A next generation MRO system at CSAGA

Implementing new MRO software in a helicopter operator

MRO 4.0: the next big step for processes

Using Digital Twins and Location

Getting sign-off on the e-signature

A process to get the regulator's approval

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Predicting the future has long been a dream for mankind. After all, who wouldn’t want to know the winner of the race before the start? In the more exotic manifestations of this desire, people have used tea leaves, various cards and even chicken bones to try to tap into the unseen forces impelling us to the future. But there really are conditions and forces that dictate events; history reveals that similar events are usually the end product of similar conditions. So, if we can gauge the presence of those conditions and forces, and the impact of other conditions around them, it should be possible to calculate the probability of a particular event occurring. The good news is that that is now possible.

The huge resource of big data combined with the latest generation of IT processing power is increasingly making it possible to identify conditions and prevailing forces, leading to likely future events for all sorts of machines, including, for our purposes, aircraft and equipment. Not only can we now see into the future but we can also see inside machines to identify where faults are occurring. What might, even ten years ago, have seemed like Science Fiction, is today’s technological fact. All of this is of immense importance for businesses whose main assets cost fortunes to acquire and for every minute of their life whether they are working (generating revenue) or not. Being able to predict future events for and see into aircraft and aero engines has the potential to avoid unscheduled failures and AOGs, and to save the sector billions of dollars.

In this issue, we dive right into these topics with a white paper from IFS highlighting three ideas that will impact the MRO sector in 2019: predictive maintenance processes to minimize AOG and save costs; using Cloud-based services for greater speed and agility; and using technology to spread knowledge faster and further. We have a paper from Ubisense exploring the exciting possibilities for applying Industry 4.0 capabilities to MRO processes, MRO 4.0. You’ll see the possibilities for Digital Twins and Location to greatly enhance the breadth and sensitivity of control over MRO tracks. From EmpowerMX there’s a paper on how to get approval for one key element in any paperless system, the electronic signature. You’ll see how a structured approach improves the speed and likelihood of clearance. And, from China Southern Airlines General Aviation (CSAGA) a fascinating case study of how they identified the need for, selected and implemented a new MRO system in a busy helicopter operator without disrupting their day-to-day business.

On top of all that, there is the regular round-up of news and technology developments and Vendor Job Cards from EXSYN Aviation Solutions and Aerostrat. Add our regular features such as ‘MRO Software Directory’ and you have Aircraft IT MRO: revealing tomorrow’s technology today.

Ed Haskey
AIRLINE & AEROSPACE MRO & FLIGHT OPERATIONS IT CONFERENCE
26th & 27th March 2019 – Hotel NH Noordwijk Conference Centre, Amsterdam, Netherlands

Pre-Conference Digital Transformation in Aviation Training Workshop
25th March 2019
14:00 - 17:30

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Engineering Specialist, Emirates

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58 MRO Software directory
A detailed look at the world’s leading MRO IT systems.
Vendors are the lifeblood of aviation IT and so it’s no surprise that we are very proud of the vendors on the Aircraft IT Vendor Panels. In that vein, we’re very pleased to welcome three new members to the Aircraft IT MRO Vendor Panel.

**Orlando Suite for Tech Pubs** is an XML-based cloud Document Management System designed for airlines, MRO and manufacturers and is capable of managing Company, Flight Operations, Maintenance and Engineering manuals in one single system. It is compliant with OEMs’ proprietary electronic data schemas and with the main aviation technical data standards (ATA Spec 2300, ATA iSpec 2200, S1000D). Orlando Suite includes 7 modules and supports interoperability with other systems.

**Vistair Systems** provides document, safety and quality management technology solutions in a suite of technology solutions providing both airlines and ground operations with an approach that helps demonstrate a clear link between increased reporting, and a change in procedures and behaviours, which fundamentally drives a safer organisation. DocuNet™ is capable of delivering content across all platforms. SafetyNet™ is an aviation reporting system and investigation solution that drives real change in the management of safety-related occurrences.

With 20 years of experience, **AMC Aviation** is an EASA CAMO PART-M, EASA PART-145 and consulting company that offers an important range of services to airlines and leasing companies such as maintenance support, engineering services, airworthiness management, civil aviation training, software solutions and flight operation services. AMC’s motto is ‘Your success is our commitment’.

**Laminaar Aviation InfoTech PTE Ltd** offers a future-ready integrated software application suite for airlines, operators, MROs, airports, regulators and training facilities; available as a complete suite or 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 for a seamless flow of data and information between functions, is customizable and designed to adapt to clients’ requirements with good technical support.

Welcoming the new members to the Aircraft IT MRO Vendor Panel, Aircraft IT CEO, Scott Leslie commented, “Without the specialist developers and vendors in the sector, aviation IT would not offer the choice of solutions available today. We welcome Orlando, Vistair Systems, AMC Aviation and Laminaar Aviation InfoTech PTE Ltd to the Aircraft IT MRO Vendor Panel, to share with our readers their depth of experience gained working at the cutting edge of aviation IT.”
ENGINEERING Holding, S 7 ENGINEERING, Sibir Technics and Cyprus Airways commonly take off with AMOS, the world-class M&E software solution. AMOS will contribute to the work scope expansion as well as digitalisation strategy of the four organisations.

“ENGINEERING Holding always focused on increasing the efficiency of our processes in order to satisfy the high level demands. We assured that the AMOS integration will give us an opportunity to offer services which will provide competitive benefits to our clients.”

Planning Director of ENGINEERING Holding.

SWISS-AS.COM
With the introduction of iPads to loading supervisors, SAS Ground Handling announced in early October 2018 that it has taken the first step to digitalize the working environment; simplifying everyday tasks and making the turnaround process smoother and more efficient. Earlier in 2018, SAS Ground Handling launched a three part mobility and planning project, managed by Cervino and divided into three streams. The first part of the project ‘Ramp mobility’ started in May and has delivered a number of advantages. Ramp mobility involves that each loading supervisor at ARN, OSL and CPH airports is equipped with a personal iPad. The iPads contribute to improved efficiency for the staff working on the ramp; whereas the loading supervisor used to have to leave the apron to print a release, or to talk with load control, they can now do that while loading or unloading the aircraft.

“The waiting time is gone, we can now start to work right away,” says loading supervisor Alexander Vasberg. “SAS Ground strategy focuses on our operational priorities; safety, punctuality and care.” One of the main focuses of the digitalization of SAS Ground Handling has therefore been improving safety work. Loading Supervisors agree that the safety work has become easier now.

“We have all manuals in the iPad, so if there are any questions about what the wizard says, we can just look it up while we’re out working,” says loading supervisor Johan Edkvist.

Occurrence reporting has become easier and less time consuming since the digitalization project was launched. Whereas loading supervisors used to do the occurrence reporting on a computer when they got back inside, they can now file the report right away.

Like all new projects, not everything has worked smoothly. Loading supervisors have experienced problems with Group Talk, a function that makes flight crew, gate staff and ramp staff able to speak to each other: Group Talk will eventually replace today's radio communication “We have approached Group Talk with our concerns and they are looking on a way to improve the function and see if they can integrate our equipment today with Group Talk,” says Product manager Oscar Becker.

Though there are some issues, both Loading supervisors and management are very happy with the launch of the mobility project and they can already see the benefits with it. “We have a much smoother and more effective handling of the turnaround procedure now; loading supervisors have everything they need with them. We can see that it creates less stress, plus increases safety
Web Manuals announced in mid-October 2018 that it is partnering with PRISM, a wholly owned subsidiary of ARGUS International, to launch the first product in its online store, providing a frictionless way for aviation companies to transition to digitized documentation.

Ready for download by the end of 2018, the initial product on offer from ARGUS is a Part 91 operators manual document template. Martin Lidgard, CEO and founder of Web Manuals, said: “The document template is ideal for start-ups just getting to grips with their digital documentation and wanting to get started as quickly and efficiently as possible. For existing operators looking to upgrade, it provides an easy solution for uploading all their documentation into a digital version.”

Web Manuals’ online store allows customers to buy additional products and services to help support their compliance needs in a seamless, intuitive way. By creating friction-free access to digital documentation, Web Manuals and ARGUS are making it easier than ever for corporate jet operators, airlines, training centers, cargo and helicopter fleets to remain compliant and up-to-date with any regulation changes.

For added ease, the templates are integrated into Web Manuals and plugged into FAA regulations and IS-BAO and ARGUS standards to provide all compliance requirements straight out-of-the-box. As part of the document template, ARGUS will be providing a tailored maintenance service to suit each customer’s need. Joe Moeggenberg, president and CEO of ARGUS International, said: “ARGUS provides ongoing regulatory updates in Web Manuals by learning which regulations apply to which documents and then linking to the appropriate standards, which is then propagated to documents and safety improvements. Operators can tailor their documentation on their own or with ARGUS.”

Lidgard concluded: “Our online store is designed to make the transition to digital documentation as easy as possible, meaning the road to compliance is seamless and stress-free. The launch of our first online store product from ARGUS is the start of a new era in on-the-spot adoption of digital documentation and we are excited to see this evolve.”

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Aircraft Fleet View App:
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Binter Technic live with AMOS

Swiss-AS was pleased to announce at the end of October 2018, the smooth AMOS go-live of Binter Technic. “Binter Technic is one of the most well-known MRO providers when it comes to ATR aircraft. On behalf of Swiss-AS I would like to congratulate Binter Technic on the successful cut-over to AMOS and officially welcome them to the AMOS Community. We are pleased that the circle of MRO providers using AMOS is expanding constantly,” stated Ronald Schaeuffele, CEO of Swiss-AS.

Right from the beginning, the project had a strict timeline as the go-live was planned to take place before Binter’s high season started. Thanks to the dedicated key users, the ambitious timeline for the cut-over was successfully completed with an on-time go-live. The big bang cut over was very smooth with hardly any disruption to the ongoing maintenance projects and the Binter workforce rapidly integrated the new processes.

Binter Technic decided to perform all related project tasks in-house. While other companies may engage third parties to outsource time-intensive project tasks, such as data migration or change management, Binter Technic was in the fortunate position of having the required resources and skills available in-house. Read the full story on Aircraft IT Website

Albawings takes off with AMOS

In mid-November 2018, Swiss-AS was happy to announce its latest addition to the AMOS customer community: Albawings. Albawings is an Albanian airline headquartered in Tirana that operates services from its hub to several Italian destinations.
Global A&D manufacturer Terma ensures data management and traceability with IFS Applications 10

IFS, the global enterprise applications company, announced in mid-November 2018 that Terma, a global manufacturer and provider of military and civil electronics, software, and aerostructures, has chosen to upgrade its ERP platform to IFS Applications™ 10. As the Danish defence industry’s biggest player and a supplier to the F-35 Joint Strike Fighter, Terma is experiencing rapid growth. Increasing its top line by double digits for four consecutive years, the organization is delivering a growing number of projects through its 16 units worldwide.

Since 2001, IFS Applications has played a critical role in supporting Terma’s complex operations and stringent requirements for project management and traceability. To support its global expansion, the company needed to modernise its enterprise software platform with robust tools delivered through a state-of-the-art, browser-based user experience. By upgrading to IFS Applications 10, Terma will benefit from powerful functionality in key areas such as project management, CRM, and HR. In addition, the new IFS Aurena user interface will help optimise mission-critical areas such as documentation and traceability by empowering users with intuitive access to the ERP platform on any device, at any time.

“Companies in our industry must comply with very high standards of data management and traceability,” Terma vice president of IT Jørgen Eskildsen said. “By upgrading to IFS Applications 10, we are ensuring that we continue to meet these demands and remain in full control of the entire supply chain. Another key consideration for us was the new version’s extended capabilities for automating previously labour-intensive business processes. One example is financial management, which is now automatically consolidated across all subsidiaries involved in a project and enables global date change management.” Eskildsen continued, “IFS Applications is ideally suited for project-centric companies with global operations, which is why we are using it as our central system of records. Thanks to the solution’s comprehensive set of fully integrated functionality, we are able to deploy robust additional CRM and HR capabilities without any need for complex systems integration. This means that we are able to leverage one central platform using fewer resources.”

Read the full story on Aircraft IT Website

Commssoft’s OASES MRO system offers comprehensive professional functionality together with a flexible, affordable approach that understands your business’ scalable growth needs in today’s turbulent market.

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Argentum provides growth capital to EmpowerMX

In mid-November 2018, EmpowerMX announced that it has received a significant investment from Argentum, a growth equity firm that partners with entrepreneurs to build industry leading B2B software and technology-enabled services companies. Dan Raynor and Chris Leong of Argentum have joined EmpowerMX’s Board of Directors in connection with the investment. EmpowerMX represents Argentum’s third portfolio investment in aviation software and / or services within the last 12 months.

EmpowerMX has established itself as an innovative provider of cloud-based mobile software technology to the commercial aviation industry by delivering new levels of efficiencies and cost savings through the automation of the complex workflows of MRO tasks and activities. The company’s core software suite, FleetCycle, is being used by many of the world’s largest commercial airlines and MROs to reduce maintenance costs and lower aircraft maintenance turn-around times (TAT) by eliminating unproductive processes, supporting higher workforce utilization, automating traditionally paper-based and manual processes (including FAA-approved electronic task cards) and providing real-time visibility into task completion.

“Argentum has a long and successful track-record partnering with growth stage companies, including high growth aviation software and MRO services businesses that are synergistic with EmpowerMX,” said Dinakara Nagalla, CEO of EmpowerMX. “ Accordingly, we feel they are the ideal partner for us as we look to further broaden our cloud offerings, expand our customer base, and bring unprecedented levels of efficiencies and cost savings to the commercial aviation industry by replacing antiquated processes with modern automation.”

“We are excited to be supporting EmpowerMX as it brings game-changing automation to the maintenance operations of commercial airlines and MROs,” said Dan Raynor, Managing Partner of Argentum. “…we believe that the company is ideally positioned to continue to build upon its market leadership position.”

Chris Leong, Partner at Argentum, added, “We have been impressed by the validation of EmpowerMX’s cloud-based software solutions by an enviable roster of major airlines and MROs, and look forward to partnering with Dinakara and his team to accelerate the company’s growth.”

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Willis Asset Management chooses Commsoft’s OASES for new CAMO operation

Commsoft was delighted to announce in late November 2018, that its MRO IT system, OASES, has been selected by Willis Asset Management Ltd to support its newly launched CAMO operation, which will be a key service provision in its growing platform of aviation advisory and asset management services. Willis Asset Management, a subsidiary of Willis Lease Finance Corporation, provides independent and expert aviation advisory services as well as technical and commercial management solutions for both aircraft and engines. The company currently manages a global portfolio of over 700 aero engines with customers including a large variety of airlines, major lessors, OEMs, MROs and financial institutions around the globe.

