation MRO, we see inventory complexity arising out of parts serviceability status, the modification status, and traceability of technical data e.g. TSN (time since new), CSN (cycles since new), and TSO (time since over-haul), which are incidentally also mandatory regulatory requirements.

This variety in the data requirements for managing the supply chain, and on the other aspect the voluminous real-time sensor data coming from in-service airplanes (and components), are neither organized nor harmonized to integrate seamlessly in a way that can facilitate the drawing of insights or reacting to, if not to preempting, a service disruption in time. This also extends to developing business insights that will allow for organizational changes in the strategy. Most times the data received from the aircraft is deposited and analyzed in a system that is separate from the supply chain and planning systems.
“In the present business environment, the costs or the efficiency of a supply chain is under pressure as customers demand better services at lower costs.”

The business needs to manage the entire supply chain at a uniform cadence, and in harmony with its different parts, with data that is able to offer meaningful insights and is tailored to individuals along the supply chain. Where management is by exception, when there is a service disruption along the supply chain, the systems are not able to provide alternative course of action.

Reducing the Cost of Operation
In the present business environment, the costs or the efficiency of a supply chain is under pressure as customers demand better services at lower costs. This is made difficult with borders between an OEM, the supplier, and an MRO, dissolving as each tries to either scale their business by forward or backward integration. The business is now morphing into a scenario where it’s the performance of the supply chains between competing aviation MRO suppliers that is going to decide to whom the business will be directed.

The challenge now lies not in the ability to provide services (inventory and technical engineering) but the ability to deliver on the goals of a supply chain (integrated or self-sustained), which is to offer the highest service level or remain within the SLA (Service Level Agreements) at optimal investments in spares and inventory, low working capital requirements, and the highest effectiveness i.e. ability or, more appropriately, the agility to respond to customers with tailored solutions.

The goals of a supply chain are made complex for the aviation MRO business, due to the spare-parts requirements. These requirements include inventory sizing to match the customer’s (i.e. airline’s) in-service fleets and new aircraft types that will come into operation, withdrawing obsolete parts, introducing programs for parts modifications / upgrades, and dynamically re-positioning spare-parts and services within the supply network from warehouses, main bases’ depots, forward deployment depots, or suppliers to the closest point of its use or potential use.

Also, for repairs, it’s to identify the shop that is capable of performing the repair and also route the part from the customer location to the repair facility and back to inventory (either internal or customer).
At a strategic level one of the supply chain challenges is with the warehousing location, and the levels of inventory to maintain, when time to market are critical.

A significant part of service delivery, yet often not considered on a par with the other criteria, is the logistics costs. There is a significant lack of systems implemented that are able to optimize the way to move parts within the network and also to customer’s locations. The logistics costs can also improve the profitability of contracts and customer retention, if it can include customer business rules, embargoes, and other geo-political specific criteria that can impact the delivery time, and cost.

Managing Risk
According to IATA, a typical airline maintains approximately USD 1.9 million of inventory per aircraft, and the study also points out that most airlines want to move a large part of their inventory to supplier owned / provided inventory. With that, the cost of owning and managing the inventory will likely rest with the aviation MRO’s or the suppliers. Along with the cost of inventory is also the associated process of managing parts upgrades, obsolescence, liquidating slow-moving / non-moving inventory, and lead time associated risk of stock-outs. The overheads required in maintaining warehouses, depots, or customer sites, add to the risk for the MRO, when considered from a global perspective. Most airline customers want to move towards parts pooling, and the risk with managing the pool quality as well as knowing the parts required for the customer’s aircraft configuration is critical to the MRO supply chain to ensure that there are no cost over-runs or inventory issues.

The costs associated especially with rotables which may have re-certification requirements, or special handlings i.e. temperature controlled or ESDS (electro-static discharge sensitive) environments will also add to the management requirements. In turn, it is also important to consider the logistics and warehouse effectiveness, which will allow parts and services to be moved across the supply chain to meet the customer’s (potential) requirements.

For many of today’s airplanes e.g. the Airbus A350 which offers over 100,000 aircraft health management parameters, there are a plethora of parameters available for monitoring. However, the maintenance information systems (MIS) of the MRO/ Airline M&E are not capable of consuming, organizing and analyzing this raw The health monitoring tools provided by OEMs do provide diagnostics, however, MIS seldom consumes the output of these tools. This critically enhances the risk translated to financial metrics; if we don’t have systems to effectively manage, and monitor the entire supply chain. Part of the process of managing is the support to decision making.

Customer Satisfaction / Enablement
An efficiently managed supply chain, means that its effectiveness to meet customer requirements increases. Customers receive high levels of service and satisfaction. This is most visible in the form of the performance of the contract e.g. SLA (Service Level Agreements), and the increase in revenues.

In today’s environment customers find difficulty in their ability to receive real-time updates on the progress of their requests to the MRO. Due to disconnected systems the customer receives incomplete or erroneous updates and/or the consistency of updates varies, depending on the person handling the request.

There is a severe lack of that transparency that the customer requires regarding the status of their requests, early warning when orders are delayed or prices are revised, and the ability to intervene to decide before the invoice is prepared. This leads to misunderstanding, disputed invoices, and payments from customer being delayed or forgone. Even today, a customer might not have access to a published rate card and services catalog from which a selection is possible. Lack of visibility to inventory across the supply chain, causes the customer to move to other suppliers maybe at a higher cost.

A key differentiator yet not available as a service, is for the customers to receive recommendations on services and parts supply that is most suited and cost effective for their aircraft fleet operation. In today’s environment the systems integration, and analytical capabilities required to make value adding recommendations are dependent on the customer services department, and the process for such services are time-consuming and not precise due to the lack of business insights. What is required is an agile and customer-oriented supply chain, and one that is able to tailor and offer MRO services and solutions specific to customer requirements.

NISHANT BALAKRISHNAN
Nishant Balakrishnan is an aviation enthusiast with over 18 years of industry experience. He has performed various roles in the industry ranging from aircraft maintenance, fleet management, inventory management, management consulting and digital transformation/sales. Currently, he leads the digital services sales for a European OEM.

AMOL SALASKAR
Amol Salaskar is with IBM and is working as a Consultant business analyst in the aviation and MRO. Prior to that he was a Manager Engineering IT with Jet Airways for over seven years, and for around two years as Business Analyst for Fleet Management Operations, with General Electric where he certified as a Six Sigma Green Belt. He holds a Bachelor’s degree in Mechanical Engineering, a Master of Science in Industrial and Systems Engineering from Auburn University, USA, and followed by a diploma in Management.
Predictive maintenance — beyond the buzzwords

Sander de Bree, Founder & Chief Visionary, EXSYN considers what the value of predictive maintenance, why it matters and how MROs might achieve it.
It’s a topic of increasing importance and in this article I want to share with you some thoughts and information about predictive maintenance in aviation. I’m sure that many readers will already have read plenty about the subject and its functions, using terminology such as AI (artificial intelligence), machine learning, big data and the Internet of things (IoT) plus much besides. However, I want to offer a different perspective, not to look at the technology and what it can do: instead, we’ll put things in the context of today’s aircraft maintenance. To consider the true value of predictive analytics and predictive maintenance for the aviation industry, we’ll tackle the subject in three basic parts.

First a little about what predictive maintenance is and what it entails; we’ll then look at how it works and why that matters in aviation; finally we’ll look at some things that can be done today at airlines and MRO businesses in order to start applying predictive analytics and predictive maintenance technologies.

To start things off, some questions, which I have asked to live audiences, with their responses that offer a useful insight into current feelings about predictive maintenance:

‘Predictive maintenance for aviation: what does that mean for you?’
1. Is it something to reduce cost and increase aircraft up time?
2. Is it the next stage of aircraft maintenance philosophy?
3. Is it completely useless?
4. Is it the next hot Buzzword?

Most people in our sector would answer number 1, that it’s something to reduce cost and increase aircraft up time.

With predictive maintenance, the idea is to still perform maintenance but make it condition based; so, rather than doing maintenance based on a certain fixed number of flight hours, flight cycles or calendar dates, we determine which condition of aircraft systems and components would justify performing maintenance actions.

‘Which key word do you think of when you think of predictive maintenance?’

When we asked this, the sort of words that were offered included ‘big data’, ‘safety’, ‘reliability’, ‘money’, ‘machine learning’... and we’ll look back at these further on.

WHAT IS PREDICTIVE MAINTENANCE?

Bearing that last exercise in mind and the idea that predictive maintenance is able to reduce costs and increase aircraft up time, let’s first of all look at what predictive maintenance really is in essence. If we think about predictive maintenance, it is much like a pyramid (figure 1).
using that in order to think about what could happen in the future.

**FIGURE 2**

Not everyone will agree on this but, in this context, aircraft maintenance is, in essence, not that complicated: it’s either reactive or it’s proactive, that’s all. Reactive is failure based; something breaks down so it has to be fixed. Proactive aircraft maintenance offers two options; it can be preventive maintenance, A-Checks, C-Checks, overhaul of components, etc. or we can do predictive maintenance. The big difference between these two is that preventive maintenance, the current position of the industry, is very much age based, i.e. at certain intervals of hours, flight cycles and/or time there are checks to be performed and components to be overhauled... With predictive maintenance, the idea is to still perform maintenance but make it condition based; so, rather than doing maintenance based on a certain fixed number of flight hours, flight cycles or calendar dates, we determine which condition of aircraft systems and components would justify performing maintenance actions.