Karl Gibson, Vice President, commented: “The launch of Willis Asset Management CAMO services will add a new dimension to our broad range of aviation programs. We will be growing the Willis CAMO platform in combination with our Part 145 maintenance and Airframe services to provide a truly unique service offering for our clients.”

Nick Godwin, Commsoft’s Managing Director, commented: “OASES is continually being developed with the active participation of our users and reflects the breadth and depth of our experience in all areas of aviation maintenance support. We are proud that Willis Asset Management has chosen OASES for its specific needs and we’re very much looking forward to working with them to ensure an early and successful implementation.”

Combining a high level of technical sophistication with an intuitive user interface, OASES is currently being relied on by more than 130 aviation operations in over 55 different countries; a customer base that includes national and regional airlines, charter operators and cargo specialists as well as third party maintenance and leasing companies. To provide maximum flexibility, OASES is designed in a modular format and Willis Asset Management has selected the Core, Airworthiness and Planning modules which will be accessed by the company through Commsoft’s Private Cloud service.

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Visit www.rusada.com
Lockheed Martin licenses IFS Applications to service assets for $3.5 billion US Army contract

IFS, the global enterprise applications company, announced in early December 2018 that it has signed a contract with Lockheed Martin for 2,600 user licences of IFS Applications™ modules for supply chain management, warehouse management, purchasing and other functionality.

IFS Applications software will be a key tool for Lockheed Martin as they deliver on a seven-year, $3.5 billion contract to globally sustain more than 300,000 fielded Training Aids, Devices, Simulators and Simulations (TADSS), including live-fire ranges and instrumentation systems in support of the US Army TADSS Maintenance Program (ATMP) contract. IFS Applications will be used to ensure that materials, parts and resources are available to sustain these assets. As part of a subsequent phase, IFS will provide powerful scheduling capabilities for mobile technicians servicing the assets.

Lockheed Martin is one of a number of major aerospace and defence (A&D) companies that rely on IFS Applications. Analysts have recognised IFS for its sizeable customer base of defense agencies as well as tier I and tier II aerospace contractors. In October 2018, IFS was ranked as the number one vendor of enterprise asset management (EAM) software for the A&D sector. This is the tenth consecutive year that IFS has been named as the global A&D market leader by the major research and advisory firm ARC Advisory Group.

“As a recognised leader in aerospace and defence software, IFS Applications will provide the logistics and supply chain functionality to support this contract,” said Scott Helmer, President, Aerospace and Defence Business Unit at IFS. “This solution will then be extended with IFS planning and scheduling optimisation software, which will enable Lockheed Martin to rely on artificial intelligence (AI) algorithms to automate the real-time management of mobile technicians according to shifting demands and priorities.”

IFS Regional President, Americas, Cindy Jaudon added, “A company delivering on major US Department of Defense (DoD) contracts while ensuring they meet or exceed service level agreements (SLAs) needs a robust, proven software platform capable of managing the entire contract lifecycle. That is what we can deliver here, in a commercial-off-the-shelf (COTS) solution.”
Spanish airline ALBASTAR chooses Commsoft’s OASES

Commsoft was pleased to announce in early December 2018 that Albastar has chosen to support its airline operations with OASES, Commsoft’s industry-leading MRO IT system.

Albastar is a privately-owned Spanish airline, founded in 2010 by Italian and British entrepreneurs from the tourism and transport sectors to provide on-demand flight services in collaboration with major Spanish, Italian and other European tour operators. Based in Palma de Mallorca, Albastar operates mainly charter flights from its principal bases of Palma de Mallorca, Milan Malpensa and Milan Bergamo as well as seasonal services from Lourdes. The fleet to be supported by OASES will initially include four Boeing 737-800 aircraft.

Renowned for its technical sophistication as well as its intuitive user interface, OASES is structured in a modular format to provide maximum flexibility and scalability and Albastar has opted for the Core, Airworthiness, Materials, Planning and Production modules with an option to add the Line Maintenance Control module at a later date. All modules will be accessed through Commsoft’s Private Cloud service, avoiding any need for the airline to invest in new hardware.

Nick Godwin, Commsoft’s Managing Director, commented: “We’re delighted to be welcoming Albastar to the ever-growing global community of OASES users. This is the ninth new OASES contract we’ve signed in 2018, our second in Spain, and we already have a dedicated team working on-site in close co-operation with Albastar’s management and technical specialists to ensure an early and successful implementation.”

OASES is currently being used to support more than 130 aviation operations in over 55 different countries, including national and regional carriers, business aviation and charter operators, cargo specialists, leasing companies, MROs and specialist rotatable stockists.

Jaime Bestard, Albastar’s Chief Operating Officer, commented: “We’ve been pleased to learn that, working with Commsoft, not only can we get a very sound solution with OASES, but we can be supported with business solutions that are going beyond the scope of an IT system supplier”.

Albastar has a fleet of four B737-800 and two B737-400 aircraft. Over 600,000 passengers are flown each year to over 140 destinations. The airline is a member of the AIRE Association in Brussels.

Read the full story on Aircraft IT Website

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Cervino empower your staff with knowledge that will enable them to challenge the process and endorse the culture of continuous improvement through classroom and digital based training
Aviation engineering and maintenance company, Commsoft announced in mid-December 2018 that it has signed a contract for its leading MRO IT system, OASES. The deal was signed with the recently launched Emirates Flight Training Academy (EFTA), located in custom-built premises at Al Maktoum International Airport in Dubai.

OASES has been supporting the prestigious flight training academy which began operations in Dubai South in November 2017. The contract covers five key modules of the OASES system: core, airworthiness, planning, inventory and production. These have been implemented on Commsoft’s private cloud for optimum security and customer care.

EFTA recently received its CAR M Subpart G continuing airworthiness management organisation and CAR 145 maintenance organisation approvals (ref CAMO/0007/18 & UAE.145.0073) from the UAE General Civil Aviation Authority which allows EFTA to manage and carry out the maintenance on the aircraft in-house. OASES support is being progressively rolled out across the fleet of twenty-two Cirrus SR22 G6 aircraft and five Embraer Phenom 100EV Very Light Jets that are being used to train cadets in EFTA’s ab-initio flight training program.

“EFTA is pleased to be working with Commsoft for their flagship maintenance software system. OASES was assessed against a number of different options and was found to be the best solution for EFTA for providing an airline standard system for inventory management, aircraft maintenance tracking and maintenance control within our flight training organization. We have been particularly happy with the support we have received including system set-up and user training.” said Captain Abdulla Al Hammadi — Vice President Emirates Flight Training Academy.

EFTA has been designed to offer world-class advanced flight training, attracting top airline cadets from around the globe. Students will receive basic flight training, combined with airline-specific requirements. Topics covered will include multi-crew co-operation, advanced jet orientation and line-oriented flight training. Cadets will be equipped with the skills and knowledge needed to move into First Officer positions with leading international airlines.

OASES currently serves more than 130 aviation customers worldwide, ranging from national carriers and large third-party maintenance providers to small independent operators. It is a fully integrated MRO IT system that works to maintain effective aviation maintenance and engineering operations for CAMOs, airlines and associated organizations.

Read the full story on Aircraft IT Website
AMOS new customers

In 2018, Swiss-AS was in the fortunate position of having attracted several new customers. During the past weeks and months, besides the already announced ones, LIAT (1974) LTD (Antigua), CAMO Solutions (Germany), Laudamotion GmbH (Austria) and Anisec Luftfahrt GmbH dba LEVEL (Austria) have joined the AMOS Community.

Though all new customers have a different background, ranging from start-up, to CAMO support services up to the operation of an established airline, they all have chosen AMOS as their perfect fit. Due to the four different AMOS Editions, airlines, CAMO organisations and MRO providers of all sizes can rely on the AMOS Edition that supports their business scope best.

Malaysia Airlines AMOS go-live

With tremendous pleasure, Swiss Aviation Software (Swiss-AS) announced, in mid-December 2018, that Malaysia Airlines has selected and implemented AMOS. The successful go-live of AMOS took place after a very short and ambitious implementation time frame. Now, the usage of AMOS is paving the airline’s way to further digitize its maintenance division. We congratulate the Malaysia Airlines team on the smooth and successful completion of the project!

EXSYN announces new customers

In mid-December 2018, EXSYN was delighted to announce that several aviation companies had joined the EXSYN portfolio in the preceding couple of months. From Avilytics implementations to data migration projects and subject matter expertise, the projects are as diverse as the new customers.

Belavia live with AMOS

More good news towards the end of the year. Congratulations to Belavia-Belarusian Airlines for the smooth go-live with AMOS. Swiss-AS was pleased to announce in mid-December 2018 that the AMOS implementation project at Belavia had been brought to a successful go-live and the MRO software is now used in daily operation.
It was announced in mid-December 2018 that the leading Polish MRO organisation, WZL2 (Wojskowe Zakłady Lotnicze Nr 2 S.A.), has chosen OASES, Commsoft’s MRO IT system, to support its developing commercial operations. With more than 70 years’ experience of repairing, modernising and servicing complex fighter-bomber and fighter aircraft for the armed forces of the Republic of Poland, WZL2 is now approaching civil aviation customers with Bombardier Q400, ATR 42 and ATR72 turboprop airliners, Embraer E-Jet airliners and ultimately Boeing 737NG aircraft.

OASES, with its technical sophistication allied to an intuitive user interface, is structured in a modular format to provide maximum flexibility and scalability. WZL2 has selected the Core, Airworthiness, Planning, Materials, Production, Commercial and Warranty modules which will be implemented initially through Commsoft’s Private Cloud service.

Nick Godwin, Commsoft’s Managing Director, commented: “We’re delighted to be welcoming WZL2 to the growing international OASES family. This is our tenth new contract signing in 2018 and WZL2 will be our fourth customer in Poland. Initial implementation meetings have already taken place and we are looking forward to OASES going live very soon.”

Conduce was pleased to announce at the start of January 2019 that it has entered into a distribution and reseller agreement for the supply of ELB (electronic log book) software solutions with Airbus. The agreement will see Conduce providing Airbus with the capability to provide the eTechLog8 ELB solution, already in operational service under several regulatory authorities, to both current and new airline customers.

Steve Russell, CEO Conduce Group, stated that “Adding Airbus as a Conduce customer for the eTechLog8 suite of applications gives us an additional route to market, providing airlines with the option to select their preferred supplier dependent upon their specific requirements.”
New flag carrier Air Senegal first in Africa to sign for SITAONAIR’s high-speed IFC

In mid-February 2019, Air Senegal announced that it has selected SITAONAIR to deploy its best-in-class high-speed inflight connectivity (IFC) on its new-generation A330neo fleet — making Air Senegal the first airline on the African continent to activate GX Aviation passenger connectivity onboard.

With a growing demand for connectivity from Africa’s young population and a change in the overarching aviation landscape, Air Senegal’s new inflight connectivity offering comes at a crucial moment for economic growth. SITA Air Transport IT Insights figures show that 90% of the world’s airlines plan to have major wireless inflight connectivity programs in place for enhanced passenger experience by 2021.

Senegal’s new flag carrier is ambitious to expand its footprint by connecting 2 million passengers on routes between Dakar and Paris, and driving innovation in the West African market. Air Senegal appointed SITAONAIR as the Inflight Connectivity service provider best-placed to support its goal by pioneering its connected passenger experience. Under the deal, SITAONAIR is activating its market-leading Mobile ONAIR and Internet ONAIR inflight connectivity solutions — via Link ONAIR over Inmarsat’s GX Aviation network — across Air Senegal’s new A330neo fleet.

Following the launch of its first commercial flight in February 2019, passengers can now enjoy cutting-edge cabin connectivity across Air Senegal’s Business Class, Premium Economy and Economy offerings, on routes connecting West Africa with Europe.

Philippe Bohn, CEO of Air Senegal said: “We at Air Senegal are extremely proud to say we are leading inflight innovation in Africa’s aviation industry, and delivering, thanks to our carefully-considered partnership with SITAONAIR. With our new A330neo fleet, we can connect passengers from Europe with the heart of our country within six hours. These passengers have high standards, needs and expectations when it comes to inflight connectivity and Air Senegal is ready to empower them, thanks to SITAONAIR’s support and solutions.”

Read the full story on Aircraft IT Website
An exemplary implementation project reaches a successful completion

After a common and shared journey with Swiss-AS, Evergreen Aviation Technologies Corp (EGAT) announced in late December 2018 that it has successfully accomplished its go-live with AMOS. EGAT, as the key development partner of Swiss-AS for the AMOS MRO Edition, has significantly influenced the realization of the advanced AMOS MRO functions. Therefore, implementing AMOS at EGAT was not just ‘another’ project for Swiss-AS. It was the beginning of a strategic partnership, which allows Swiss-AS — in cooperation with EGAT — to complete the AMOS MRO Edition and thereby fulfil the functional requirements of the global MRO business segment. EGAT, as a renowned MRO provider with an extensive in-field experience, was the perfect fit to accompany Swiss-AS in this major development project.

The AMOS MRO Edition has been available since the end of 2017 and offers MRO providers a fully-fledged MRO solution covering the specific needs of their maintenance activities. For a timely realization of the new Edition, Swiss-AS allocated a substantial amount of resources to build up a dedicated and interdisciplinary project structure and prioritized MRO specific functions on the development roadmap. The new functions have been well received by the AMOS Community, as well as by the market. AMOS has been enriched by new modules including Facility/Hangar Planning, Ground-time Management, Finance and Production Control Dashboards, CRM and an in-depth Quotation/Contract Management.

EGAT and nine other MRO companies in the AMOS Community had actively participated in scoping workshops for the new functions and shared their expertise and knowledge gained in their daily work as MRO providers. This valuable input, gathered in the early development phases and based on the in-field experience of EGAT, provided a significant contribution to the successful development of the AMOS MRO Edition.

Apart from supporting the scoping and specification process, EGAT was also very committed to testing the new developments. In line with the Agile Development approach at Swiss-AS, EGAT supported the unit tests in repeat 15-day cycles (sprints) based on the programming progress made by Swiss-AS in response to end user feedback. In addition, once per month, EGAT performed specific functional tests to validate all features that had been implemented in the new modules.

During the project, three extensive testing
sessions were scheduled in order to conduct process-driven integration tests defined as ‘Final Validation’. The Final Validation took place at the end of the development process. Dedicated EGAT AMOS Key Users travelled to Switzerland to test the new modules and all related business processes onsite with the Swiss-AS AMOS MRO team.

The valuable feedback from each testing phase was immediately available to Swiss-AS which enabled an efficient development process. This common scope definition and validation review proved to be a very successful approach to deliver mature and functionally advanced AMOS modules.

The EGAT project team consisted of 20 project team members, all experienced professionals in their own business areas. Besides the daily project work, the EGAT key users were responsible for training the end users, mostly in the form of classroom training. This ‘train-the-trainer’ approach was very successful and helped to overcome language barriers. The Swiss-AS project leader, who looked after EGAT, is fluent in English and Chinese, which favorably influenced this successful project and which ensures optimum support for EGAT while moving forward with AMOS.

EGAT had assigned a highly skilled and fast learning team to this project including a well-respected project leader. It did not take long for the EGAT project team members to become experts in AMOS, which in turn had a positive impact on the quality of functional discussions and decisions made during the workshops and in the different development phases. All these positive factors combined perfectly and the project was finalized well within budget, while the project team needed less support from Swiss-AS than initially expected and budgeted.

Largest AMOS implementation in APAC region
This implementation was the largest AMOS project in the Asia Pacific region so far and fully managed by the AMOS branch office in Singapore. In addition, it was the first AMOS implementation in which the customer also participated as a pioneering development partner. Due to an in-depth usage of the AMOS MRO Edition, and the excellent implementation project, Swiss-AS is pleased to have found in EGAT, a new reference customer for interested airlines and MRO organizations.

EGAT’s President NH Huang commented, “As an award-winning, airline-affiliated MRO with a global customer footprint, we are constantly looking for ways to improve value-added fleet management services, to integrate MRO business activities and expand overall customer service capabilities. We believe that AMOS’ MRO edition is the primary enabler to help EGAT achieve its business integration objective.”

Read the full story on Aircraft IT Website
Air Madagascar selects ADSoftware MRO IT solution

ADSoftware is proud to announce its collaboration with Air Madagascar and its subsidiary, Tsaradia. The contract, announced in late December 2018, covers the complete fleet of 10 aircraft (Airbus A340-300, Boeing 737-800 NG, ATR72-500, ATR72-600 and TWIN OTTER). Maintenance and procurement personnel will be using the software daily to manage all aspects of maintenance operations. Air Madagascar joins ADSoftware’s growing customer base in the region. The move is part of a complete redesign of Air Madagascar’s IT systems and a significant step towards operations optimization.

The combination of Airpack’s technology and Air Madagascar’s MRO know-how will improve time saving and cost efficiency while giving Air Madagascar’s management valuable insight into maintenance activities. With Customers including Air Austral and Corail Helicopter, ADSoftware has increased its presence in the region.

ADSoftware’s expertise in handling data migration was a key factor in Air Madagascar’s decision. Years of maintenance activities will be transferred to the new system via exclusive processing tools developed locally. As part of the start-up service, ADSoftware’s maintenance data experts visited on-site to elaborate a tailored and efficient implementation plan.

Air Madagascar COO Benoit Shafer said: “Air Madagascar is looking forward to initiating this new partnership with ADSoftware. We believe AIRPACK is a significant upgrade that will result in increased aircraft availability and optimized operations. Our customers’ safety and satisfaction are our main concerns and ADSoftware will support us in managing our aircraft maintenance towards those objectives. The ease of transferring to AIRPACK and solid references were major aspects of our decision.”

ADSoftware’s CEO Fred Ulrich said: “At ADSoftware, we have a high-performance software laboratory that specializes in high-volume data treatment. This allows us to maximise data transfer capacities while maintaining 100% data accuracy. We are proud to have been given the opportunity to prove our solution’s superiority to Air Madagascar.”

The ‘pain-free’ data migration solution is reinforced by the technical knowledge of the ADSoftware teams, whose industry-leading expertise and 24/7 customer service commitment guarantee clients a smooth data migration process. Ease of integration is also a plus: data is stored accurately and completely either in the Cloud or on internal servers, with AIRPACK able to fit seamlessly into existing structures.

Read the full story on Aircraft IT Website
Conduce were proud to announce in early January 2019 that Royal Brunei Airlines (RB) have selected eTechLog8 to replace the airline’s paper technical log books for both their Boeing and Airbus fleets.

Conduce eTechLog8 eliminates line maintenance paper processes with regards to the aircraft technical log and deferred defect/cabin logs. It is a Universal Windows Platform (UWP) application that is mostly used offline, only requiring an internet connection to transmit data when appropriate.

Conduce CEO Steve Russell, stated that “We are honored and excited to have been selected by the Brunei Darussalam national flag carrier.” Conduce are committed to setting up an office in the Far East, as there is an enthusiastic local airline market for paperless operations. At Royal Brunei Airlines, eTechLog8 will be integrated with the in-house MIS system AMOS, utilising the AIM SPEC 2000 compliant ‘TRANSFER_ATA_EL’ interface.

Rob Woods (Head of Engineering, Royal Brunei Airlines) commented “The Conduce eTechLog8 solution has been selected as a result of a formal RFP process. eTechLog8 is both compliant and flexible, which facilitates the operational needs of our Airbus and Boeing fleet. The extensive EASA NAA approvals for eTechLog8 is a strong positive along with Conduce’s demonstrated experience of implementing ELB solutions”.

Conduce provide robust mobile solutions for the worldwide airline industry. eTechLog8 is the leading ELB solution to replace paper technical log books. It is certified by many NAA’s, often managing multiple AOC’s. Full integration with the majority of MIS/MRO back office airline systems is standard.

Royal Brunei currently operates a fleet of fourteen aircraft comprising of five Boeing 787-8 Dreamliner aircraft together with seven Airbus A320NEO aircraft and two Airbus A320 CEO, one of the youngest fleets in the world with an average fleet age of two years. In 2018, RB received the APEX Official Airline Ratings™ Four-Star Award and as winners of TripAdvisor Travellers’ Choice Economy Class — Asia and Travellers’ Choice Regional Airlines — Asia. In the recent Skytrax airline rating RB moved up fourteen places to be at number 78 (from 92) in the top 100 airlines in the world.
SWISS and Edelweiss Air sign 5-year contract with FLYdocs

FLYdocs, the aviation data and records management solution provider announced, in mid-January 2019, a 5-year contract with leading Swiss airlines, SWISS and Edelweiss Air, who will use the FLYdocs® platform for the ongoing management of their maintenance and engineering records across their entire respective fleets of 90 and 15 aircraft.

The FLYdocs® platform provides a centralised cloud-based digital replica of all aircraft technical records — right back to birth. That means, once uploaded into FLYdocs®, the millions of paper records, combined with electronic documents often distributed in different formats around most aviation organizations, are now instantly available in useable, industry standard formats to support business critical operations, such as verifying airworthiness compliance, and aircraft sales and transitions.

What’s more, the Airlines, which are also users of AMOS, are set to be the first organizations to benefit from significant operational efficiencies and cost savings from FLYdocs® holistic approach to data management, as the platform has an exclusive integration with AMOS, and its advanced functionality is enriched further by live feeds from the ATA e-business specifications, Spec 2500.

Patrick Scherrer, Head of Continuing Airworthiness Engineering Swiss International Air Lines added: “We pride ourselves on delivering the highest product and service quality, and that not only applies to customer-facing functions, but back-office functions, which deliver excellence across the value chain. With all our aircraft technical records contained within the FLYdocs® platform, we’ll have the underlying infrastructure in place to manage our operations in a way, which will have a positive impact on the Airline’s profitability and the value of our assets.”

Read the full story on Aircraft IT Website
FLYdocs announces enhanced AMOS integration to advance the digital transformation of aircraft M&E

FLYdocs, the aviation data, records and asset management solution provider, announced, in late January 2019, exclusive integration capabilities with industry leading MRO software solution, AMOS. The powerful combination of the two platforms will allow airlines and MRO service providers to automatically link maintenance and engineering (M&E) work packages with a digital record of their associated data and records, streamlining M&E tasks and providing real-time access to up-to-minute and verified data for airworthiness compliance and quality audits.

With a unique FLYdocs-branded interface within AMOS, developed in accordance with ATA Spec standards, FLYdocs® and AMOS users can quickly and easily access FLYdocs® functionality to benefit from:

**Current Status (Airworthiness)** — Automated exports from AMOS of ATA Spec2500 compliant status reports such as ADs, SBs, modification status, component listings and repairs can be automatically linked to their associated digital documentation, as soon as they are uploaded from the MRO, line stations or other locations. Once within FLYdocs®, this information provides users with real-time compliance reports of the current status of their fleet.

**Work Package Management** — AMOS users can now transfer planned, open and closed work packages and their work orders to FLYdocs®. FLYdocs® again attaches associated documentation to work orders, providing MRO engineers and back office support teams with instant access to actionable and verified data to enable them to perform their tasks more efficiently, and to easily provide proof of compliance of closed work orders.

Read the full story on Aircraft IT Website
Wizz Air, established in 2003, provides low-cost air transport to and from Central and Eastern Europe. Being an AMOS customer since 2010 and operating 106 Airbus aircraft (72 Airbus A320, 34 Airbus A321) the workload of AMOS has increased during recent months. Bearing in mind that Wizz Air has a further 265 aircraft on order, the IT department realized that it would be good to get additional external support regarding AMOS. Wizz Air announced in early February 2019 that it had decided in favor of CrossConsense because of their proven customer support given to other major European airlines like easyJet, Brussels Airlines, Volotea and Lufthansa CityLine (amongst others).

Christian Ambiehl, Head of Maintenance at Wizz Air said: “We successfully used CrossConsense products and skilled services for our initial implementation of AMOS 9 years ago and continuously used their system interfaces which always proved to give professional results. CrossConsense has an extensive experience, has been a recognized partner of SWISS Aviation Software for many years and became one of most knowledgeable AMOS experts on the market so the decision to work together was made easy for us. We are confident that this partnership will be an extended collaboration and productive innovation.”

CrossConsense provides AMOS support for Wizz Air

FLYdocs were delighted to announce, in late January 2019, the arrival of Mark McLaren who recently joined as a Technical Manager. Mark has over forty years’ experience in the aviation sector, making him a highly qualified and perfect addition to the team. Read on to learn more about Mark’s path to FLYdocs, his areas of expertise, and how his future with FLYdocs is going to take shape.

Welcoming Mark McLaren to the FLYdocs Technical Team

Looking back to 2018

In 2018, Swiss-AS proudly welcomed 12 new customers to the AMOS Community, amongst them Ural Airlines, Kuwait Airways, LIAT, Bamboo Airways, Lufthansa German Airlines and Air Tahiti Nui. Though the new customers have different backgrounds, ranging from start-ups and CAMO organizations up to MRO providers and established airlines, they have all chosen AMOS as their perfect fit. With the offer of four different AMOS Editions, airlines, airline groups, CAMO organisations and MRO providers of all sizes can individually select the AMOS Edition that best supports their business scope. With Lufthansa German Airlines joining the AMOS Community, Swiss-AS now equips all carriers in the Lufthansa Group with AMOS.

One highlight of the year was the AMOS Customer Conference that took place in October in the beautiful city of Lucerne, Switzerland. Over 250 delegates attended the conference with customers and partners representing 92 companies from all over the world. You can gain an impression of this event with our official conference movie: http://bit.ly/AMOS-Customer-Conference-2018

For the first time, Swiss-AS offered a series of AMOS Adoption Seminars to the Customer Community. It is our strategic objective to continuously support an increase in the adoption of AMOS in the Community and to drive digitalization initiatives within the AMOS customer base. We invited customers to learn first-hand how to optimize their AMOS adoption by applying the latest industry-leading features available. Topics included e-Signature, AMOS Competence Centre, AMOSmro Base Maintenance Planning & Execution or Staff Capacity Planning (Line & Base Maintenance). The high interest of AMOS customers in these seminars confirmed once again the increasing commitment of the AMOS Community and their eagerness to stay updated with the latest benefits of AMOS.

Growth envisaged for 2019

As already announced, Swiss-AS is currently developing AMOScentral, which has the potential to revolutionize the MRO software market. The launch of this development has attracted the attention of AMOS customers, potential AMOS customers and the industry in general. In addition, the Lufthansa Group airlines have defined AMOS as their collective standard. AMOScentral is the enabler of this complex cooperation between the different airlines within the Lufthansa Group.

Read the full story on Aircraft IT Website

2018 — a successful year for Swiss-AS in many ways
WHAT’S IN THE OPERATIONS ISSUE?

**CASE STUDY: Finnair – Introducing an EFB-based operational efficiency tool to the Airbus A350 fleet**
Henri Lonn, Development & Support Manager, Finnair and Tom Hakala, Technical Pilot, Finnair

Finnair outlines its A350 flight profile optimization project including selecting and the challenges of implementing the chosen solution which leverages the availability of real-time information and advances in onboard technology.

**CASE STUDY: Going paperless at Cebu Pacific**
Francesc Torres, Director — Operational Support, Cebu Pacific

CEBU Pacific outlines its extensive EFB project including the software platform covering a full suite of operational planning and calculation modules; connectivity solutions; and how they achieved a paperless flight deck.

**CASE STUDY: Building an EFB program on experience at airBaltic**
Andrejs Cupecs, EFB Specialist, airBaltic

Over five years, airBaltic’s EFB program has constantly evolved in line with available solutions, changing company policies and operational needs. This is the story of embracing constant changes, achieving set goals and staying sane in the process.

**WHITE PAPER: A fuel Efficiency Masterclass Part 3**
Sander de Moor, Director, Airline Fuel Efficiency with Aircraft Commerce Consulting

In this third and final part of the fuel efficiency masterclass, Sander shares with readers some of the areas of the business outside of Operations but whose actions and decisions have a significant impact of fuel use.

PLUS News and Operations Software Directory
Looking to an efficient future

Yang Kai, IT Project Manager, China Southern Airlines General Aviation Ltd (CSAGA) shares the operator’s journey to next-generation software.
In this article, I want to share with readers something about the implementation of next generation MRO software at China Southern Airlines General Aviation Ltd (CSAGA). Starting with the business pain points and the key business needs that we identified as motivation to make the change, we’ll go on to look at the process by which CSAGA selected the right software provider for our needs and how the chosen provider met our requirements. The project schedule and milestones will be covered and some of the challenges that were faced during implementation as well as the implementation process itself. Finally, we’ll look at the business benefits that have been gained as a result of the implementation and the future plans for leveraging full value from the new system. But first, to set the scene, here’s a brief look at CSAGA.