In short, reactive maintenance is too late as in AOG (aircraft on ground) situations; preventive maintenance means that you’re doing some jobs too early; but predictive maintenance tries to do maintenance right on time: So there is a sound philosophy behind doing maintenance based on condition monitoring.

If condition monitoring is that important for predictive maintenance, how can we monitor and measure the condition of aircraft systems and of components installed in the aircraft to ensure that maintenance is carried out on time rather than being reactive and waiting for them to break down? This is the million dollar question of our time.

The answer is very straightforward: there are two options. The first option is to put as many sensors in an aircraft as it is possible to do, as these sensors will allow users to measure the condition of systems and components (figure 3).

**Option 1: Sensors**

If condition monitoring is that important for predictive maintenance, how can we monitor and measure the condition of aircraft systems and of components installed in the aircraft to ensure that maintenance is carried out on time rather than being reactive and waiting for them to break down? This is the million dollar question of our time.

The answer is very straightforward: there are two options. The first option is to put as many sensors in an aircraft as it is possible to do, as these sensors will allow users to measure the condition of systems and components (figure 3).

**WHY PREDICTIVE MAINTENANCE MATTERS IN AVIATION**

Pretty much since the introduction of the Boeing 787, people have been talking about predictive maintenance, data collection in aviation and suchlike. The reasons that it has become such a hot topic are the arrival of next generation e-enabled aircraft, reduced costs for data storage, increased availability of data through mobile and smart devices with the tools to access this, catching-up with and spill-over from the consumer market (social media developments and consumer behavior analysis), the drive to reduce maintenance costs and more efficient use of resources.

**Understanding the real value**

In short, there are a lot of good reasons why predictive maintenance matters in aviation and, going back to the questions and answers at the top of the article, not least is reducing costs and increasing aircraft up time. So, there is a very valid use case for predictive maintenance and predictive analytics.

**The History**

Interestingly enough, I feel that the real value of predictive maintenance exists in something completely different which relates to our current maintenance philosophies in aviation and the ever increasing shortage of ground engineers.

In order to explain this viewpoint, we need to
In order to understand the real value of predictive maintenance we need to take a quick history tour:

Age based maintenance is, in essence, a maintenance philosophy. So, when the Boeing 747 was introduced, something else important happened in the aircraft MRO industry. With the 747, MSG Maintenance Programs were introduced, moving away from older to new maintenance philosophies. As a result, certain sets of aircraft components where classified as ‘On-Condition’ components and others remained age-based centric with hard-time requirements and life limits. In addition to this, airlines, under the MSG-3 philosophy, needed to monitor the performance of the ‘on-condition’ parts and the effectiveness of their maintenance. As such, modern day aircraft reliability management was born. This is actually still very relevant today as most aircraft maintenance programs are based on MSG-3 philosophy with hard-times, life-limited parts, age-based maintenance and a number of aircraft components where there are no requirements associated with them.

The facts, the real value
In order to monitor the effectiveness of that maintenance program, it is necessary to perform reliability analyses. That’s the one thing that comes with MSG-3: if there are components that don’t have any maintenance requirements against them, it is still at least important to monitor whether maintenance is being carried out effectively. That is why ‘reliability’ was introduced. And those maintenance programs are still in the industry today: so, a significant amount of tasks in an aircraft maintenance program consist of functional checks, component replacements, etc.; all based on age-based maintenance. But what does all this have to do with the real value of predictive maintenance in aviation?

A typical maintenance planning document (MPD) would be broken down as in figure 5 with just 15 percent of work related to zonal/structural maintenance, 25 percent to components and a huge 60 percent related to systems.
“... most aircraft maintenance programs are based on MSG-3 philosophy with hard-times, life-limited parts, age-based maintenance and a number of aircraft components where there are no requirements associated with them.”

Why now?
Technology and computing power available today allow us to develop sensors and reliable statistical solutions for condition-based monitoring. But there’s another material reason why predictive maintenance is becoming increasingly important. That has to do with the forecast, from ICAO, for a global shortage of Aircraft Engineers. This will require us to rethink the way we do aircraft maintenance. If we are still in a situation where we are effectively applying maintenance philosophies, age-based maintenance, that are, essentially, not applicable to those 82 percent of aircraft systems and components, and there is a global shortage of engineers looming, it means people are performing maintenance activities which are not the most effective to maintain that aircraft and there is a shortage of those people anyway. A combination of issues that cry out for improvements in maintenance philosophies.

This is what predictive maintenance is about, being able to get to a point where we can do condition based monitoring on that 82 percent of aircraft systems and components for which we know that maintaining them based on cycles or hours or calendar dates simply doesn’t make sense. We do it today because the MPD says we have to do it, but we know it doesn’t make sense. If that is already the case today, what might we be able to do to get started on transforming to predictive maintenance philosophies in an airline?

WHAT YOU NEED TO GET STARTED WITH PREDICTIVE MAINTENANCE
We, at EXSYN, see this as three different and distinct phases from the Reportive Airline to the Monitoring Airline to the Data Driven Airline (figure 6).

**FIGURE 6**
This diagram reflects the stages of ability of an airline to analyze what happened in the past and what is happening today; the different steps in what we might call the evolutionary ladder in order to be able to successfully adopt predictive analytical or predictive maintenance technologies. First it is necessary to look to the past and also know what is happening today, which makes up a Reportive airline. The Monitoring airline goes one step further; they know what happened in the past, they know what is happening today and they use that information to look for trends and what might happen going forward. The third step in adopting predictive maintenance or predictive analytical methodologies is to start looking beyond today. To use information from last year, yesterday; monitor what is happening today, identify trends with mathematical models and sensors in order to look beyond today and to what might happen with certain components and how their condition can deteriorate over time.

This implies that data is quite important: if we’re going to monitor conditions of components in order to maintain them it’s also important to know which factors will influence that condition: which environmental conditions can influence it, which
system use parameters can impact those conditions. It might be important to know several different things that an airline might not know today in order to successfully adopt predictive maintenance technologies (figure 7).

FIGURE 7
It’s important to know about the airline’s aircraft and fleet utilization and everything else that is needed for aircraft reliability monitoring; but it’s also necessary to have access to flight data recorder information. These are what we call ‘operational parameters’ that show how a particular aircraft has been operated or to which conditions it has been subjected. They’re the operational parameters that, in turn, influence the condition of aircraft components. That would require quite an extensive data model but, again, it’s a push towards a new maintenance philosophy. However, it comes with one big challenge and, interestingly enough, with all the different airlines with whom I’ve worked across the world, there is a common denominator which was confirmed in a recent industry survey.

For most airlines, if a technical director or head of maintenance and engineering is asked, they’ll tell you that their number one focus is predictive maintenance and that they’re putting a lot of resource, time and attention into that. Ask what is the biggest issue that respondents face and the largest response is ‘data accuracy’, the data is not that good. So, on the one hand, predictive maintenance is the highest priority while, on the other hand, data accuracy is the biggest issue that airlines face. That’s ironic in its own right; trying to use a lot of analytical, condition based monitoring technologies based on data that users don’t think is wholly reliable which, in turn, might influence the accuracy of some of these analytical models.

Of course, businesses will want to know when they might see a return on the investment into predictive maintenance and early evidence suggests that benefits of improved aircraft uptime and reduced maintenance costs, especially for unscheduled maintenance events are the early wins. The bigger benefits come when the airline is able to look at that 82 percent of maintenance programs and to improve those items which will deliver significant cost savings but that are hard to quantify as the change will be to a completely new situation in terms of aircraft maintenance philosophies.

There are some early win advantages but the main driver for those who are really serious about adopting predictive maintenance technologies is start with data accuracy today to have early-win advantages, focus on the accuracy and availability of data. That will be the foundation of being able to do successful predictive analytical modelling to get to
the point where maintenance on the aircraft can be done based on the monitored condition of those aircraft and systems.

The biggest challenge is not so much data sharing, because that is just a matter of time and the removal of barriers that constrain data sharing in the industry. It will be the change that has to take place in the industry that will bring the greatest challenge. We’re accustomed to doing maintenance too early in the preventive mode and will be moving to condition monitored maintenance which means we’ll need to rely on and trust the systems and algorithms that monitor the actual condition of aircraft systems and components. That might feel like giving up a bit of security, so we need to be one hundred percent sure that the outputs and conditions monitored are accurate.

TAKE-AWAYS
So, what can I offer you to take away from this article? There are five important things that I hope you have gained.

• Sensors and statistical modelling are the core essence for condition monitoring or for condition-based maintenance.

• A looming shortage of aircraft engineers will push MRO / M&E functions to rethink how aircraft maintenance is done.

• Technology allows us to only perform maintenance when condition indicates the necessity to do so. In essence, what we are talking about is a push of the industry towards a completely new maintenance philosophy: a move towards condition-based maintenance.