CHINA SOUTHERN AIRLINES GENERAL AVIATION LIMITED (CSAGA)

Founded in 1980, China Southern Airlines General Aviation Limited is the general aviation subsidiary of China Southern Airlines and is China’s second largest operator in the offshore oil & gas industry. Currently, CSAGA operates 24 aircraft, including Sikorsky (the largest operator of Sikorsky civil helicopters in Asia) and Bell helicopters, and holds certification for CAAC-145 maintenance, CAAC-91 & 135 operator and CAAC-147 training qualification. Offshore oil & gas services are flight services for domestic and foreign petroleum companies in offshore oil & gas exploitation, including platform crew changes personnel, material & equipment, emergency transfer, medical evacuation and typhoon evacuation. As well as offshore oil & gas, CSAGA also conducts maritime rescue operations and helicopter charters in various lines of business such as air travel, geophysical exploration, forest protection, aerial photography, power line inspection, tower hanging and hoisting, medical evacuation, and vessel pilotage. Plus, of course, CSAGA undertakes helicopter maintenance services, the subject of this case study.

The company operates from thirteen bases across China (figure 1) including 3 that are company-owned, respectively located in Zhuhai, Zhanjiang and Sanya.

WHY CSAGA NEEDED A NEW MRO SYSTEM

As with any business, CSAGA had grown and had updated its systems as required but, again as with any business, this eventually put some strain onto the overall system and was beginning to be a drag on our activities. Everything worked but we realized that the overall system and its components were becoming increasingly difficult to manage and maintain.

Currently, CSAGA operates 24 aircraft, including Sikorsky (the largest operator of Sikorsky civil helicopter in Asia) and Bell helicopters...”
CASE STUDY: CHINA SOUTHERN AIRLINES

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The business was using multiple and disparate systems which were giving rise to data inconsistencies and the need for repeated data entries. Both of these were adding non-productive time to our activities and, therefore unnecessary costs.

Business Pain Points
Over time, we had identified, in the CSAGA MRO operation, a number of business pain points that needed to be addressed in order to ensure that the operation was fully up-to-date and future ready. These can be summarized as below:

• The business was using multiple and disparate systems which were giving rise to data inconsistencies and the need for repeated data entries. Both of these were adding non-productive time to our activities and, therefore unnecessary costs.
• Our maintenance planning and execution was a manual process undertaken by the hangar department and so subject to the time requirements and inconsistencies associated with any manual operation.
• Similarly, task compliance monitoring was a manual process in the Quality and Engineering department.
• There was a lack of real-time stock visibility leading to overstocking in some cases and/or parts being unavailable when needed in other cases.

Key Business Needs
Looking beyond where we were, CSAGA identified a number of key business needs that we felt would help the business to work more effectively and efficiently and be able to not only continue to offer an excellent service but also to adapt to whatever changes and challenges the future might hold. Summarized as below are some of the key outcomes that we wanted from the new system:

• One integrated system with streamlined processes and cross-department interactions so that we no longer had to move between systems and to eliminate data inconsistencies and the need for multiple entries of data.
• An advanced maintenance forecasting and planning process within the system to eliminate the need for a manual planning process.
• A reduction in maintenance turnaround times (TAT) to increase aircraft availability.
• Improved stock visibility through all stages of Maintenance and Supply Chain management.

THE SOFTWARE SELECTION PROCESS
Having carefully identified the pain points for and business needs of CSAGA, the next step was to select a software provider from among the many in the market: a provider whose solutions would best support the elimination of those pain points and the fulfilment of those key business needs. CSAGA designed a rigorous selection process which included a number of steps and assessment criteria.

• In the first instance, we compiled our requirements based on the identified pain points in the business and an assessment of the shortcomings in the existing process.
• We next undertook a survey of the market to see what providers there were who might be able to address our requirements.
• Bearing in mind the market space we occupy, we also got feedback from other helicopter operators who would have faced similar challenges to those we were seeking to resolve.
In India, the challenge to deliver software services and solutions to multiple clients across the globe was a significant one. We had to understand the specific needs of each client and provide solutions that met those needs. We had to ensure that the technology we used was up-to-date and met the latest standards.

To address this challenge, we conducted an in-depth analysis of each client's needs. We identified the key requirements and developed a comprehensive solution that met those needs.

Armed with all of the above inputs, we drafted the specifications of what we were looking for from a new MRO solution and...

... with that specification, we floated an RFP (Request for Proposal) into the market to see which providers responded.

Each response was first subjected to an evaluation of the technical specifications and, for those proposals whose technical specifications were accepted...

... they were subjected to an evaluation of the commercial aspects of the offer.

This process produced a shortlist of three vendors who were further assessed based on their software demonstrations, according to three weighted evaluation criteria:

1. A 50% weighting was given to an evaluation of the extent to which the offer covered the requirements in the RFP:
2. A 30% weighting was given to a product demo, organized for each of the shortlisted 3 providers;
3. A 20% weighting was given to the extent to which the proposal matched CSAGA’s IT compliance requirements.

THE SELECTED SOLUTION
At the end of the selection process, the provider who best matched CSAGA’s requirements was Ramco Aviation Systems, whose scope met our needs. We also visited one of their customers, who had been live on Ramco for over a decade, to get a better understanding the benefits and implementation process.

SOLUTION SCOPE
The selected system offered CSAGA a comprehensive and end-to-end integrated software for configuration management, component maintenance programs, technical records management, reliability and quality/safety audit.

“The selected system offered CSAGA a comprehensive and end-to-end integrated software for configuration management, component maintenance programs, technical records management, reliability and quality/safety audit.”

INTERACTIVE Click here for full product details
included the capability to develop and manage aircraft maintenance programs along with the management of Service Bulletins and Airworthiness Directives SB/AD; offering aircraft maintenance planning, component maintenance planning, tools and equipment management, and work center management. The solution covers a range of logistics issues including parts administration, warehouse management, stock management, general procurement, component repair and exchanges. This includes line maintenance and heavy aircraft maintenance as well as in-house component repairs. The scope also includes the maintenance of employee profiles and the management of training programs and qualifications records. With all that settled, the remaining and large task was to implement the new solution.

**PROJECT SCHEDULE AND MILESTONES**
Considering the breadth of the scope and the work required to implement this new system, the whole process was completed in the very creditable time of nine months from the initial project kick-off in May 2017. Also in May 2017, the Project Charter was finalized and agreed and Conference Room Pilot (CRP) discussions took place. By July 2017, solution confirmation and closure had been completed ready for preparatory work to be undertaken prior to the first data migration mock to test the new system in October 2017. November 2017 saw the training of User Champions to help colleagues with the implementation and bedding in of the system; also, there was the second mock data migration. User acceptance training took place in December 2017 as did the third and final mock data migration, incorporating all that had been learned in the first two mock migrations. January 2018 was a busy month with end user training and the cut-over data uploads for the fleet prior to a Go Live sign off in February 2018.

**CHALLENGES IN IMPLEMENTATION**
As in every implementation, there were challenges related to the system and with the people who would be using it; some were foreseen, some were less expected and at least one was wholly out of the control of either CSAGA or Ramco. This included some reorganization in affected departments with reassignment of responsibilities in order to align the structure of the business with the way that the new software worked. Personnel-based challenges were more diverse. Discussions had to be conducted in multiple languages, English and Chinese, requiring us to put both Chinese and English speaking staff and consultants on-site. Also, with employees spread across CSAGA’s thirteen bases, training presented some challenges which were overcome by posting User Champions in different bases to train end users. In any move from multiple systems and legacy data management to a single system, there will be data collection and validation challenges and this implementation was no exception with the need to collect data from multiple available sources and undertake consistency checks on the variously sourced data. The transition to the Ramco system required the shutting down of the old systems and processes in order to implement and follow the new system and its processes.

Some things cannot be planned or legislated for and that was the case when Typhoon Hato struck in 2017, causing the whole project to have to be put on hold for two months.

**IMPLEMENTATION PROCESS**
Notwithstanding all of the challenges, the process went well and was divided into three stages.

**Solution definition**
A thorough site study was conducted by Ramco to understand the department structure, roles and responsibilities, and processes in CSAGA and which would need to be followed by Ramco who introduced industry best practices and processes based on experience with other helicopter operators.

**Data migration**
Data from different sources such as manual reports and legacy systems were collected, validated for consistencies and then migrated to Ramco. A total of three mocks of data migration were conducted to cleanse and improve data quality. Each of the mock uploads resulted in increased accuracy of the data and reduced time for uploading.
Training and testing

Different user champions from each department were nominated for process training. These user champions were trained on Ramco, according to their responsibilities, and they, in turn, trained the end users in their departments. Post training, a round of user acceptance testing was conducted and clearance was provided for Go Live.

BUSINESS BENEFITS REALIZATION

Following the implementation and with the benefit of experience using the new system from Ramco, CSAGA has identified the business benefits that had been realized at the time of writing and the list is already impressive.

Technical Records
• Structured multi-level configuration and maintenance programs with strong component replacements and task compliance tracking.
• Effective monitoring of aircraft and component utilization and ageing.
• Elaborate flight parameter reporting helps identify abnormal flight performance and troubleshooting.

AD/SB Management
• There is now a comprehensive process for AD/SB applicability assessment and EO (Engineering Order) execution.
• Enhanced compliance monitoring and reporting of ADs (Airworthiness Directives) and ASBs (Advisory Service Bulletins).

Centralized maintenance planning
• Advanced forecasting and visibility of due tasks for aircraft stationed across the thirteen bases.
• Work Order packaging of due tasks with automatic allocation of parts in stock.
• Repair planning, based on demand, for components available in ‘unserviceable’ warehouses.

Inventory management
• Maintains an optimum inventory based on stock analysis, plus reduces excess procurement and transfer between stations.
• Lean ‘Goods Receipt’ process with inspection, certificate attachments and parts binning.
• eQuote — Automated RFQ (Request for Quote) emails to suppliers and quote generation based on supplier response.

Maintenance execution
• Maintenance execution with access to a real time stock profile which improves efficiency and reduces TAT.
• Effective discrepancy deferral process supported by component replacements integration with configuration.
• In-built regulatory compliance certificate AAC-038 form.

Employee training
• Detailed employee profile maintenance with proactive monitoring of employee skills and licenses.
• Structured training plan to meet skill requirement demands with growing business and fleet induction.

FUTURE ROAD MAP

With the new system installed and working, CSAGA is already looking to the future and some ideas on how to leverage Ramco’s power and capabilities to further improve the business. We are planning for tool crib automation using new technologies and also leveraging advanced optimization tools for reducing inventory costs.

SUMMARY

This has been our journey at China Southern Airlines General Aviation to upgrade our MRO system from multiple legacy solutions to a single next generation solution with all of the efficiencies that entails. I hope that you also will find our experience useful when you are also contemplating such a move.

KAI YANG

Kai Yang is currently a Senior Engineer with China Southern Airlines. He is also an S92 Mechanical Instructor in the training department of China Southern General Aviation Company.

CHINA SOUTHERN AIRLINES GENERAL AVIATION

中国南方航空

China Southern Airlines General Aviation Ltd (CSAGA), a general aviation subsidiary of China Southern Airlines, is the China’s second largest flight operator in offshore oil & gas industry. Currently, CSAGA operates 24 aircraft including Sikorsky and Bell helicopters and holds the certification of CAAC-145 maintenance, CAAC-91 & 135 operator and CAAC-147 training qualification.

RAMCO AVIATION SOFTWARE

Defense is an M&E / MRO software addressing the needs of the airline, helicopter operator, MRO, and business aviation segments. Leveraging the suite’s vast array of applications, one can automate operations end-to-end, reduce overhead costs, manage inventory more effectively, increase aircraft availability, reduce AOG (aircraft on ground) times, and control operations on a business-for-profit basis.

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Effective and efficient

Mark Schulz, Senior Vice President Worldwide Sales, EmpowerMX on how to obtaining regulator acceptance for electronic signature
I know that regulatory approval can sometimes seem a little dry as subjects go but I have, for forty years, been passionate about the implementation of digital technology, and we’re at a place today where more paperless operations are possible than ever before in our industry. The question is, ‘what is preventing us from being successful?’ One thing preventing that success is the difficulty in moving forward and one item key to that is the ability to obtain regulatory approval. So this article is going to address that topic; how to obtain regulatory approval on the projects that readers might wish to implement.

**A PROFOUND PERSPECTIVE**

Let me set the scene: I was recently visiting a new customer in Latin America, COOPESA, to meet Walter Ching, Director of Operations. He said something that I considered profound; that was “The reason that we implemented paperless operations was because we are effective but we are not efficient.” That’s very true for many operations. People find ways to be successful in their operation, to be effective, to get the job done but they don’t end up being efficient in those processes. Bearing that in mind, I decided to focus this article around that concept.

**Effective and efficient**

Let’s start by envisioning an environment in which, whatever our rank or standing in the business, each of us has a role to play in the successful implementation of paperless operations. Let’s start from a situation where you have an effective environment. Aircraft are being delivered on time, when they are scheduled to go out. Quality escapes and defects are minimized and safety isn’t simply the number one priority but it is proven by the results of the operation; and employee satisfaction is at an all-time high. Those are situations where we begin to consider ourselves to be effective; when things are going well. Now let’s envisage a situation where there is an efficient environment. In this situation, maintenance event man hours are down, time to accomplish work is down and cycle times are reduced, perhaps getting aircraft out ahead of schedule. Revenues are up and costs are down so margins are significantly improved. The vision I often have when walking into an efficient operation is that the flow of work is like a school of fish swimming perfectly in an ocean in one direction and in synchronization. That’s the type of operation in which I wish to be: one that’s effective and that’s also efficient.

Now, consider yourself in that environment and think what you have to do as a person wanting to implement a paperless environment and accomplish being both effective and efficient? My question is: what is stopping you? What is keeping you from achieving this kind of environment? Is it a lack of belief that it is possible or simply that it’s just not attainable? Is there a lack of technology in your operation or a lack of management support for the initiative? Or is it the belief that the regulators will not approve it?

Having been involved with the implementation of paperless operations in airlines, MROs and lots of different operations for almost forty years, there are key things I have seen that have prevented successful implementation for many years. One of the perennial obstacles to success has been the lack of ability to convince regulators that what is being done is an acceptable practice. I challenge that thinking and say that you, the reader, the person working in the business can be the hero of the story. Paperless operations are possible today and you can be taking the lead in your organization to make this happen. In this article I want to share the things that I’ve learned from the people that I’ve worked with in implementations and that have helped them to become the heroes of their environments; helped them to create an effective and an efficient operation.

**THE TIME TO DO THIS**

When is the time to do this? Is the time now? Let’s look back: I was flying airplanes in the late 1970s and, in the 1980s, I joined airlines and manufacturers and was party to the development of ATA standards, IATA standards, OEM standards and SGML (Standard Generalized Markup Language); those early efforts where we were defining data standards that would become the foundation for what was going to become the success of paperless operations today. Moving on into the 1990s, I was involved in the development of software tools for electronic maintenance manuals with other things at...
the time around electronic task cards, materials, maintenance planning documents (MPDs), minimum equipment lists (MELs), trouble shooting manuals… many different things and, again, core elements for the success of paperless operations. In the 2000s we began to see developing infrastructure with the Internet coming into play, computers, mobile devices becoming available and, as technology continued to improve, tablets became available… clunky and inefficient maybe; but mobile devices were developing. Moving into the 2010s, we began to get developing acceptance. Electronic records and signatures are no longer an anomaly in the aviation industry but are now the preferred method of compliance by most regulators. FAA, EASA and regulators worldwide offer guidance for the use of electronic signatures, electronic recordkeeping and electronic manuals.

So, is now the perfect timing? I believe that the critical factors have aligned to provide the most optimum environment possible for the creation of necessary efficiencies resulting from paperless operations in technical operations. The real question is: if the time is not now, when is it? If you've been holding back from implementing a paperless operation because of some of these factors that might have seemed difficult to overcome, the question you might ask yourself now is, if all these things have not come together now, when will be the right time?

REGULATOR GUIDANCE HISTORY
Let’s now look at the history of regulator guidance on this subject, things that have happened over time and have affected our ability within the aviation industry to be successful in the deployment of paperless operations.

Going back to the 2000s, on June 30 2000, the President of the USA signed into law the Electronic Records and Signatures in Commerce Act (or Electronic Signatures Act). He actually signed it both on paper and electronically and it gave the ability for an electronic signature to be an electronically binding contract just as though it had been signed on paper; setting the beginning for giving electronic contracts the same weight as those executed on paper. But this was nearly twenty years ago, so why are we still where we are today on this subject? We should be further on.

In 2002 on October 29, the FAA released an advisory circular, AC 120-78 on Acceptance and Use of Electronic Signatures, Electronic Recordkeeping Systems, and Electronic Manuals. This AC gave guidance on the acceptance and use of electronic signatures to satisfy certain operational and maintenance requirements. I have to emphasize that it’s a method of acceptable use, not the only method but one method. More recently, in 2016, the FAA released a revision to that AC, AC120-78A, which provided additional guidance on the use of electronic signatures, electronic record keeping, and electronic manuals. This AC, as with any AC, is not mandatory and does not constitute a regulation; rather, it provides standards and guidance for electronic signatures, electronic recordkeeping, and electronic manual systems. Electronic record keeping systems/programs are used to generate many types of records This AC describes an acceptable means, but not the only means, for a certificate holder to be in compliance and utilize an electronic signature, electronic recordkeeping, and electronic manual systems. So, this information has been out there from some of the core regulators for sixteen or seventeen years at the time of writing.
BASELINE REGULATOR REQUIREMENTS
In a similar manner to the FAA guidelines, EASA guidelines offer some specific, unique characteristics that must be addressed in the application for or in the obtaining of agreement from the regulator for electronic signature. Many of the customers with whom I deal will use this guidance as a map or checklist to be able to secure agreement from them. They literally go down the guidelines and ask ‘what am I doing to prove uniqueness, to prove significance and scope? Let’s consider these.
• Uniqueness: an electronic signature needs to be able to provide uniqueness and identify a specific individual and be difficult to duplicate: the signature needs to confirm ‘this is the person who provided the signature’. In gaining regulatory approval, you need to demonstrate that the methods you are employing are meeting those criteria, i.e. providing the ability to be unique and say ‘this is the person who signed off this particular paperless document’.
• Significance: this is important inasmuch as, the individual using the electronic signature should be taking a deliberate action to affix their signature. It cannot just be an automatic sign-off; it has to be something where the person creating the signature has to take action and has to know that they’re taking action to affix their electronic signature to that record that they’re signing off. It will be necessary to demonstrate that the processes, the software and the approach that the business is taking allows the ability to be able to track that it’s a deliberate action.
• Scope: this is also important that the scope of the information being affirmed with the electronic signature needs to be clear to the people who look at it following the signing. Scope means, what is the scope of the signature? Is it signing off a particular task, an entire task card... what is being signed off? The scope.
• Digital security: the security of an individual’s hand-written signature is maintained by ensuring that it’s difficult for another individual to

“...this is a combination of technology and process that has to be put together into a plan which is presented to the regulator to offer them the comfort level that the system provides security with a digital signature that’s equal to or better than a hand written signature”
duplicate it. Of course, somebody could write your signature and forge it but that’s not easy and it’s even harder to forge a digital signature. The system has to be able to demonstrate that it’s not possible or that it’s very, very difficult to be able to forge an electronic signature.

- Non-repudiation: this is essential; it must not be possible for someone to say ‘I didn’t sign that off’. It must be possible to prove that, if someone signed something off, that it actually was them that signed it off. It will be necessary to identify what actions have been taken to ensure that it’s non-repudiatable.
- Traceability: an electronic signature should provide positive traceability to the individual who signed a record, record entry, or any other document. This could be a history or a log that occurs within a system or a process.

A lot of software provides these kinds of capabilities and, by now, readers might be wondering how to come up with all these ideas or what about the business processes and we’ll look at that below. But this is a combination of technology and process that has to be put together into a plan which is presented to the regulator to offer them the comfort level that the system provides security with a digital signature that’s equal to or better than a hand written signature.

THE PERFECT TIMING

Why am I writing about all these things? This is not a new subject; it’s been over twenty years that this information has been available. What I contend and readers should consider is that everyone worldwide knows that paperless operations (paperless environments and electronic signatures) are progressing. Probably five years ago, there were more regulators who were apprehensive of or reluctant to agree to electronic signatures because they were uncomfortable whether the processes and technology were there to be able to demonstrate and provide security around a digital signature. I have been with MROs and regulators all around the world for the last five years and can confirm that there are many more regulators who are looking for digital signature than those who are resisting it. There are still places where people are saying that it isn’t possible or that they can’t control this but it’s really only a very small number. Having been involved in operational approval for flight deck equipment, regulatory approval for maintenance manuals and being involved in regulatory approval at the moment, I write not as an expert in the industry but as someone who has worked with enough people that I’ve seen that it is possible to successfully implement this.

EmpowerMX has 30,000 users today and, whether they’re using an electronic task card or a non-routine, every one of those has to have agreement from the regulators that they’re using an electronic signature because part of our system is that every user is using an electronic signature. The largest airlines in the world are using electronic signatures today and readers should not be afraid to proceed with the same actions.

THE APPROACH

How can people get more comfortable with the approach now? At the highest level, the regulators are primarily concerned about developing a value proposition and a company approach. So, what is the value to a company to be able to have paperless operations and what is the approach they are going to take at a high level? Consider the factors that the regulator is going to look at such as safety, quality and compliance. Then consider what the key performance indicators (KPIs) are that will need to be put into place to demonstrate to that regulator the company has done those things; i.e. created an environment that’s going to be safe, deliver quality and provide compliance according to those things that we identified above.

A PROCESS FOR MOVING FORWARD

Let’s look at the process (figure 1) step by step using key elements developed with customers that I’ve worked with on building successfully achieved approval by their regulator.

| Understand | • Understand the project requirements |
| Develop | • Develop a High Level Plan |
| Bring in | • Bring in affected Regulators early and coordinate project high level intentions |
| Identify | • Identify those elements that will need to be accepted and / Approved by the regulators |
| Develop | • Develop a detailed approach for implementation of the program and the electronic signatures |
| Secure | • Secure agreement from the affected operator or customer |
| Changes | • Develop changes to the required Operations Manuals at the operator and/or MRO |
| Demonstrate | • Demonstrate that the new processes meet the intent of the regulation guidelines |
| Agreement | • Secure agreement from the regulator |
| Validate | • Validate that the process has integrity, is repeatable and will maintain integrity over time |

FIGURE 1

- Regulators need to understand the requirements of the project so it’s important that those implementing the project understand what they are trying to capture; how big is the scope... what is it that the company is trying to do?
- Develop a high level plan: it doesn’t need to figure out every little detail; in fact, where there are multiple systems in a large MRO environment, it won’t be
It's very important to bring in the affected regulators early and often and let them know the general intentions. There doesn't have to be an entire plan figured out when that first approach is made to the regulators; it's the involvement that counts. I've found a successful approach is to go to the regulator and say...

'We just want to let you know that paperless operations are happening all around the world and we're going to head in that direction and want to let you know that we're considering a program or project that will address electronic signature: we'll keep you involved to make sure you're comfortable that the things we're doing meet your requirements and we're giving you an early advanced notice'

That has been a critical part of people's success, bringing in the regulator early in the process.

Identify those elements that will need to be accepted and approved by the regulators. We've identified a few above (Baseline Regulator Requirements), including six that will be of key importance. Some of my customers have taken those six items and built their plan around them asking, 'how are we meeting the objectives of each of those requirements in that regulation?'

Develop a detailed approach for implementation of the program and electronic signature meeting all of the regulator's requirements. This is where it's time to develop the detailed approach but readers might say that they've not done that before so where would they get the details, they don't have the expertise or know what to do. The answer is to find someone who does know what to do and has been successful at accomplishing these things, and use their experience with the regulators to be able to create a detailed plan that will also be successful.

Secure agreement from the operator / customer. Some readers will be from airlines, some will be from MROs, some from consulting organizations, many different types of operations. There are a few key things, in my experience, that have caused significant risks and delays in a program.

The availability of data has been one that's been a risk in a program from the beginning.

Changing requirements from the operator or from the customer.

A regulator that didn't know what the company was doing and, at the last minute, decided they wanted to make changes. In a recent large implementation at an MRO in the USA, two days before the program was going
to go live, the regulator decided it was time to look at the program in detail then came back with ‘I don’t like the way that this statement reads, it doesn’t define the scope of the program.’ So, two days before the first aircraft was due to be moved over to the new system, we had to go away and re-code the application to make changes based on the regulator’s requirements. That delayed the program by one aircraft because, while we got it done within two days, the regulator couldn’t approve it within two days.

So it’s very important to secure agreement with the operator and the customer.

- Develop changes to the required operations manuals required by the operator and the MRO.

There will be changes to manuals and exactly what they will be can vary quite widely. But it’s very important to look at the details of the manuals and the expectations of the regulators. Some regulators are very broad in nature and will say that, if it’s not stated, it’s OK to do it. Others will say that, if it’s not stated, it’s not OK to do it. There is no general rule I can offer because each regulator is different. It’s important to bring these things to them, bring up the subject of manuals and documentation. I always recommend don’t ask the regulators what to do but tell them what you’re going to do to meet compliance and see what their response is. Say, ‘We see this as what our current manuals say; this is what our plan is; do you agree with that?’ The response will generally be more favorable than if the company had asked, ‘What should we do?’ to which the response will be to tell the questioner ‘do everything’.

- Demonstrate that the new processes meet the intent of the regulations. So, now that the plan is laid out with its details, and the manuals have been updated, now is the time to use the KPIs to be able to say, ‘this is what we’ve done in order to be able to meet your regulations.’

- Secure agreement from the regulator at every stage because if that agreement is not secured, it creates risks.

- Validate that the process has integrity and will maintain integrity over time. That includes data integrity, a very important part of the process because poor data integrity has created failure for many programs in my experience. Maybe the data is not presented in the best way or maybe some of the structured data isn’t structured properly and loses data when it’s being presented; but data, its structure and the integrity of the data is very important and the only way to verify that is to check it over and over, and over again.

Build upon the baseline requirements

We’ve already looked at what the EASA regulations say and how they identify:

- Uniqueness;
- Significance;
- Scope;
- Signature security;
- Non-repudiation;
- Traceability.

There are other factors that are affected in this process: however, those are six key pieces. I’ve seen many businesses be successful in building their case for approval around those six factors.

Collaboration

This is a really important part in the success of a project. For executives, leadership in any
organization is extremely important. I’ve seen leaders in organizations who have said something along the lines of, ‘We’re going to try this paperless operation; let’s just see how it works.’ Or, perhaps, ‘The new way of doing business is paperless operations; we need to make this successful.’ That first approach is sometimes difficult and the second approach, the more authoritative approach, the stronger approach, has been much more successful in operations than has any other way. So, if you’re in a leadership role in your organization, I’d encourage you, when you make a decision to move forward, to make sure that there’s a strong commitment to the success of such an operation.

There also needs to be a focused project team. I’ve seen efforts in this regard fail because there wasn’t a focused project team: they had too many activities to do, they weren’t able to focus on the successful implementation of a paperless operation and when they were diluted and spread across too many functions, they were not able to be successful. The project needs to be focused on this program of change.

Engage early and often with your experts:
• Internal business subject matter experts.
• Internal training department.
• Civil Aviation Authority.
• Technology providers who will have implemented solutions at many different airlines and MROs, so you can use their knowledge and expertise.
• OEMs and other suppliers.
• Form relationships with like-minded airlines and learn from each other (benchmarking); it’s a common practice for us, as a technology provider, to take a prospective customer to meet one of our existing customers and connect them; let them work together and to see how people have achieved success, and to leverage that. Those relationships that we’ve helped create have lasted for many years and they’ve been able to learn from that, to be mentored by the success of another organization to help them be successful.
• Test, test, and test again prior to going live to make sure that everything works and that you’re successful.

Key risk factors
We’ve already looked at risk factors but, just to reprise, they are data issues, operator / customer acceptance and regulatory requirements.

IN SUMMARY
The world is moving forward with the acceptance of Paperless Operations. The ability to have Electronic Signature is a fundamental element of the solution. How can you have a paperless operation if you don’t have electronic signature approval; it’s a critical element for success; maybe not the most riveting subject but, nonetheless critical and important.