• The data required to be able to properly use such models within an airline might be of questionable quality and is scattered amongst multiple different stakeholders (OEM / Airline / MRO) so, if this is to be done properly by the industry then information needs to be shared with each other: otherwise, any initiative that might be embarked upon in the area of predictive maintenance, will be destined to fail from the outset.

I hope that this has managed to clarify a few issues around predictive maintenance and how readers might begin to go about implementing it in their own businesses.

on a scale from 1 to 5 how likely do you think to be able to adopt predictive maintenance within the next 24 months (with 1 not likely and 5 very likely)


If you are interested to discover at which stage your airline stands and receive feedback what you can do next, take the free questionnaire: Are you ready for predictive maintenance https://www.exsyn.com/news/Questionnaire


EXSYN AVIATION SOLUTIONS
EXSYN Aviation Solutions is an industry recognized partner for engineering and data solutions for the aviation industry. Driven by the purpose of supporting airlines and MRO’s to adapting to an increasingly digital aviation world, EXSYN’s capabilities have grown from a sole consulting firm to an aviation IT and managed service provider. EXSYN’s offering of applications and services is specialized for the fields of aircraft data management, data analytics and aircraft data processing. EXSYN’s solutions are driven out of real airline use cases and focus on aircraft reliability management, predictive maintenance, data processing and managed services for data migration, aircraft data optimization, and robotic process automation.
CASE STUDY: Smartwings’ App helps better manage parts
Petr Barton, Operational Supply Chain Manager, Smartwings
How Smartwings Group overcame the challenges associated with managing spare parts supply chain operations in a variety of outstations and different MRO providers by building an in-house web application for improvements across stock management.

WHITE PAPER: Looking for a smarter supply chain in MRO: Part 1
Nishant Balakrishnan, Lead, digital services sales for a European Airframe OEM, and Amol Salaskar, Consultant business analyst in aviation and MRO, IBM Center of Competency
Changes in the aviation industry also influence the MRO landscape, including OEMs (Original Equipment Manufacturers), airframe maintenance service providers, components and complex assembly repairs shops, and spare parts suppliers.

WHITE PAPER: Predictive maintenance — beyond the buzzwords
Sander de Bree, Founder & Chief Visionary, EXSYN Aviation Solutions
Predictive maintenance has become a top priority for many airlines and OEM’s, however what it entails is often unfamiliar. Explore the world of predictive maintenance and its technology in the perspective of the challenges faced in MRO.

WHITE PAPER: Digital twins: improving the way things work and wear
Nadine Etong, Director, MRO Product Line at the Aerospace and Defence Business Unit, IFS
As part of an enterprise eco-system, digital twins offer asset owners or MROs a high degree of insight into performance, wear and potential for failure in order to better plan and manage the lives of those assets and their contribution to the business.

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Digital twins: improving the way things work and wear

Nadine Etong, Director, MRO Product Line at the Aerospace and Defence Business Unit, IFS explains how commercial MRO is unlocking the huge opportunities of digital twins in aviation.
With interest in digital twin technology at an all-time high across a wide variety of industries, one of the forerunners in its adoption right now is the aerospace and defense sector. This is particularly true for the commercial aviation segment. In this article, I want to zero in on the potential benefits in this for independent MROs, outlining how they can leverage the technology to better serve customers, differentiate their service offerings and increase understanding of the specialist assets with which they work.

The global digital twin market size is expected to reach USD 26.07 billion by 2025 — registering a strong CAGR (compound annual growth rate) of 38.2% over the forecast years — and we are now starting to see the first successful use cases of digital twins in action in commercial aviation. GE has already built digital twin components for its GE60 Engine family and also helped develop the world’s first digital twin for an aircraft’s landing gear. In this last scenario, sensors placed on typical landing gear failure points, such as hydraulic pressure and brake temperature, provide real-time data to help predict early malfunctions or diagnose the remaining lifecycle of the landing gear.

FOUR TECHNOLOGY DRIVERS

These major advances in digital twin capabilities have been driven by four key technologies:

- **IoT (Internet of Things) and Big Data** — The proliferation of sensors on assets or components combined with connected systems allows organizations to gain detailed insights into live performance.
- **Advanced analytics** — Through machine learning we can use this data to predict and simulate the future condition or deterioration of the asset in question.
- **Computing power** — Cloud-based technology vastly improves the affordability and availability of the computing power required to run large-scale digital twin models.
- **Accessibility** — Where previously a digital twin may have been locked into the control room of a factory or organization, this data can now be accessed from anywhere via mobile devices.

DIGITAL TWIN IN NAME ONLY — DISPELLING THE ‘PHYSICAL’ MYTH

But, in order to use digital twins for the benefit of the business, it will first be necessary to understand them: so, what is a digital twin? An accepted definition would be a replica of anything which gives you real-time insight into the status of a real world asset to enable the organization to better manage equipment and inform business decisions. In fact, digital twins have been around — at least in part — for a while, but they’ve taken names such as ‘mirrored systems’ and ‘connected factories.’

However, these deployments have been focused on physical assets, unlike digital twins which are not limited to a 3D model of a single piece of equipment. Running a digital twin for a single asset is only the first step and, thanks to those four enabling technologies, this can now be extrapolated to create a digital twin of a whole fleet of assets. Take this a step further and a digital twin of the whole fleet can become part of a digital twin of an entire business or organization, with process flows visualized and bottlenecks flagged in real-time — much more valuable than one fancy 3D model.

No twins are identical

Digital twins work in different situations, applications and processes depending on the context of the organization in the supply chain. Component manufacturers, for example, are primarily focused on individual components, while engine OEMs care mainly about the engine as an entire asset. Heavy/base maintenance inspectors and regulators are more focused on overall maintenance business processes and standards, and this continues right up to line maintenance providers who look primarily at MRO data and the airline/operator which wants to piece together a digital twin of the entire aircraft.

**It’s all about the data — business applications act as key enablers**

These differing priorities have a consequence on what a business application needs to do to manage digital twin data. A lot of the data required for digital twin technology sits within supporting business applications: assets are mapped within enterprise software, including historical maintenance data, work orders and original engineering and design data.

From this we can see that enterprise applications are hugely beneficial in constructing different kinds of digital twins. In some cases, the supporting enterprise application acts as a digital twin of certain processes — whether that is the entire business or running a 3D model by taking in data from several third-party systems. In others, the enterprise software could be the source of the digital twin, becoming part of a larger data ecosystem which builds up a digital twin somewhere else. However, this requires flexible and agile enterprise software that has been designed to support digital twin
initiatives and is suitable to fulfil a variety of roles — failure to track and deliver data in the right place at the right time could lead to weak links in the chain and undermine an entire digital twin operation.

**FOUR BUSINESS BENEFITS FOR INDEPENDENT MROs**

Independent MROs who are regularly capturing key data streams in their enterprise software can start to quickly take advantage of digital twinning to differentiate their service offerings against other independent MRO competitors, and also against large inflexible OEMs that have a number of disparate systems in place.

There are a number of ways independent MROs can leverage digital twins to benefit themselves and their customers

**Increase aircraft safety**

Using serialized asset digital twins in conjunction with real-time/near real-time monitoring and predictive analytics can help detect a defect earlier, through prior insight into the component’s condition. The net result is that part safety is increased, making aircraft and airlines safer. One strong example is Dutch carrier KLM— it reduced its minimum equipment list defects and delays and cancellations by 50% since introducing AI to manage predictive maintenance.

**Evolve from repair shop to power-by-the-hour service provider**

Digital twins can transform the maintenance models offered by independent MROs toward offering lifecycle support contracts that reduce maintenance visits and costs through individual serialized inspection and service schedules. By taking the pressure of asset maintenance management, MROs allow airlines to focus on their core business of flying passengers, not spending cycles managing wrench turning. MROs can also redefine service contract terms for the specific assets being maintained, based on their digital twin history and projected future performance.

“Digital twins work in different situations, applications and processes depending on the context of the organization in the supply chain. Component manufacturers, for example, are primarily focused on individual components, while engine OEMs care mainly about the engine as an entire asset.”
“MROs are ideally placed to harness the ROI (return on investment) and benefits of digital twin technology to improve and optimize their service offerings and business performance.”

Extend asset life
Digital twins also enable MROs to build a broader understanding of supported assets while in service. They can use predictive maintenance techniques to maximize their availability and time on-wing, or overlay health monitoring data with a digital asset twin to trend performance and reliability on a serial number basis. This gives them unparalleled insight into the assets they support over time. As more asset information is built into the digital twin, MROs can learn from this to cement their reputation as asset or component experts.

Improve the business supply chain
The benefits of a digital twin spread more widely than just the single component in question. By knowing in advance which component will fail, supply chain managers can plan and have parts and material ready and available when needed—either to replace the failed component or for use as part of the repair process. The net result is that supply chain managers have better control of their stocks.

CASE IN POINT: TEST-FUCHS
One IFS customer that has designed a dedicated digital twin program is TEST-FUCHS, a leading manufacturer of test systems and components for aerospace and defense organizations. TEST-FUCHS has a dedicated digital twin approach for ground support assets and test equipment.