Many readers will have been waiting their whole career for this time so you should make this the moment that you move forward. All factors have come together to make this the best time in history to seize the moment and leverage paperless operations, including electronic signature. Standards are in place, data is ready, software is ready and the infrastructure is ready. The industry needs to move forward and, now, regulators are ready. You can make this your moment in time. If you’ve been waiting for many years to decide when is the right time: there is no better time than today for a paperless operation. You, reader, can be the hero of this story and help your organization to be successful through the implementation of such technology.

“The ability to have Electronic Signature is a fundamental element of the solution. How can you have a paperless operation if you don’t have electronic signature approval…”
EXSYN

How EXSYN is driving innovation

Sander de Bree is founder of EXSYN Aviation Solutions; focusing on engineering and data solutions for aviation. EXSYN is specialized in the field of aircraft data management, data analytics and aircraft data processing. Sander holds a degree in aeronautical engineering with specialization in human factors, airworthiness, business administration and IT. As founder of EXSYN he is heavily involved in business development and R&D projects, utilizing his years in the field to further drive innovation.

Aircraft IT: Your name, your job title and the name of the business?
Sander de Bree: Sander de Bree, Founder & Business Development, EXSYN Aviation Solutions

Aircraft IT: How did EXSYN Aviation Solutions get started?
SdB: EXSYN started out in 2011 as a consultancy company focused on supporting airlines in implementing MRO systems. Over the course of several projects, use cases were encountered that triggered the development of what now is EXSYN’s solution platform. This started with the release of our Aviation Data Migration Tool, TITAN, in 2014, followed, in 2015, by our Data Analytics and Predictive tool, Avilytics, and more recently frameworks for adoption of Robotic Process Automation. It all resulted in EXSYN’s unique positioning as being a leader in offering digital solutions for aviation maintenance and engineering data.

Aircraft IT: What is the attraction of aircraft-related software?
SdB: The answer to this runs deep within EXSYN and is embedded in what we call the three main pillars of our company’s foundation: 1. Airlines can be more competitive and efficient if they have a high adoption of digital technology and solutions in their operation. 2. It is possible to eliminate human induced errors and incidents in aircraft maintenance through continuous improvement of digital technologies, systems, and software for aircraft maintenance. 3. In our life time, digital technology will outsmart human capabilities, and revolutionize air travel and all supporting industries, companies, and processes.

Aircraft IT: What is the guiding business principle that drives EXSYN Aviation Solutions?
SdB: Safety is paramount in aviation. All of EXSYN’s solutions revolve around Airworthiness, and Maintenance and Engineering data. Not compromising on this on behalf of our customers will always be our number one key driver. In the same way, implementing or developing solutions for the sake of developing or implementing can never be the main driver. In everything we do we always ask ourselves the question, “how will this benefit an airline”.

Aircraft IT: What has been EXSYN Aviation Solutions’ greatest technical achievement to date, and why?
SdB: Recently we completed an airline data migration project in a record time. We transferred the airline’s entire set of airworthiness data in just eight months. The fleet in question consisted of more than 80 aircraft and comprised a full mixture of A380’s, A350’s, B737’s, B777’s and A330’s all managed in different systems. Typically, such a process would have taken at least 14 to 18 months, however due to our unique data migration platform, TITAN, and our knowledge of aircraft data we were able to support this airline within this timeframe. Ultimately, this is paving the way for further digitization within the airline.

Aircraft IT: What has been EXSYN Aviation solutions’ greatest business achievement to date, and why?
SdB: Since our start back in 2011, we have experienced a rapid adoption of our data solutions and services by the aviation industry. Throughout these years, however, we have been able to combine rapid adoption with
guaranteeing quality and the levels of trust placed in us by airlines. This was rewarded in 2017 with the certification of EXSYN according to the prestigious ISO27001 standard, and our ability to remain certified to this standard whilst enlarging our impact on the industry.

**Aircraft IT:** What have been EXSYN Aviation Solutions’ disappointments and what have you learned from them?

SdB: As you know predictive maintenance is a hot topic within the aviation industry. Since 2017 EXSYN has been offering the Avilytics AOG risk monitor that uses data from MRO systems as well as onboard aircraft data to create risk profiles of aircraft in the fleet and their probability of component failures. However, we had to accept a rather slow adoption as we underestimated that many airlines are not ready yet to really adopt predictive analytics and a predictive maintenance philosophy. Based on this experience, our consulting services now focus more on supporting airlines to become ready for using predictive analytics (rather than simply offering the AOG risk monitor) and then enabling them to use it.

**Aircraft IT:** In a sentence, how would you summarize what EXSYN Aviation Solutions does for aviation customers?

SdB: Supporting airlines in driving as much value as possible within their maintenance and engineering from digital technology.

**Aircraft IT:** What is new on EXSYN Aviation Solutions’ development horizon?

SdB: Several items are to be announced and released during 2019 as well as 2020. One of these items is a new suite in Avilytics that will use predictive analytics algorithms in order to determine the probability of findings on base maintenance task cards when an aircraft goes into a C-Check. Another item is the release of our Airline Lease Contract monitor, which can be used by airlines to monitor their current aircraft status against lease contract conditions and, as such, prevent costly penalty fee’s when an aircraft is returned to the lessor. In addition, we will extend our capabilities into Natural Language Processing; however, more on this will follow in due course...

**Aircraft IT:** What will be the next big thing in Aviation IT?

SdB: Cognitive systems in aircraft maintenance and operations. In other words, we will be talking to systems instead of typing, clicking and tabbing.

**Aircraft IT:** What do you want your customers to say about EXSYN Aviation Solutions?

SdB: EXSYN makes a difference for its customers through the optimal adaptation of data and digital technology.

**Aircraft IT:** Sander de Bree thank you for your time.
Commercial aviation in 2019

Mark Martin, Director, Aerospace & Defence Business Unit, IFS suggests three moving targets for Operators and MROs to focus on in the coming year.
In 2019, global fleet and maintenance, repair and overhaul (MRO) markets will see dynamic growth as the demand for air travel rises. Alongside this, organizations will have to deal with fluctuating oil prices, a shortage of labor skills and newer, complex assets entering service. So just how will they cope in this competitive market environment? In this article I’ll identify and target three developments that will enable operators and MRO commercial aviation companies to take advantage of these growth opportunities in 2019.

**PREDICTION ONE: RELIABILITY ANALYSIS BECOMES THE ENGINE FOR GROWTH OF PREDICTIVE CAPABILITIES.**

Reliability data buys operators decision-making time

A recent IFS study into the top commercial aviation pain points found operational availability to be the greatest challenge, cited by 60 percent of respondents. No matter how quickly operators can turn around a plane between flights, the disruption of having an aircraft on the ground (AOG) has drastic ramifications — with parts and time potentially costing millions of dollars. Improving operational availability and avoiding costly schedule delays must begin in the maintenance planning process.

The solution lies in analyzing reliability data, which can enable operators to accurately predict when a component will fail and give them more time and freedom to decide on the next step. If operators know when a part is likely to malfunction or break, they can get as much as two to three weeks to review options and source a replacement from the most cost-effective vendor. This removes the pressure to find a part at short notice, which often leads to cascading maintenance schedule changes and expensive emergency parts sourcing.

**MROs can also capture valuable reliability data**

Last year, IFS predicted digital twins would play a bigger role in commercial aviation and we have seen this materialize and continue to dominate the agenda across the industry. In 2019, we will see MROs take advantage of digital twin information gained from original equipment manufacturers (OEMs) to capture much of this valuable reliability data.

During the manufacturing process, sensors on machinery send signals to the twin to gauge operational performance, product characteristics and environmental conditions within the factory. When this is combined with organizational information — such as data and user rights — and third-party data on weather forecasts, historical intelligence and flight schedules, the digital twin is able to run analyses to spot patterns signaling sub-optimal conditions.

When MROs see this data, they can better understand how assets are used in the field, how long-lead-time components improve product performance and where data can be used to open new revenue streams.

It is important to note that some improvements pay off better than others. Take the essential fuel pump for example — expensive to produce and with a long repair time. Focusing analytical capabilities on this area will deliver more efficiencies and cost savings than elsewhere. The key for MROs is to identify the areas where reliability data can have the most disruptive effect. Any improvement that will allow an MRO to enhance or gain predictive capabilities is going to be a major service differentiator.

In 2019, both operators and MROs will double down on their efforts to make data count towards predictive capabilities — and these capabilities will stretch further than ever before.

**PREDICTION TWO: QUICKER DEPLOYMENT OF IN-AIR AND IN-HANGAR INNOVATION**

For operators, the only way is cloud

Operators face unprecedented demand to innovate faster, which usually manifests in pressure to adopt new technologies that improve the passenger experience — from in-flight entertainment systems to the latest avionics. Yet these new tools and functionalities often take too long to approve and integrate — so much so that aviation is lagging other industries in speed of innovation.

This innovation dilemma is down to several factors, including regulatory constraints, but is often due to the fact that archaic processes are still widespread across the operator ecosystem. Paper is still prevalent in a lot of maintenance hangars, RFPs for new projects themselves are extremely old fashioned in their construction and personnel are still taken out of operations to conduct classroom-style training sessions.
Instead of pointing the finger at OEMs, regulators and the industry as whole, operators can get a head-start on innovation by looking within. Cloud software will be a necessary tool in the new aviation IT landscape to speed up the delivery of new capabilities and eliminate the cost of purchasing and managing ‘on premise’ technology. Software-as-a-Service (SaaS) will remain a primary model for this. In 2019, we’ll see commercial operators connect more areas of the enterprise to the cloud to deploy new technologies faster and drive efficiencies through successful digitization and supply chain optimization.

**Mobile customer service: MROs must manage maintenance expectations**

In 2019, MROs will face increased competition from OEMs moving into aftermarket services. Unlike most

OEMs and operators, maintenance is the main skillset of an MRO — this gives them a head-start when it comes to being flexible, but they are also afflicted by paper-based processes and regulatory pressures.

When it comes to innovation, MROs will need to demonstrate their capabilities through customer value. This means looking for new ways to use technology to deliver a better service and overcome distance challenges. Moving maintenance visibility beyond the boundaries of the MRO organization and in front of the customer is a good place to start.

Mobile devices are an indispensable part of this. MROs can make accurate maintenance status reports instantly available through mobile-enabled customer portals, and customers will directly benefit from better visibility into key metrics such as turnaround time to help with flight scheduling.

In 2019, the MROs who prioritize innovative service will take the step from technology laggard to leader and can develop a key service differentiator in an ultra-competitive climate.

**PREDICTION THREE: COMPANIES PUT TALENT AND KNOWLEDGE FIRST, PUTTING ROBOTS ASIDE**

One-to-many knowledge transfer now a reality for operators — virtual or augmented

Labor costs are the second-largest operating
expense for airlines after fuel costs. Robots will not replace engineers and professionals in 2019 and the labor force is quickly aging; so there needs to be a better way to aid human labor and help an ever-increasing number of people travel seamlessly. This means operators have a responsibility to ensure workers have all the knowledge, tools and support currently available.

Knowledge transfer — the capability to capture knowledge from a small pool of subject matter experts and disseminate it across the enterprise — is going to be a key factor in 2019. It is an area that has benefited from significant developments in commercial software tools over recent years.

In the short-term, point solutions, such as augmented reality, are coming to the fore. IFS is already working to deliver IFS Applications on Microsoft HoloLens headsets, which supports real-time ‘one-to-many’ knowledge transfer from experienced technicians to newer recruits. Looking longer-term, incorporating asset history into maintenance support systems will ensure that lessons learned stay learned and component history can be tracked.

Using technology for one-to-many knowledge transfer will make it simpler for new recruits to learn, receive on-the-job training and get to grips with new and complex assets much more easily.

MROS: GET INVOLVED—IT’S YOUR FUTURE
Aviation maintenance technician (AMT) demand is higher than supply. In 2019, MROs need to start to rebalance this by opening the door to both new opportunities and emerging technologies.

Apprenticeships and agreements with universities and technical colleges can give fresh momentum to the industry. Such training programs are already taking off across Europe and Asia, with some degree apprenticeships providing students the opportunity to earn a degree and work in the field at the same time. In the US, there are a few early examples of academia and industry coming together to help aircraft technicians fast-track their career and, in 2019, we will see the industry push on to strengthen this trend.

But MROs need to go further than just putting new recruitment programs in place — they need to dial up their digitization efforts too, so that younger, digitally native, workers and apprentices can use the technologies they take for granted in their personal lives. Taking a more experienced team member on a journey from paper to desk computer will manifest a productivity boost, but equally, taking a younger recruit away from mobile technology and putting them in front of a computer screen is a major step backwards.

When mobility is allowed to play a key part of the workplace experience, the consequence is what I call an innovation spillover. One such spillover would be the visualization of technical records — making vital information available through mobile platforms or augmented reality tools for people to access whenever and wherever they might need it.

In 2019, the best approach MROs can take to tackle the AMT shortage is to join forces with academia to help talent enter the industry and cultivate a technologically-driven workplace culture to help train and retain them.

KEEPING AIRCRAFT FLYING AND CUSTOMERS HAPPY
2019 will be a critical year for the aviation industry to improve the operational efficiencies that have a real impact on the quality and speed of service, go to market time, scheduling, maintenance and training. This means that reliability analysis, customer portals, more responsive maintenance capabilities and a tech-driven approach to knowledge transfer and recruiting will be essential to keep aircraft flying and customers happy.

MARK MARTIN
As Director, Operator Edition Product Line, Aerospace & Defence Business Unit, IFS; Mark is responsible for helping commercial aviation organizations and operators increase efficiency, reduce costs, perform maintenance more effectively, meet stringent performance targets and ensure industry compliance.

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.
Elliot Margul is the CEO and a co-founder of Aerostrat. Before starting his career in aviation, Elliot studied at University of Washington. After graduating, he joined Alaska Airlines Heavy Planning, followed by Maintenance & Engineering Finance. Elliot’s inspiration and passion are rooted in listening to customer challenges, both big and small, and finding creative ways to solve them at Aerostrat.

**Aircraft IT: Your name, your job, and the name of the business?**
Elliot Margul: Elliot Margul, CEO, Aerostrat

**Aircraft IT: How did Aerostrat get started?**
EM: At the time, I worked at Alaska Airlines and I saw there was a large gap in the range of tools available for heavy maintenance planning. Three years ago, I decided to leave in order to build Aerostrat and improve the tools available in the heavy maintenance space. It took us a year to really dial in our product and sign our first customers. In two years, we have signed five, and tested with almost twenty.