As manufacturer of the assets, TEST-FUCHS looks at the engineering and design and procurement data of the asset it is selling, and also has full control of the IoT-enabled test facility to provide maintenance data in real-time and then execute that maintenance in its repair shop. This gives the company a deep view of the data which builds up in an asset’s lifecycle and provides visibility across the entire digital twin landscape around every asset. IFS Applications plays a prominent role in this environment—enabling TEST-FUCHS to build up an enterprise-wide picture of their business processes to put the digital twin strategy into action.

UNLOCK MRO POTENTIAL
MROs are ideally placed to harness the ROI (return on investment) and benefits of digital twin technology to improve and optimize their service offerings and business performance. But in all these examples I have shown, to effectively put a digital twin strategy in place requires the support of agile and flexible enterprise software geared towards data-driven decision-making. With a strategy that is both solid and visionary, and the right software support, independent MROs can take a slice of the USD 26.07 billion opportunity that the growing digital twin market represents, and better serve their increasingly demanding airline customers.

NADINE ETONG
Nadine Etong is Director of the MRO Product Line at the Aerospace and Defence Business Unit in IFS. With over ten years of professional services, product management and marketing experience in the Aerospace and Defense market, Nadine has worked closely with numerous commercial aviation and independent MRO organizations on the selection and implementation of next-generation enterprise asset management software. She is a member of the International Association of Business Analysts (IIBA), holds a Bachelor of Computer Sciences from the University of Quebec in Montreal, and is currently working towards her Masters in Technical Projects Management.

IFS A&D
IFS has been delivering value-added solutions to the A&D sector for more than 20 years, providing solutions for commercial aviation, defense, fleet and asset management, logistics, manufacturing and more. Their aviation and defense industry experts are committed to ensuring the future success of customers by providing best-in-class solutions and industry expertise to prepare them for what’s next.

“Digital twins can transform the maintenance models offered by independent MROs toward offering lifecycle support contracts that reduce maintenance visits and costs through individual serialized inspection and service schedules.”
MRO Software Directory

Key ‘at-a-glance’ information from the world’s leading MRO software providers.

IT is a powerful force but, to leverage its greatest value, it must be harnessed and directed. It must also be able to handle huge and growing data streams that record every aspect in the lives of aircraft and the processes by which they fly. This challenge has attracted the best brains and most innovative enterprises to create IT solutions for one of the most demanding working environments, Aircraft MRO and M&E. Inevitably, there are many such developers and vendors offering solutions ranging from single function ‘Specialist Point Solutions’ to complete ‘End-to-End’ solutions covering the whole process. Only readers will know the specific requirements of their businesses but we have assembled a directory of the best MRO software providers and listed them alphabetically to make it easier for you to undertake a brief-ish (there are 35 providers and the number continues to grow) survey of the market, as a preliminary to starting on any specification and selection process. Or you might simply read it to keep up to date with what is available today.

2MoRO Solutions

2MoRO is a software development company dedicated to the Aviation market. Our teams are located in America, Europe and Asia. We work with partners and resellers in 20 countries. Our solutions are operated in 24 countries and are available in 5 languages. We have been providing cost-effective software to large aviation players as well as small and medium size enterprises for 12 years. We offer a panel of software to fit any type of aviation companies. Our solutions have been chosen by aircraft and engine manufacturers such as Airbus Helicopters or Safran Group but also by many aircraft operators, airlines or independent MROs. We are proud of our 95% retention rate achieved over twelve years of operation thanks to a superior customer service. 2MoRO Solutions works mainly on a fixed-price basis and is ISO 9001 certified for aviation software development, maintenance and support.

Aero One® and Aero-Webb® are certified by SAP® and complement their ERP solutions for aviation and MRO needs. 2Fly® is our cloud solution to reduce emergency AOG, mitigate human error and facilitate continuing airworthiness management. BFly® is a new way to create customized software for aviation and enables users to design personalized screens, workflows and business processes.

ADSoftware

ADSoftware has developed an integrated fleet management system and logistic package called AIRPACK. This 6 module system answers to the needs of aircraft and helicopters operators, as well as MRO and CAMO centres. It meets all requirements in terms of functionality, traceability, performance, aviation legislation and regulations. Today, ADSoftware counts more than 54 clients worldwide. The strength of ADSoftware is the simplicity of its products; they are Microsoft Windows® ready, Web-enabled, available in various languages and a complete training program can be done in just five days. The company also provides a 24/7 online technical support and extremely competitive pricing conditions.

ADT: Applied Database Technology

APPLIED DATABASE TECHNOLOGY (ADT) is a professional services and software development firm that provides MRO software solutions for aircraft operators as well as aircraft repair and overhaul organizations. Our commitment to this business segment is proven with our software package, WINGS, designed specifically for aerospace companies. ADT has been in the software business since 1992 and has built an excellent customer reference base. Our first priority is always customer satisfaction; thus we have obtained 100% customer satisfaction since 1992. ADT has a proven record to develop reference accounts in the Aviation industry along with other high technology companies which are considered to be leaders in their fields.

NAME OF PRODUCT MARKETED
• Wings NG

KEY BUSINESS/SOFTWARE AREAS
• Fleet Management
• Maintenance Engineering
• Material Management
• Production Planning
• Labor Collection, Billing
AeroSoft Systems

**W:** www.aerosoftsys.com  
**T:** +1 905.678.9564  
**E:** sales@aerosoftsys.com

Location: Ontario, Canada; Miami, FL, USA; Austria

**NAME OF PRODUCT MARKETED**  
• DigiMAINT, DigiDOC, WebPMI/DJM

**KEY BUSINESS/SOFTWARE AREAS**  
• Maintenance and Engineering Management  
• Digital Document Content Management  
• Business Intelligence Reporting  
• Business 2 Business transaction interface  
• Interface to Financials / Flight Operations

AeroSoft Systems Inc. is unique in MRO IT, born in 1997 out of aircraft OEM digital document systems and the evolution of ATA iSPEC2200 and SPEC2000 standards. AeroSoft has two distinct MRO IT products: DigiMAINT and WebPMI sharing a common set of optional modules for BI, B2B, Finance and Flight Operations, plus DigiDOC, a state of the art digital content management system. AeroSoft has the unique expertise to integrate DigiDOC with any competitive MRO IT system. Strategic partners include Hexaware Technologies Inc. who are jointly going to market internationally offering large IT capacity at competitive rates.

**CLICK HERE** for Product Details  
**CLICK HERE** to Request Private Demo

Aerostrat

**W:** www.aerostratsoftware.com  
**T:** +1-888-558-2860  
**E:** info@aerostratsoftware.com

Location: Seattle, USA

**NAME OF PRODUCT MARKETED**  
• Aerros

**KEY BUSINESS/SOFTWARE AREAS**  
• Heavy/Base Maintenance Planning  
• Capacity/Workload Planning  
• Maintenance Event Optimization  
• Maintenance Event Performance Tracking  
• Heavy/Base Production Schedules

Aerostrat is based in Seattle, WA and offers one product called Aerros, a one-of-a-kind program that manages an airline’s or MRO’s aircraft maintenance schedule. Aerros enables users to optimize the maintenance program by managing various maintenance and operational constraints, which maximizes event yield, drives costs down, and enable the organization to plan proactively, not reactively.

Aerros provides robust ‘what-if’ scenario capabilities that allow users to see the effect of different variables. This aids in making sound business decisions concerning the maintenance and fleet plan. Some of these variables are maintenance programs limits, min/target/max yield, aircraft hr/cy utilization, track/requirement compatibility, and maintenance allocations. To forecast an optimal maintenance plan within an operation, Aerros also provides a Capacity Planning feature. This feature allows users to input and view vendor capacity available and labor hour demand to better manage the labor force.

Aerros also provides easy-to-navigate scenarios with drop and drop event movement and manipulation. Scenarios can be published so others (including vendors or operators) can view the plan. Aerros provides excellent system stability and reliability with standard IT practices. It is also integration-ready and designed to work as an extension of a user’s existing information systems.

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AMC Aviation

**W:** www.amc-aviation.fr  
**T:** +33 6 33 27 80 38  
**E:** contact@amc-aviation.fr

Location: France and Dubai

**NAME OF PRODUCT MARKETED**  
• iCare AMS, iCare SMS, iCare iTech

**KEY BUSINESS/SOFTWARE AREAS**  
• Full Operator / independent CAMO management  
• Full Operator / independent AMO/MRO management  
• Full Logistics / Purchase Management  
• QA Conformity and SMS management  
• Costs and invoicing management

With 20 years of experience, AMC Aviation is an EASA CAMO PART-M, EASA PART-145 and Consulting company. We offer an important range of services to airlines and leasing companies such as Maintenance support, engineering services, airworthiness management, civil aviation trainings, software solutions and flight operation services.

Our Moto is “Your success is our commitment”

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APSYS

**W:** www.apsys-airbus.com  
**T:** +33 (0) 5 61 30 99 00  
**E:** gesine.varfis@apsys-airbus.com

Location: France

**NAME OF PRODUCT MARKETED**  
• AMASIS, IBIS, Simflia and Simlog

**KEY BUSINESS/SOFTWARE AREAS**  
• Consulting Services  
• Enterprise Risk Management  
• Digitalization and Analytics  
• Airline and MRO Excellence  
• Maintenance and Risk Management Solutions

As an Airbus subsidiary APSYS serves customers worldwide in determining leading risk management standards in close cooperation with our customers.

Deeply rooted in aerospace engineering, the company's experts are involved throughout the entire lifecycle of an aircraft from design to in-service operations guaranteeing reliable and safe aircraft operations (Product Assurance & Safety). APSYS supports its customers in achieving highest security standards for their operational and Information Technology to reduce vulnerability, making sure that clients have state of the art tools and processes established to manage attacks and threats (Product Security). On behalf of customers, APSYS has defined and implemented processes and tools for controlling technical, human and operational risks. With more than 450 employees APSYS supports the aerospace industry, but also the defense, transportation and energy sectors.

**CLICK HERE** for Product Details  
**CLICK HERE** to Request Private Demo
AIS’s RAAS system is a best-of-breed M&E solution for the evolving operator, MRO and CAMO. Our solution is 100% browser-based and tablet friendly, compatible with all major browsers including Apple Safari, Google Chrome, Firefox, and Microsoft Internet Explorer. RAAS includes industry-leading paperless functionality such as task-step level signature, parallel inspection program management per type, digital part certification handling, iPad/Android /Windows tablet-based EML, electronic maintenance status board, centralized document library, wireless barcode scanning, and much more. RAAS offers flexible pricing and system hosting options making it suitable for a wide range of customer types and sizes.

**NAME OF PRODUCT MARKETED**  
- RAAS & RAAS Express

**KEY BUSINESS/SOFTWARE AREAS**  
- Production Planning and Management  
- Inventory and Procurement  
- Inspection Document Management  
- Reliability and Performance Analysis  
- Financial and Flight Operations Integration

The Boeing Company

**NAME OF PRODUCT MARKETED**  
- Airplane Health Management  
- Business Consulting  
- Maintenance Performance Toolbox  
- Optimized Maintenance Program

**KEY BUSINESS/SOFTWARE AREAS**  
- Technical Content Management  
- Vehicle Health Mana gement  
- Maintenance Optimization Consulting

Boeing is the world’s largest aerospace company and leading manufacturer of commercial jetliners and defense, space and security systems. Boeing Support and Services combines airplane design and manufacturing expertise with unique access to fleet-wide operational data to offer optimization solutions. With these offerings, Boeing addresses the evolving need for integration and optimization of data and information across the aviation ecosystem to empower smart decision-making. The portfolio includes services and solutions for flight operations, maintenance & engineering and procurement organizations to optimize the operational efficiency of airplanes and operations. Boeing has more than 250 customers for its optimization solutions. The portfolio draws on solutions from a family of Boeing companies: AerData, Inventory Locator Services and Jeppesen, serving operators of Boeing and non-Boeing airplanes.

**NAME OF PRODUCT MARKETED**  
- Aircraft Project Management  
- Aircraft Asset Management  
- CARDS (Civil Aviation Remote Delivery System)  
- Aircraft Technical Services

**KEY BUSINESS/SOFTWARE AREAS**  
- Aircraft Asset Management  
- Aircraft Delivery and Re-delivery Management  
- Aircraft Annual Inspection Management  
- Aircraft Project Management  
- Aircraft Technical Services

CaseBank Technologies

**NAME OF PRODUCT MARKETED**  
- ChronicX  
- Spotlight  
- ATP Maintenance  
- ATP Operation Manuals  
- ATP Libraries

**KEY BUSINESS/SOFTWARE AREAS**  
- Maintenance Operations Solutions  
- Reliability Tools  
- Aircraft Troubleshooting  
- Business Intelligence for Aircraft  
- Recurring Defect Analysis

CaseBank Technologies Inc., a Division of ATP provides troubleshooting, reliability and defect trend analysis, so engineering and service teams can accelerate equipment repair, increase uptime, reduce warranty costs and enhance product support and performance. ATP is focused on maximizing the value of aircraft and aviation operations by providing tools, information and insight that optimize aircraft availability and operational compliance. Over 40+ years in the aviation industry ATP has developed expertise in managing and analyzing content for maintenance, operations, and compliance. ATP adds value through smarter reference content and historical documentation, integrated into decision support, productivity and advisory services to deliver efficient operations.

The ChronicX® innovative solution for detecting and managing recurring aircraft defects, identifies, consolidates, and ranks recurring/chronic defects to uncover hidden trends. It employs advanced NLP and fuzzy logic to analyze PIREPS and MAREPS and generate clusters of potential recurring defects to help prioritize costly and critical problems.

**NAME OF PRODUCT MARKETED**  
- Aircraft Health Management  
- Aircraft Troubleshooting  
- Reliability Tools  
- Maintenance Operations Solutions  
- ATP Libraries

**KEY BUSINESS/SOFTWARE AREAS**  
- Business Intelligence for Aircraft  
- Aircraft Technical Services  
- Aircraft Project Management  
- Aircraft Annual Inspection Management  
- Aircraft Delivery and Re-delivery Management

CloudCARDS Ltd.

**NAME OF PRODUCT MARKETED**  
- CARDS (Civil Aviation Remote Delivery System)  
- AMS (Asset Management System)

**KEY BUSINESS/SOFTWARE AREAS**  
- Aircraft Asset Management  
- Aircraft Delivery and Re-delivery Management  
- Aircraft Annual Inspection Management  
- Aircraft Project Management  
- Aircraft Technical Services

CloudCARDS Ltd. an aircraft delivery and asset management software provider, formed in Ireland April 2013, has an experienced team of aviation experts working together to seamlessly deliver its exceptional software products to both Airlines and Leasing Companies around the globe. The long-term objective in CloudCARDS Ltd. is to dramatically reduce the cost of aircraft asset management and improve the oversight the owner and operator has on the asset.

CARDS® — Civil Aircraft Remote Delivery System is a software platform designed to financially manage the asset and fully project manage the technical review, aircraft physical & records audit. AMS — Asset Management System is designed to manage the day-to-day management of the asset including utilization, maintenance reserves, alerts, forecasting, invoicing and reporting. All CloudCARDS Ltd. products are securely built using the latest cloud based technology.

After all, your aircraft operate in the clouds, so why not manage them there too?
Comply365

**W:** www.comply365.com  
**T:** +1 (800) 206-2004  
**E:** info@comply365.com  

**Location:** USA

**NAME OF PRODUCT MARKETED**  
ProAuthor (XML-Based Authoring Solution)  
Electronic Flight Bag (EFB)  
Digital Briefing  
Document & Communication Manager  
Training Solution (LMS Learning Manager)

**KEY BUSINESS/SOFTWARE AREAS**  
XML-Based Authoring Solution  
Electronic Flight Bag (EFB)  
Digital Briefing Flight Release  
Document Mgmt. and Distribution Platform  
Targeted Distribution w/ Compliance Tracking

**Comply365** delivers secure, cloud-based solutions, focusing on Authoring, EFB and Digital Briefing Solutions, as well as Targeted Distribution of Mobile Manuals.

The Authoring Solution, features ProAuthor: the aviation industry’s first and only XML-based solution for authoring, revising and distributing publications.

Comply365’s proven Electronic Flight Bag (EFB) solution lets crews access mission-critical information throughout each phase of flight.

Digital briefing helps turn planes faster for more on-time departures with instant feedback to dispatchers when the flight crew accepts a release and signs Fit for Duty.

Comply365’s full-featured Document Management and Targeted Distribution Platform boosts productivity by delivering any type of manual or document directly to any mobile device or stationary workstation.

**CLICK HERE for Product Details**  
**CLICK HERE to Request Private Demo**

Commsoft

**W:** www.commsoft.aero  
**T:** +44 (0) 1621 817 425  
**E:** nsg@commsoft.aero  

**Location:** Tiptree, Derby, Norwich, Gatwick, UK; Australia, India

**NAME OF PRODUCT MARKETED**  
• OASES

**KEY BUSINESS/SOFTWARE AREAS**  
• User Friendly: for all levels of expertise  
• Excellent Support: full support throughout the product life cycle  
• Scalability: can grow with your business  
• Cost: low ‘cost of ownership’  
• Security: proven security

OASES from Commsoft covers all aspects of aircraft maintenance for airlines and third-party maintainers including: inventory control; rotatable tracking; demand handling; requirements planning; PO and RO processing; component and aircraft technical records; maintenance forecasting; aircraft check planning and documentation. Also, check accomplishment analysis; aircraft technical log recording; shop floor data collection; work in process; time and attendance monitoring, and system and component reliability analysis, plus repetitive defects, sales order processing, full quotation management, invoice passing, advanced scheduling, line maintenance control, AD/SB evaluation and deferred defect management. The company provides electronic AMMs and IPCs linked electronically to, and accessible by, the system.

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Conduce

**W:** www.conduce.net  
**T:** +44 333 888 4044  
**E:** info@conduce.net  

**Location:** Nuneaton, Warwickshire

**NAME OF PRODUCT MARKETED**  
• eCentral8  
• eCabinLog8  
• eTechLog8  
• eTraining8

**KEY BUSINESS/SOFTWARE AREAS**  
• Electronic Tech Log  
• Cabin Log  
• Document Viewer

Conduce specializes in producing mobile applications for the aviation industry, writing native Win8/10 and IOS tablet “Touch” solutions and integrating these with responsive modern connected websites. The current flagship product eTechLog8 enables an airline to eliminate the traditional paper based tech log/cabin log and deferred defect books and is currently in differing stages of contract, trial & acceptance with various airlines. Several NAA’s are also now involved with respect to monitoring these projects, enabling the necessary approval for the eventual roll out of paperless tech log systems with multiple EASA approved airline fleets.