**Aircraft IT: What is the guiding business principle that drives Aerostrat?**
EM: I would have to say it is how we want to work closely with our customers. I really feel like this differentiates us. While solving our customers’ problems, we keep them fully involved in many aspects at Aerostrat. Thus, their ideas and feedback make their way into our software. This allows us to not only have a better product but also ensure our product integrates seamlessly into our customers’ processes. We really want our customers to feel like we are part of their IT team.

**Aircraft IT: What has Aerostrat’s greatest business achievement been to date, and why?**
EM: I am really proud of the impact we are having on our customers. When starting Aerostrat, I wanted to create a tool that would enable our customers to plan their whole heavy program over the life of each aircraft. We are certainly close to that today. Our customers are now planning over five hundred maintenance requirements beyond five plus years and managing all of the constraints that come with it: constraints such as maintenance allocation, cost, and manpower requirements.

That isn’t the limit of our impact though. We have seen massive reductions in overheads, better collaboration with vendors, and much more. Our customers have seen improvements in nearly every metric.

**Aircraft IT: What are your disappointments and what have you learned from them?**
EM: When starting Aerostrat, we were hoping we would penetrate the market quickly, but we were surprised by how difficult it is to create change in large corporations. Fortunately, this drove a lot of innovation in our processes and product. We created a repeatable evaluation process where our customers really get to experience being an Aerostrat customer risk free. This includes building features for them at no cost while evaluating. We also built tools in Aerros so our users could quickly set up our product, generally taking less than a day. These tools also enable our users to keep their data in sync with their maintenance ERP without IT.
“With one big system you get a situation where everything is okay but not excellent. I hope Aerostrat helps open the door for modular ERPs and changes the philosophy, fostering innovation in the sector.”

support. All of these and more really help make the decision easy for our customers and help us to show, not tell, the value that Aerros and Aerostrat create.

**Aircraft IT:** In a sentence, how would you summarize what Aerostrat does for aircraft maintenance customers?

**EM:** Aerostrat offers a heavy planning solution that enables airlines or MROs to plan their entire program, at the task card level, over the life of an aircraft.

**Aircraft IT:** What will be the next big thing in maintenance Aviation IT?

**EM:** From Aerostrat’s standpoint, it will be the modularization of ERPs. When looking at other industries, relying on one big system to do everything is a thing of the past. Now there are many companies focusing on one thing and then they sync together. This allows companies to plug and play systems where they please, which essentially creates a custom ERP. This allows their suppliers to focus on a smaller aspect and excel at it.

With one big system you get a situation where everything is okay but not excellent. I hope Aerostrat helps open the door for modular ERPs and changes the philosophy, fostering innovation in the sector.

**Aircraft IT:** What do you want your customers to say about Aerostrat?

**EM:** I would like our customers to say that we listen to feedback and deliver meaningful outcomes. It is essential that our customers know they are heard by incorporating their feedback in our product. It is why we meet with them regularly, design features with them, and let them test our features from initial release to stable. Most importantly, it is also why we release updates monthly. It’s really nice that we can look at each button, function, etc. in Aerros, and know it was customer inspired.

**Aircraft IT:** Elliot Margul, thank you for your time.
Improving business efficiency in an MRO environment

Dr. Hugh Revie, Sales Director, Aerospace, Ubisense explains how using MRO digital twins and location can drive business efficiency
Industry 4.0 is a hot topic within many sectors; it fosters what has been called a ‘smart factory’. Within modular structured smart factories, systems model physical processes, create a virtual copy of the physical world (the Digital Twin) and make decentralized decisions. Over the Internet of Things (IoT), systems communicate and cooperate with each other and with humans in real-time both internally and across organizational systems utilized by participants in the value chain.

There are many sides to Industry 4.0, the Smart Factory or, in this specific case, the Smart Hangar, but at the heart of this new way of running industrial processes and their component parts is digital technology and the use of data. In this paper, my plan is to offer readers a new perspective on one aspect of how they can apply Industry 4.0 ideas, methodology and data management to better manage their maintenance, overhaul and repair businesses, creating the start of an MRO 4.0 implementation.

Ubisense Limited is a real-time location focused solution company. So, perhaps, it will come as no surprise when I say that I want to describe how location can help influence your business and improve the efficiencies of what you do in an MRO perspective and within your Smart Hangar. I will also explain what we mean by a Digital Twin, what it means in this context and how it can help to better understand what is going on in your business.

**THE IMPORTANCE OF LOCATION**

Within the MRO community, the concept of using ‘location’ is new for most companies since there are very few that are currently using this as a tool to help drive efficiency.

Figure 1 offers a good perspective on today’s position in most MRO companies showing business systems at the top of the graphic, including ERP or MES systems, systems of records, control systems, etc. — the systems that are managing what is happening in the business. At the bottom of the graphic is the real world, which is the hangar floor and all the activities that go on there. Currently, the activities that are planned in each business are managed using the systems and data available, with no link to what is actually happening on the hangar floor. This creates a data gap, where there is no way of knowing what is happening on the hangar floor until after it’s happened. Only limited historical information is fed back into the systems to indicate if things haven’t happened in the way they were planned or that there is a disconnect somewhere. Eighty percent or more of activities on the hangar floor aren’t being controlled and managed from the business systems or from the available data.

“Eighty percent or more of activities on the hangar floor aren’t being controlled and managed from the business systems or from the available data.”

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**FIGURE 1: LINK BETWEEN BUSINESS SYSTEMS AND THE REAL WORLD PROCESSES**

- **Industrial Internet of Things (IIoT) technology** is a foundation for implementing a digital strategy.
- This leaves a critical **data gap** for IIoT implementations in large scale manufacturing or overhaul plants — nobody knows where anything is.
- In typical discrete MRO facility 60% to 80% of hangar space is dedicated to processes **not connected** to the LAN.
Ubisense has created a solution, SmartSpace, which helps close that data gap to manage the activities that are completed on the hangar floor and integrate with the business systems and records. Therefore, the data contained and managed within the business systems is now connected to actual events on the hangar floor (Figure 2).

**HOW A DIGITAL TWIN CAN HELP YOUR BUSINESS**

Perhaps the first thing to establish is what is meant by the term ‘digital twin’ — it is a virtual model of a product, place or process. Digital twins come in lots of different guises. There are probably more than five different types of recognizable digital twins and these include product design, manufactured product, plant design, plant equipment and control room. Each of these digital twins reflects, in the virtual world, the real world activity of the user or business and helps users to perform their tasks more efficiently and at lower cost.

Imagine if you were able to send a real time demand for technicians to help on a particular task that is in a specific zone on the aircraft. Imagine also if the business systems were able to direct the technicians with the right skills, experience and in the right location to help complete the task. This is currently being achieved in other sectors where they have already adopted this technology.

So how are we able to build this technology into the MRO environment? Initially a digital twin of your business is created reflecting the infrastructure and the activity completed within the environment, enabling users to see exactly what is happening on the hangar floor.

A 3-dimensional model of your business is created in SmartSpace to replicate the infrastructure within the hangar environment that enables the user to track material, tooling, components or tasks within that environment in the model. This is the initial aspect of starting to build a full digital twin of your work environment, creating an image of what is being done in real time.

**USING LOCATION TO DRIVE THE BUSINESS**

In other sectors, location is already being used extensively. In the sports world and in particular football, all players have an embedded tag to track their activity. Initially this was used to show TV audiences who the individuals were as well as providing statistics on their performance. Now this same technology is used extensively to review and change plays, depending on how successful they were. This is now a key element in the sports world to gain a competitive advantage.

Similarly, in other types of business, location has been used initially to track where ‘things’ are in real time, then, once the tracking is fully operational, for analysis and extensive review to gain a competitive advantage by improving business efficiency. I believe the same process will work within the MRO sector with initially ‘things’ being tracked then rapidly followed by significant business improvements.

How can we adopt what has already been accomplished in other sectors to rapidly implement a location-based solution in the MRO business and gain significant benefit?

“...location has been used initially to track where ‘things’ are in real time, then, once the tracking is fully operational, for analysis and extensive review to gain a competitive advantage by improving business efficiency.”
WHAT’S THE VALUE OF A DIGITAL TWIN AND LOCATION IN AN MRO?
So location has been used in other sectors to drive real efficiency gains, but what is the real value within the MRO environment?

The first step in this is to create a digital twin of the facility. Figure 3 shows an example of the digital twin for a manufacturing facility in the UK where a three-dimensional model has been created to reflect the actual hangar. Within the model, the digital twin enables the business to control what happens to objects and processes in that environment.

FIGURE 3: MANUFACTURING FACILITY DIGITAL TWIN
The first step in this is to create a digital twin of the facility. Figure 3 shows an example of the digital twin for a manufacturing facility in the UK where a

FIGURE 4: OPERATIONAL DIGITAL TWIN
Figure 4 shows how the digital twin works, there are areas or zones, that are expecting to see work orders, which could be an assembly or a maintenance
activity, that are being managed. So, if things go somewhere where they’re not supposed to go, alerts can be sent to specific individuals and that whole process can be managed within the solution to get a perspective of what needs to be done, what is being controlled from the system of records or being controlled from the ERP system, to make sure that what gets done on the factory floor is what was planned. This effectively closes the data gap shown in Figure 1 and joins the planned activities to real world actions.

Figure 5 illustrates a similar solution within a maintenance environment showing information about components, tooling or tasks in real time and visible to all SmartSpace users.

“The pillars of MRO are: the tasks that should be managed within the MRO processes; people and the various skills that are required to perform the tasks; the tooling required for each task; and the material required. Each of these pillars is discussed in further detail highlighting some key components and areas where value can be realized.

Tasks
Looking first at the tasks, here are some examples of how tasks can be scheduled and coordinated effectively within an environment, where the user creates the rules within SmartSpace to manage what gets done, when and how.

• Plan efficiently using actual data;
• Record actual vs planned activities;
• Record findings over time, resource, skills and materials for information that can be used in future planning;
• Execute consistently;
• Save the plan template for training, insight and future use.

People
This is about making sure that the right people are available and, if the business allows it, to track those people to know where they are. In most cases, people get allocated to particular work orders or tasks so it’s possible to know where they should be. Here are a few examples of what can be captured and monitored to review what is working well and what is not working well within that facility and returning the value through the business.

• Check/monitor skills required to complete planned tasks;
• Check/monitor currency of qualifications of those with correct skills;
• Allocate specific technicians to tasks;
• Manage and control enablement of Electronic Task Cards for technicians on mobile devices;
• Record time spent on tasks;
• Sign completion/closure of tasks.

**Tooling**

This can be managed through a digital twin and is one area where many of those adopting this technology start, by managing how they issue the tools out and where the tools are to ensure that they are always controlled. Again, here is a sample list of what can be achieved to ensure that tooling is available, conformant and able to be located:

• Ensure tooling is serviceable;
• Ensure tooling is available;
• Deliver tooling to zone prior to need;
• Confirm use of tooling;
• Return tooling to storage.

With ground support equipment (GSE) or larger more expensive tooling, SmartSpace can help to understand how these tools are managed including their utilization. Another example could help manage tooling: when a tool is issued to one individual, instead of the tool going back to the tool store, it can be transferred to another individual but still be controlled through the tooling inventory management process.

“Another example could help manage tooling: when a tool is issued to one individual, instead of the tool going back to the tool store, it can be transferred to another individual but still be controlled through the tooling inventory management process.”

With real-time tracking of GSE, a team lead awaiting a specific GSE can be notified instantaneously when it becomes available and claim it faster, thus reducing the overall time-span of a repair.
**Material**

It is always important to know where material or components are. Is it at the right place at the right time so that the user can pre-draw the material and get it to the point of use in a timely manner? The solution can also manage the store so that the business knows how much material is available (how many consumables or other types) and can manage that in real time as well as pull all that information together. Again, here is a short list of aspects of material management that need to be considered:

- Check material is available, if not place an order;
- Prepare material for delivery to zone just in time but prior to demand;
- Confirm consumption of material and recover possible lag time in replenishment;
- Arrange for return to store of unused stock.

**SINGLE PLATFORM**

All this information provides a single platform that delivers visibility to all internal processes and activities. This is shown in Figure 6.

**CONTROL**

- Real-time, context-aware tool control
- Soft identification and flexible workstations
- Paperless quality and task inspection
- Digital build record
- Parts logistics and flow management

**VISIBILITY**

- Maps for finding Tooling, Material and People
- Work instructions
- Performance & status dashboards

**AUDIT & COMPLIANCE**

- Digital completion records for regulatory compliance
- Process flow and movement history of parts and process
- Process Improvement KPIs and reports
- Progress against plan recording

**MISSION CRITICAL PLATFORM**

- Use location and identification information to drive processes
- Give managers and operators visibility of process in order to make decisions

**FIGURE 6: SMARTSPACE SOLUTION PROVIDING CONTROL, VISIBILITY AND AUDIT**

Many things can be tracked, so it is possible to see in real time where the various components are and at what stage the work orders are within that area, providing complete visibility of what is happening.

There is also complete control since, within SmartSpace, there is the ability to put controls in place enabling the business to build rules to monitor their critical processes, making sure that what gets done within the hangar floor is more efficient, flexible, profitable and safe.

Finally, there is audit and compliance. With SmartSpace the business can audit what has been done, when it has been done and who did it. A good example would be in the car industry; if there is a problem with a car and it needs a recall, traditionally that recall would cover, perhaps, a quarter of a million vehicles. Using SmartSpace, this can be significantly reduced to just a few thousand vehicles because historical data shows who performed the task, which tool was used and what other vehicles the tool was used on. So, it is possible to identify exactly where the problem is and which vehicles were potentially affected.

There are a number of examples where SmartSpace has already been used successfully within an aerospace environment. In one case, a customer had set an ambitious target to quadruple production within a two-year period and Ubisense was selected to assist with efficiency improvements and process waste identification as key opportunities for successfully achieving their rate increase. In other examples, a significant reduction in operational costs was achieved, comparing actual expenditure against plan, and for other customers the system delivered real time visibility of work in progress along with more efficient tool utilization and management. There were also improved turnaround times with some customers achieving as much as 20% improvement: that’s not only important for an MRO but also important for their customers who can reduce the amount of time the aircraft is out of service.

**SAMPLE USE CASES**

Perhaps the best way to understand where digital twins and SmartSpace might be useful for an MRO operation is by going through a few customer use cases. Hopefully, these will help readers see the potential that there is for them to start the process of building a digital twin.