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**CLICK HERE to Request Private Demo**

CrossConsense

**W:** www.crossconsense.com  
**T:** +49 69 4035 7600  
**E:** contact@crossconsense.de  

**Location:** Frankfurt Germany; Heusenstamm Germany

**NAME OF PRODUCT MARKETED**  
• CROSSMOS

**KEY BUSINESS/SOFTWARE AREAS**  
• Electronic Techlog Development  
• Support  
• Consulting  
• Business Intelligence solutions  
• App and dashboard development

“Since being established in 2002, we basically think from the perspective of the user. We are not pure IT geeks and it is exactly that which characterizes our services and products. Thus we distinguish ourselves from most of the specialists for the implementation of solutions. We can’t do otherwise, because in the DNA of CrossConsense are many years of experience in Airlines, in the area of procurement, engineering and maintenance. We know your job as if it were ours. And THAT you will feel immediately!”

CrossConsense’s portfolio stretches from AMOS Support, BI-Management, Data Migration and Hosting to the products CROSSMOS® (electronic tech log) and ACSIS (tool for predictive maintenance).

CROSSMOS® is an electronic technical logbook (eTL) developed with state-of-the-art methods and technologies. The CROSSMOS® ELB consists of a service oriented architecture with modular and exchangeable components, exchangeable interfaces and separately updateable software modules. CROSSMOS® includes a pilot client, a cabin client and a maintenance client. CrossConsense is already working with several international customers, gathering operational and legal requirements from all sources CrossConsense also has a long tradition in providing support for AMOS. You have one single point of contact (no separated responsibilities for hardware, database or application support) for 1st and 2nd level.

**CLICK HERE for Product Details**  
**CLICK HERE to Request Private Demo**
EmpowerMX
W: www.empowermx.com
T: +1 866-498-3702
E: info@empowermx.com
Location: Frisco TX, USA

EXSYN Aviation Solutions
W: www.exsyn.com
T: 0031-20-760 8200
E: hello@exsyn.com
Location: Amsterdam

Flatirons Solutions
W: www.flatironsjouve.com
T: +1.303.627.6535
E: patrick.dawson@flatironsjouve.com
Locations: Europe, Asia, and the United States

Honeywell
T: +44 1344 656000
E: John.Bradshaw@Honeywell.com
Location: Germany, UK, USA

NAME OF PRODUCT MARKETED
• FleetCycle® Execution Suite — MRO Manager (FCXM)

KEY BUSINESS/SOFTWARE AREAS
• FleetCycle® Execution Suite: Production Manager (FPXM), MRO Manager (FCXM) and Line Manager (FCXL)
• Maintenance Program Manager (FCMPM), Planning Manager (FCPM), Reliability Manager (FCRM), Material Manager (FCMM), and Maintenance Intelligence (FCMI), Electronic LogBook (FCELB)
• Coming Soon: FleetCycle® Executive Suite — Shop Manager (FCXS)

EmpowerMX is an aviation industry-recognized software development/consulting-services business. We are purely focused on empowering our customers with the ability to decrease the costs of making air travel safer by equipping their decision makers with reliable, real-time/globally available intelligence for minimizing maintenance turn times/OpEx while maximizing airworthiness/profits. FCXM allows MROs, airlines, and lessors to effectively control the entire maintenance lifecycle or only the portions for which they are responsible. Airlines can jointly manage their outsourced and insourced activites like engineering reliability, QA and maintenance programs at the line, heavy and shop levels with an expected reduction in cycle times and increase in labor productivity on the magnitude of 16-30 percent. Third-party MROs can run their entire operation from bidding through contracting to invoicing.

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EXSYN Aviation Solutions

NAME OF PRODUCT MARKETED
• Avilytics, TITAN

KEY BUSINESS/SOFTWARE AREAS
• Aviation Analytics solution
• Aircraft Reliability Management solution
• Predictive Maintenance solution
• Robotic Process Automation
• Data Migration
• Consulting Service

EXSYN Aviation Solutions is specialized in the field of aircraft data, analytics & processing and provides user-friendly and innovative aviation IT solutions for aircraft reliability management and predictive maintenance. Also offered are data processing and managed services for data migration, interface design and software implementation management. They also build customized solutions and software tools if off-the-shelf products do not meet a customer’s needs.

Avilytics is EXSYN’s Predictive Maintenance, Aircraft Reliability, and Engineering & Maintenance KPI Solution, reducing AOG’s through informed decision making to prevent delays, cancellations and save costs.

TITAN is a source independent data processing solution for data migration purposes during an MRO software implementation and for aircraft phase-in & phase-out. Because of its unique technological framework TITAN eliminates most human intervention during migration of aircraft airworthiness & maintenance data and allows repetitive usage to directly migrate fleets between MRO software systems.

CLICK HERE for Product Details
CLICK HERE to Request Private Demo

Flatirons Solutions

NAME OF PRODUCT MARKETED
CORENA Suite

KEY BUSINESS/SOFTWARE AREAS
• Content Management System (CMS)
• Interactive Electronic Technical Publisher (IETP)
• Maintenance & Engineering
• Flight Operations
• Tablet Solutions & Mobility

Flatirons provides consulting, technology, and outsourcing for content lifecycle management (CLM). For more than 20 years, we have served global Fortune 1000 customers in aerospace, automotive, electronics, financial services, government, healthcare, and publishing. Our customer engagements help organizations efficiently deliver the right information, at the right time, to the right people by leveraging structured content and digital media — Turning Content into Knowledge®. The CORENA Suite by Flatirons is the leading content lifecycle management (CLM) solution developed specifically for organizations that rely on mission-critical data to design, manufacture, operate, or maintain complex assets over their product and service lifecycles as well as across multi-echelon business networks. For more than 25 years, the world’s leading airlines, aerospace manufacturers, OEMs, and defense organizations have relied on the CORENA product suite to create, manage, and deliver large volumes of technical information throughout its lifecycle. Today, CORENA customers rely on the CORENA suite to modernize their IT infrastructures, improve customer satisfaction, and maintain their competitive advantage.

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Honeywell

NAME OF PRODUCT MARKETED
• Vocollect

KEY BUSINESS/SOFTWARE AREAS
• Voice Solutions for MRO
• Hands-Free, Eyes-Free MRO

Vocollect solutions deliver a new level of documentation and compliance in your maintenance and inspection operations. The use of voice in a Hands-Free, Eyes-Free manner enhances the documentation of standard operating procedures and provides the continuity you need to provide better consistency across your various locations.

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IDMR Solutions

W: www.IDMR-Solutions.com
T: +1-347-565-4367
E: sales@IDMR-Solutions.com
Location: New York/Tel Aviv

NAME OF PRODUCT MARKETED
• InForm

KEY BUSINESS/SOFTWARE AREAS
• Technical Publication
• Engineering Orders
• Task Cards
• Planning
• Maintenance Programs

IDMR is a global provider of easy to use and all encompassing Technical Documentation Management Solutions which have been designed exclusively for Fleet operators, MRO providers and OEM organizations. IDMR's Technical Documentation Management Solutions have proven success in increasing operational performance and decreasing operational cost while ensuring airworthiness, safety and regulatory compliance.

IFS

W: www.ifsworld.com
T: +613-576-2480
E: AndInfo@ifsworld.com
Locations: 60+ Worldwide

NAME OF PRODUCT MARKETED
• IFS Applications, IFS EOI, IFS Tail Planning, IFS Maintenix

KEY BUSINESS/SOFTWARE AREAS
• Fleet and Asset Management
• Maintenance, Repair and Overhaul (Incl line, heavy, complex assembly, component repair)
• 3rd-party MRO bidding, quoting, invoicing, product lifecycle management, enterprise operational intelligence

IFS is a globally recognized provider of software solutions for global aerospace & defense (A&D), including airlines and fleet operators, A&D manufacturers, defense in-service support and independent MROs. IFS’s solutions support project and program-centric manufacturing; a complete spectrum of maintenance management capabilities for sea, land and air assets, from heavy, complex, and component MRO, to line maintenance or at-platform/asset support; as well as all types of procurement models. IFS’s innovative enterprise solutions are designed for the regulated A&D industry and markets where manufacturing, MRO, project and service functionality are business- and operationally-critical whilst also supporting global, core enterprise capabilities for managing finance, inventory and human resources. With flexible, modular and enterprise breadth, IFS solutions empower A&D organizations to quickly adapt and manage change whilst delivering bottom-line value, increasing efficiencies and cost savings, and safeguarding compliance. IFS customers include BAE Systems, Lockheed Martin, General Dynamics, SAAB, GE Aviation, Pratt & Whitney, HAL, Emirates, LATAM, Qantas, China Airlines, Air France-KLM, and Southwest Airlines.

Laminaar Aviation InfoTech

W: www.laminaar.com.sg
T: +65 6239 0150
E: contact@laminaar.com.sg
Locations: Singapore, Denver, Bangalore, Mumbai

NAME OF PRODUCT MARKETED
• ARMS’2.5, ARMS’NS, ARMS’on the TAB, InfoPrompt 2.5

KEY BUSINESS/SOFTWARE AREAS
• Network / Commercial Planning with Optimizers
• Flight Operations / Fleet Following
• Crew Operations Management with Optimizers
• Maintenance, Engineering & Logistics

A future-ready and fully integrated software applications suite for the aviation business: airlines, non-scheduled operators, MROs, airport operators, regulators and training facilities, with in-built optimizers, business intelligence (BI) & Data Analytics. Our offerings may either be accessed as a complete suite covering the full spectrum of operations, or as a stand-alone module addressing a specific functional area, e.g., Network Planning, Flight Ops, Crew, Maintenance, Logistics or Safety or Analytics. The suite has a unified database that allows a seamless flow of data and information between operational functions. Our product is highly customizable and designed to adapt to clients’ specific requirements. We do our own implementations, on a turnkey basis, and also provide prompt, reliable and economical technical support in-life.

Lufthansa Industry Solutions

W: www.lufthansa-industry-solutions.com
T: +49 40 5070 30000
E: marketing.sales@lhind.dlh.de
Location: Germany, Switzerland, USA

NAME OF PRODUCT MARKETED
• DocManage Product Suite, DocSurf Mobile, EFFOM, DocCreate

KEY BUSINESS/SOFTWARE AREAS
• IT Solutions and Process
• Consulting for MRO
• Electronic Flight Operation Manuals
• Airline Job Card Content Management
• Predictive Analytics and Maintenance
• RFID

Lufthansa Industry Solutions is an IT service company for process consulting and system integration. This wholly-owned subsidiary of Lufthansa Group supports its customers with the digital transformation of their company. Its customer base includes both companies within Lufthansa Group as well as more than 150 companies in various other industries.

The products EFOM and DocSurf Mobile were developed together with Lufthansa Airlines based on 15 years of common experience and excellence in electronic flight operations manuals and processes to fulfill both current and future requirements. EFOM — A manufacturer independent Content Management System. Functionally mature and based on 17 years of experience, EFOM makes it possible to fulfill FlightOps requirements, e.g. expandable for new publishing backends; flexible to integrate new documents; open for customized enhancements or to integrate business processes such as Compliance Management. DocSurf Mobile — A Library Viewer for MRO and FlightOps documents is available as a native iOS app or Windows application. The revision service allows change lists to be checked and content to be compared with a previous version. Navigation is intuitive and includes a fast and easy search. A user independent management of favorites and notes is provided, keeping this information revision safe and available.
NVable

NAME OF PRODUCT MARKETED
• ConNVerge for Aviation

KEY BUSINESS/SOFTWARE AREAS
Electronic Techlog
Electronic Forms (Assessments)
Document Management
Operational Analysis
Station Operational Compliance

The concept behind our ConNVerge platform is simple. We believe that businesses should have the flexibility to easily innovate and add new applications to their toolbox, without being stilted by legacy technology or a single technology brand. ConNVerge is all about minimising risk, fuss and capital costs and maximising efficiency. Provided as a service, it combines a hosted environment and web portal with mobile applications and data interfaces to virtually any system.

The platform is easily integrated into your existing business systems and brings together the best tools to handle data acquisition and data analysis — all on scalable infrastructure. Best of all, we even take the day-to-day management off your hands.

Our ConNVerge platform is blazing a trail in the aviation sector. In a hi-tech industry, where the stakes are even higher, long-standing clients such as British Airways Cityflyer know they can rely on NVable and our custom-designed software to make things simple, safer, more secure and streamlined. We provide airlines with technology solutions that reduce effort, improve processes and produce useful information, with one simple goal — to change things for the better.

Bring everything together and do IT better when you bring onboard ConNVerge and NVable.

CLICK HERE for Product Details
CLICK HERE to Request Private Demo

Orlando

NAME OF PRODUCT MARKETED
• Orlando Suite for Tech Pubs

KEY BUSINESS/SOFTWARE AREAS
• Cloud Aviation Document Management
• OEM and company manuals XML authoring
• Controls & Data Analytics
• Publishing and Distribution
• Web & Mobile & EFB document viewer

Orlando Suite for Tech Pubs is an XML-based cloud Document Management System designed for airlines, MRO and manufacturers. It is the unique solution capable of managing Company, Flight Ops, Maintenance and Engineering manuals in one system. It is natively compliant with OEMs’ proprietary electronic data schemas and with the main aviation technical data standards (ATA Spec 2300, ATA Spec 2200, S1000D).

Orlando Suite features are in 7 modules to streamline the manuals lifecycle: Library (Cloud CMS), Editor (Web based WYSIWYG editing, content reuse), Merger (automated OEM/airline manuals reconciliation), Analytics (data checker, compliance to regulations, revision report), Publisher (HTML, PDF and XML), Dispatcher (Distribution of publications, Mobile Content Management), Explorer (Web & Mobile & EFB viewers).

It also supports interoperability with other systems, and (manuals can be exported to their native XML standard. Our customers benefit from the best in class secured Cloud offer as well as premium support services delivered by our Tech Pubs experts committed to assisting users at every stage of the process.

Orlando is the sole off-the-shelf solution approved by the leading turboprop manufacturer ATR to manage the ATR Flight Operations XML manuals.

CLICK HERE for Product Details
CLICK HERE to Request Private Demo

Ramco Systems

NAME OF PRODUCT MARKETED
• Ramco Aviation M&E Solution, Ramco Aviation MRO Solution, Ramco Anywhere Apps, Ramco flyMORE

KEY BUSINESS/SOFTWARE AREAS
• Maintenance & Engineering
• Maintenance, Repair & Overhaul
• Mobility Solutions

Ramco Systems offers Aviation Maintenance solutions on premise and on cloud, with multi-tenant capability and next-gen mobility for Airlines, Hel-Operators, MROs and Charter operations. Its comprehensive scope spans the spectrum of organizational needs, including Finance, HCM, Manufacturing, Planning and Optimization, in one integrated platform.

Ramco Aviation’s latest Next-Gen digital technologies include: Mobility Solutions: Ramco’s next-gen mobility solutions for maintenance operations are available through an app ecosystem wherein everybody involved can seamlessly execute critical operations on the go, from anywhere, anytime; The BOTS Revolution: Ramco intelligent CHATBOTS deliver parts data, manage AOGs, and perform daily admin tasks for a more personalized and immersive ERP experience: Hyper-Connected Ecosystem: B2B integrations with AeroXchange, Gains, Logistics providers and OEMs bringing Suppliers, Customers and Logistics providers together on ONE platform.

Ramco Series 5 reduces Turn Around Time (TAT) while increasing operational performance and compliance through user-friendly interfaces. Ramco has always been an innovator in maintenance IT — enabling clients to focus more on business-critical activities, while the solution processes transactions and decision support, based on intelligent rules. Powering 4000+ aircraft and 21,000+ end-users, Ramco is used by more than 75 operators worldwide.

CLICK HERE for Product Details
CLICK HERE to Request Private Demo

Rolls-Royce Controls and Data Services

NAME OF PRODUCT MARKETED
• VisiunnDIAGNOSTIC, VisiunnFUEL, VisuunnAQD

KEY BUSINESS/SOFTWARE AREAS
• Equipment Health Management
• Fuel Efficiency Management
• Emissions Monitoring
• Fleet Reporting
• Safety, Quality and Risk Management
• MRO Business and Parts Management

Today, in the aerospace sector only, over 1,300 customers are benefiting from Rolls-Royce digital services globally. Through our EHM services, we monitor around 10,000 engines, 24 hours a day, 7 days a week, 365 days a year, analysing billions of data points on-board per flight, and millions every day on the ground. Our digital services complement the Group’s TotalCare® Service Solutions of Maintenance, Availability, Efficiency and Asset Value, allowing our customers to increase availability of their critical assets, minimising risk and operational disruption to ultimately improve their operational efficiency.

CLICK HERE for Product Details
CLICK HERE to Request Private Demo
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ROTA.technology Inc.

W: www.rota.technology
T: +1 321 710 7682(ROTA)
E: info@rota.technology
Location: Melbourne, FL USA and global

NAME OF PRODUCT MARKETED
• Consulting, MXF Software, PDS(Process Development System) and custom applications

KEY BUSINESS/SOFTWARE AREAS
• MRO IT Software Implementations
• MRO IT Software Upgrades
• MRO IT Software Support/Managed Services
• MX Long Range Planning
• MRO IT Custom Software Development

With MRO systems projects and support spanning both the military and commercial markets, ROTA brings proven experience to all sides of aviation. Our team has been embedded for years in the business functions we support. In both military and commercial. Specializing in system implementations and upgrades, ROTA brings deep knowledge of aviation business processes, integrated into custom built software, to provide not only all testing documentation but also leave customers with a full manual into custom built software, to provide not only all testing knowledge of aviation business processes, integrated system implementations and upgrades. ROTA brings deep support. In both military and commercial. Specializing in aviation business processes, integrated system implementations and upgrades. ROTA brings deep support. In both military and commercial.

Rusada

W: www.rusada.com
T: 03333 440730
E: information@rusada.com
Location: Switzerland, USA, UK, UAE, India, Singapore, Australia

NAME OF PRODUCT MARKETED
• Envision

KEY BUSINESS/SOFTWARE AREAS
• Fleet Management
• Base Maintenance
• Line Maintenance
• Flight Operations
• Materials Management

Rusada develops ENVISION - an industry-leading MRO and Flight Operations solution. With over 100 customers worldwide and a combined fleet of 2,000 fixed-wing and rotary aircraft, ENVISION is used by aircraft operators and MRO’s to successfully manage their operations.

The latest version of ENVISION is web-based and device-agnostic with an intuitive and user-friendly interface. Modules, which can be purchased individually or as part of an integrated solution, include: Fleet Management, Base Management, Line Maintenance, Component Maintenance, Materials Management, Financial Management, Resource Management, Quality & Safety Management and Flight Operations.

Safran Aircraft Engines

W: www.saffran-aircraft-engines.com
T: +33 (0) 69 87 09 00
E: contact.enginelife.safrangroup.com
Location: 35 production plants, design offices and sales offices throughout the world

NAME OF PRODUCT MARKETED
• LEAP, CFM56, SaM146, Silvercrest

KEY BUSINESS/SOFTWARE AREAS
• Commercial engines
• Large turbofan engines
• Business engines
• Military engines
• Support services

Safran Aircraft Engines designs, develops, produces and sells engines for commercial and military aircraft. We also offer a complete range of support services to airlines, armed forces and other operators.

Safran Aircraft Engines provides all CFM56® users with a wide range of support services, under the EngineLife® brand. These world-class services cover the entire life cycle of the engine.

We are a world-leading provider of MRO services for the CFM56. Our overriding goal is to reduce engine removals and maintenance costs. Safran Aircraft Engines deploys the skills needed, through our network of shops and OEM expertise, to provide all customers — whether airlines, operators or leasing firms — with the same top-flight service anywhere in the world.

Safran Aircraft Engines also provides full customer support for CFM56 engines, which means that we are in permanent contact with our customers and their requirements. Building on 40 years of customer experience, we deploy a team of permanent reps, a 24/7 call center, a dedicated Customer Web Center, and a training center offering more than 90 different programs. We are also developing innovative services based on the advanced analysis of flight data, and a slate of expert, value-added consulting services from our seasoned staff.

Seabury Solutions

W: www.seabursolutions.com
T: +353 61 749 010
E: marketing@seaburymro.com
Location: Ireland; Argentina

NAME OF PRODUCT MARKETED
• Alkym, EPAS, eAuthority

KEY BUSINESS/SOFTWARE AREAS
• Technical Operations
• CAMO
• MRO
• Performance Analytics
• Regulator Applications

Seabury Solutions is a leading global aviation software development and consultancy company. It was established in 2002 and forms part of the Seabury Group. Seabury Solutions has built a reputation in that time as the vendor who delivers cost-effective world-class aviation management software. The integrated product range includes solutions for Airlines, MRO Organizations, Aviation Regulators. Enterprise Performance Analytics Systems (EPAS) includes models used for Maintenance Analytics, Contracts and Invoicing, Flight Profitability, Budget Planning, Fuel Planning, Market Analytics and Sales / Distribution Analytics.

With our software products serving over 80 customers in 35 countries globally they are suitable for the largest to small / medium sized operations.

Alkym Management and Central System for Aircraft Maintenance is a modular solution where each organization can select which tools meet their requirements. This proven solution brings the top functionality in market leading implementation time scales. Typically, the average time to GO LIVE is between 8 and 15 weeks. With 24 / 7 professional support services to make sure your teams are getting the best from our systems Seabury Solutions should be on every short listing to compare the value proposition against the market.
AMOS is one of the industry-leading MRO software systems, used to steer their maintenance activities with AMOS, which makes it possible to meet the airworthiness standards. Today, over 140 customers worldwide use the maintenance, engineering and logistics requirements of their business with AMOS. AMOS is a comprehensive, functionally unsurpassed and technologically state-of-the-art maintenance system AMOS. AMOS offers its customers the following key business/software areas:

- Maintenance Control
- Production
- Planning
- Engineering
- Material Management

**KEY BUSINESS/SOFTWARE AREAS**

- Engineering & Planning
- Production & Shop
- Technical Records & Reliability
- TRAXDoc Document Control
- Supply Chain Management
- E-enabled Aircraft Capabilities
- Aircraft Mobility apps
- Maintenance Mobility apps
- Warehouse Mobility apps

**NAME OF PRODUCTS MARKETED**
- AMOS
- eMRO
- eMobility

Swiss Aviation Software units over 25 years of IT experience with profound MRO expertise and offers its customers the functionally unsurpassed and technologically state-of-the-art maintenance system AMOS. AMOS is a comprehensive, fully-integrated software package that successfully manages the maintenance, engineering and logistics requirements of modern aircraft and MRO providers by fulfilling demanding airworthiness standards. Today, over 140 customers worldwide steer their maintenance activities with AMOS, which makes AMOS one of the industry-leading MRO software systems worldwide.

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TRAX is the global leader in the aviation industry for MRO ERP software, with over 170 airlines using their products. TRAX has the most advanced maintenance software solutions available for airlines and MROs worldwide with fleets consisting of all types of aircraft. TRAX eMRO is a completely integrated product, in addition, the eMobility suite offers a range of iOS apps to provide mobile accessibility. Organizational efficiency gains can be substantial when using TRAX eMRO and eMobility, and ROI is quickly realized. TRAX maintains its advantage over the competition by developing software that works for customers through modern technology, world class support and strong customer relationships.

**NAME OF PRODUCTS MARKETED**
- eMRO
- eMobility

**NAME OF BUSINESS/SOFTWARE AREAS**

- Engineering & Planning
- Production & Shop
- Technical Records & Reliability
- TRAXDoc Document Control
- Supply Chain Management
- E-enabled Aircraft Capabilities
- Aircraft Mobility apps
- Maintenance Mobility apps
- Warehouse Mobility apps

Ubisense provides a range of iOS apps to provide mobile accessibility. Ubisense's SmartSpace provides a foundation platform for customers' Industry 4.0 strategy, enabling them to leverage new technologies to become smarter, more productive and lay the foundations for greater competitiveness in a digital world. Connecting manufacturing systems to real-world business processes is fundamental to realising this vision and Ubisense’s SmartSpace provides a foundation platform for our customers' Industry 4.0 strategy. SmartSpace enables OEMs and MROs to create a real-time digital twin of their environment, connecting activities to manufacturing, execution and planning systems, making real-world processes involving moving assets visible and measurable.

**NAME OF PRODUCT MARKETED**
- SmartSpace, enterprise location intelligence platform

**KEY BUSINESS/SOFTWARE AREAS**

- SmartSpace Production Logistics Monitor
- SmartSpace Asset Monitor
- SmartSpace Audit & Compliance
- SmartSpace Compliance Monitor

Vistair provides document, safety and quality management technology solutions to support the delivery of improved safety, compliance, and operational efficiency that results in significant commercial savings to airline organisations. Vistair's solutions provide both airlines and ground operations with an approach that helps demonstrate a clear link between increased reporting and a change in procedures and behaviours, to drive a safer organization.

**NAME OF PRODUCT MARKETED**
- DocuNet, CrewNet, SafetyNet, QualityNet, RiskNet

**KEY BUSINESS/SOFTWARE AREAS**

- Aviation Document Management Solution
- Aviation Safety Management Software
- Aviation Quality Management Solution
- Crew Notices and Bulletins Software

Ubisense's SmartSpace is an aviation compliance software that enables it to operate in an efficient and safe manner. Safety/Quality Management: Ubisense's SmartSpace is a powerful document management and distribution solution, capable of delivering a complete operational library of all mission-critical content across multiple platforms and fleets. It provides a process for airlines to control the intellectual content of manuals, handling processes relating to data, publication and delivery, enabling airlines to focus on core business operations.

**NAME OF PRODUCT MARKETED**
- DocuNet™ is a powerful document management and distribution solution, capable of delivering a complete operational library of all mission-critical content across multiple platforms and fleets. It provides a process for airlines to control the intellectual content of manuals, handling processes relating to data, publication and delivery, enabling airlines to focus on core business operations.

**KEY BUSINESS/SOFTWARE AREAS**

- Aviation Quality Management Solution
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Digital transformation is driving a fundamental change in the way aerospace, defence and MRO sectors operate. By focusing on their culture, processes and tools, companies will leverage new technologies to become smarter, more productive and lay the foundations for greater competitiveness in a digital world. Connecting manufacturing systems to real-world business processes is fundamental to realising this vision and Ubisense’s SmartSpace provides a foundation platform for our customers' Industry 4.0 strategy. SmartSpace enables OEMs and MROs to create a real-time digital twin of their environment, connecting activities to manufacturing, execution and planning systems, making real-world processes involving moving assets visible and measurable.

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**APPLICATIONS**

- TRAX maintains its advantage over the competition by developing software that works for customers through modern technology, world class support and strong customer relationships.
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AIRCRAFT IT MRO