It is best to select quick wins that will deliver real value and enable the organization to gain knowledge and confidence in the potential benefits. As you will see, there are many use cases that businesses can start to adopt, and I am sure that readers will be able to think of examples beyond the ones listed where they could potentially start to drive real value. When businesses begin using this technology, the most successful are those that implement one use case at a time but within the context of a long-term plan.

Also, think outside the box, do not just consider what other companies might already have done. As long as there is a way to capture information about an object and its location (RFID, barcode, BLE, UWB or other technologies) then it is possible to know where it is, where it has been and its history. The important thing is being able to understand the value of capturing this information and having the means to realize the value.
**SUB-TOPIC**

Ground Support Equipment

- Visualize your processes so that it’s possible to see how something travelled through the process, where it went,
- Tracking using RFID/UWB/BLE to track

**USE CASE DETAILS**

- **Know where all your GSE is at any given time**
- **Assess the usage of your GSE**
- **Ensure GSE planned for upcoming tasks and is where it should be at the right time**

Large / Expensive tooling

- Real time view of all tools, who has them and how they are being used
- Manage the issue of tooling
- Manage the transfer of tooling from one technician to another
- Track calibration
- Track actual utilization and move to actual-based vs time-based maintenance scheduling

Small tools

- Tracking using RFID/UWB/BLE to track
- Improved traceability

**WORK IN PROGRESS (WIP) MANAGEMENT**

Where is it?

- Know where all your work is for a real time view of the current position in that process
- Real-time synchronization of ERP with shop floor, removing human error and delays

Manufacturing/assembly process

- When you know where things are, it’s possible to ask: “is your process efficient”? In one example, an aerospace customer was taking 60 days elapsed time to complete a three-day manufacturing job and needed to know where the time was being lost. This location-based solution was able to help them reveal the processes and locate where delays were occurring

Improving the supply chain

- Providing visibility to your supply chain so that customers and suppliers can see what stage you’re at within your process. In an MRO context, that might be giving airline customers visibility as to what stage has been reached in the work order for a particular aircraft. Knowing where everything is makes all that visible

Pre-drawing material to point of use

- Know what material is required and ensure it is at point of use prior to need or ‘just in time’

Monitor material usage

- Know what material has been used in your process
- Return unused material to store
- Real-time synchronization of materials movement, consumption and Kanban triggers
- Reduction in logistics delivery errors
- Improved replenishment cycle times

**MATERIAL MANAGEMENT**

Amending your process and monitor improvement

- Demonstrate that the improved process delivers the expected benefits

Continual process management

- Support 5S workshops to reveal hidden process waste

**PROCESS MANAGEMENT**

Are your processes efficient?

- Visualize your processes so that it’s possible to see how something travelled through the process, where it went, when it was stopped, for how long and why
- Identify how the overall process could be improved

**PLANNING AND PRODUCTION CONTROL**

Monitoring your plans

- Visualizing your planned work order
- Playing your plan in advance of performing the work

Reviewing and modifying your plans

- Continually review and revise your plan for optimization

Ensure efficient production control

- Having effectively planned your work, ensure it is executed efficiently and to plan
- Review execution against plan

**SUMMARY**

MRO 4.0 has enormous potential that can be realized in all companies and that potential will be easier to realize by putting a system in place that can start to manage the business and its facilities on a real time basis.

Our experience at Ubisense, in other sectors where we have worked for many years and have been able to improve their processes and efficiencies, can be transposed to an aerospace and MRO environment to help MRO companies embark on this journey. One key point to remember is to go for easy wins, do not try to go for difficult challenges at first but use easier ones as part of a master plan to build and embed understanding in the business and start to build your Digital Twin as part of your MRO 4.0 future.

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DR. HUGH REVIE

Hugh has now been working in Aerospace for more than 30 years and, prior to joining Ubisense, started his career in aviation after graduating with a doctorate in Engineering and, initially working for British Aerospace. Around 18 years ago, he created his own company, CoreData Limited, focused on helping airlines, MROs, OEMs and aircraft supply chain companies with solutions that could drive value from the large amounts of data they were accumulating. He finally sold the company to Rolls Royce.

UBISENSE

With offices in UK, France, Germany, North America, Canada and Japan, supported by a network of highly skilled partners around the globe, Ubisense has more than 900 customers across many sectors and has been influential implementing Industry 4.0 in many of those customers. Their solutions are based on powerful enterprise platforms, supported by a range of customer-led applications that use location to deliver a real-time digital twin of physical operations. This is proven to drive quality, increase productivity, manage complexity and reduce costs.
**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

**W:** [www.2moro.com](http://www.2moro.com)  
**T:** +33 (0)559 013 005  
**E:** sales@2moro.com  
**Locations:** France (HQ), Canada and Malaysia

**NAME OF PRODUCT MARKETED**  
- Aero One, Aero-Webb, BFly, 2Fly

**KEY BUSINESS/SOFTWARE AREAS**  
- MRO: Line, Base, Engine maintenance  
- Airworthiness and Fleet Management  
- Flight and Crew management  
- Material Management  
- ERP: Finance, Purchasing, Sales, HR

2MoRO Solutions 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 types 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 base 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. BFly® 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.

[CLICK HERE](#) for Product Details  
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### ADSoftware

**W:** [www.adsoftware.fr](http://www.adsoftware.fr)  
**T:** +33 (0)4.50.89.48.50  
**E:** contact@adsoftware.fr  
**Location:** France, Thailand, South Africa, Brazil

**NAME OF PRODUCT MARKETED**  
- AIRPACK

**KEY BUSINESS/SOFTWARE AREAS**  
- AIRTIME — Fleet management & CAMO  
- AIRSTOCK — Inventory control & Logistic  
- AIRDOCC — Documentation management  
- AIRSTAT — Reliability and statistic reports  
- AIRWORK — Time Tracking Software

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.

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### ADT: Applied Database Technology

**W:** [www.adbtech.com](http://www.adbtech.com)  
**T:** +1 (425) 466-5013  
**E:** sales@adbtech.com  
**Location:** Bellevue, Tampa USA; Istanbul, Turkey

**NAME OF PRODUCT MARKETED**  
- Wings NG

**KEY BUSINESS/SOFTWARE AREAS**  
- Fleet Management  
- Maintenance Engineering  
- Material Management  
- Production Planning  
- Labor Collection, Billing

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.

[CLICK HERE](#) to Request Private Demo

### NAME OF PRODUCT MARKETED

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<td>Aero-Webb</td>
<td>Aircraft MRO and M&amp;E</td>
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<td>BFly</td>
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<td>2Fly</td>
<td>Aircraft MRO and M&amp;E</td>
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<tr>
<td>AIRPACK</td>
<td>Aircraft MRO and M&amp;E</td>
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<tr>
<td>WINGS NG</td>
<td>Aircraft MRO and M&amp;E</td>
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### Key Business/Software Areas

<table>
<thead>
<tr>
<th>Area</th>
<th>Description</th>
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<tbody>
<tr>
<td>AIRTIME</td>
<td>Fleet management &amp; CAMO</td>
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<tr>
<td>AIRSTOCK</td>
<td>Inventory control &amp; Logistic</td>
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<tr>
<td>AIRDOCC</td>
<td>Documentation management</td>
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<tr>
<td>AIRSTAT</td>
<td>Reliability and statistic reports</td>
</tr>
<tr>
<td>AIRWORK</td>
<td>Time Tracking Software</td>
</tr>
<tr>
<td>WINGS</td>
<td>Aircraft MRO and M&amp;E</td>
</tr>
</tbody>
</table>

**Contact Information**

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**T:** +33 (0)559 013 005  
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**T:** +33 (0)4.50.89.48.50  
**E:** contact@adsoftware.fr  
**Location:** France, Thailand, South Africa, Brazil

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**T:** +1 (425) 466-5013  
**E:** sales@adbtech.com  
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AeroSoft Systems

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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.

Aeros

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 Schedule Optimization
• Maintenance Event Performance Tracking
• Heavy/Base Production Schedules

Aerros 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 you to optimize the maintenance program by managing various maintenance and operational constraints, which maximizes event yield, drives costs down, and enables 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 your 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 drag 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 your existing information systems.

AMC Aviation

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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
• Reliability and Performance Analysis
• Inspection Document Management
• Inventory and Procurement
• Financial and Flight Operations Integration

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”

Aviation Intertec Services

W: www.aviationintertec.com
T: +1 807-625-9260
E: info@aviationintertec.com
Location: Canada, Thailand, India, Greece

NAME OF PRODUCT MARKETED
• RAAS & RAAS Express

KEY BUSINESS/SOFTWARE AREAS
• Production Planning and Management
• Inventory and Procurement
• Inspection Document Management
• Financial and Flight Operations Integration

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.
The Boeing Company

W: www.boeing.com/supportandservices
T: +1 206-655-2121
E: BoeingSupportandServices@Boeing.com
Location: Over 65 locations around the world

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

KEY BUSINESS/SOFTWARE AREAS
• Technical Content Management
• Vehicle Health Management
• 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 airlines 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.

CaseBank Technologies

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E: slightstone@casebank.com
Location: Brisbane, California; Toronto, Canada; Austin, Texas; Brussels, Belgium

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 data 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 generate ‘clusters’ of potential recurring defects to help prioritize costly and critical problems.

CloudCARDS

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E: sales@cloudcards.ie
Location: Limerick, Ireland

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.
OASES from Commsoft covers all aspects of aircraft maintenance and outstation support, from data collection and interpretation to reporting and business productivity. The program includes rolling out of paperless logbooks and other tools for electronic documentation. The system includes a database management and control system, as well as a system for technical documentation. The application is capable of integrating with other systems and processes, providing a comprehensive solution for managing aircraft maintenance and outstation support.

Conduce specializes in providing maintenance management systems for airlines and third-party maintainers. The eTechLog8 system is designed to unify technical, engineering, and maintenance processes, providing a comprehensive solution for managing aircraft maintenance. The system includes features for tracking individual components, managing maintenance tasks, and controlling maintenance costs. The eCentral8 system offers advanced scheduling and tracking capabilities, enabling airlines to optimize their maintenance processes and improve efficiency.

CrossConsense is a leading provider of maintenance, repair, and overhaul (MRO) software solutions. The company's flagship product, CROSSMOS, is an electronic technical logbook (eTL) that is designed to improve the efficiency and accuracy of technical logbook management. CROSSMOS includes a range of modules that are tailored to specific needs, including eCentral8 for advanced scheduling and tracking, eCabinLog8 for cabin log management, and eTechLog8 for technical logbook management. The company's suite of products includes CROSSMOS® ELB, CROSSMOS® MRO, and CROSSMOS® FleetCycle®, covering the entire maintenance lifecycle from bidding through to invoicing.

EmpowerMX is an aviation industry-recognized software development consulting services business. The company provides a range of services, including custom software development, consulting, and training. EmpowerMX's suite of products includes FleetCycle® Executive Suite, a comprehensive tool for managing maintenance and operations. The suite includes modules for fleet management, maintenance management, and performance management, providing airlines and MROs with a comprehensive solution for managing their maintenance operations. EmpowerMX is a leading provider of software solutions for the aviation industry, with a focus on empowering 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.
<table>
<thead>
<tr>
<th>EXSYN AviSyn Solutions</th>
<th>Flatirons Solutions</th>
<th>Honeywell</th>
<th>IDMR Solutions</th>
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<tbody>
<tr>
<td><strong>NAME OF PRODUCT MARKETED</strong></td>
<td>Avilytics, TITAN</td>
<td>Vocollect</td>
<td>InForm</td>
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<tr>
<td><strong>KEY BUSINESS/SOFTWARE AREAS</strong></td>
<td>Aviation Analytics solution</td>
<td>Voice Solutions for MRO</td>
<td>Technical Publication</td>
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<td></td>
<td>Aircraft Reliability Management solution</td>
<td>Hands-Free, Eyes-Free MRO</td>
<td>Engineering Orders</td>
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<td>Predictive Maintenance solution</td>
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<td>Task Cards</td>
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<td>Data Migration</td>
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<td>Consulting Service</td>
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**EXSYN AviSyn 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.

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.

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.

**IDMR Solutions** 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.

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

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Locations: 60+ Worldwide

Laminaar Aviation InfoTech

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Location: Singapore, Denver, Bangalore, Mumbai

Lufthansa Industry Solutions

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E: marketing.sales@lhind.dlhl.de
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NVable

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Location: Glasgow, UK

**NAME OF PRODUCT MARKETED**
- IFS Applications, IFS EOI, IFS Tail Planning, IFS Maintainx

**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.

**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
- Flight Planning & Dispatch
- 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 design and development functions. Our product is highly customizable and designed to adapt to clients’ specific requirements. We do our own in-house development and maintain a highly skilled team who are experienced in a broad range of technologies.

**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 changes 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.

**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 stifled 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.
**Orlando Suite for Tech Pubs**

**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 iSpec 2200, S100D).

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.

**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 AGDs, 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 S reduces Turn Around Time (TAT) while increasing operational 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 world-wide.

**Rolls-Royce Controls and Data Services**

**NAME OF PRODUCT MARKETED**
- VisiumDIAGNOSTIC, VisiumFUEL, VisiumAQD

**KEY BUSINESS/SOFTWARE AREAS**
- Equipment Health 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.

**Rusada**

**NAME OF PRODUCT MARKETED**
- Envision

**KEY BUSINESS/SOFTWARE AREAS**
- Maintenance & Engineering (M&E)
- Maintenance, Repair & Overhaul (MRO)
- Maintenance Planning & Scheduling
- Paperless & Mobile Solutions
- Offline Mobile Capabilities

Rusada develops Envision — an MRO / M&E software solution for the aviation industry. Envision is used by a range of different types of customer including airlines, helicopter operators, VIP fleet, MRO and line maintenance facilities. The latest version of Envision, Envision nGen, is a web-based solution that is browser, platform and device independent. The offline capabilities of Envision nGen is one of its unique selling points. We have tailor-made solutions configured for your needs from over 200 functions and 8 modules, across multiple platforms. Key elements of our new developments include: integrated user defined workflows throughout the solution; significant use of dashboards for alerting users of key outstanding actions etc; integrated user definable templates throughout the solution; and provision of ‘off-line’ support for certain key functions. Please don’t hesitate to contact us for further information or to arrange a demo of the next generation of MRO / M&E software.
Safran Aircraft Engines

We are a world leading provider of MRO services for the aerospace industry, with a complete range of support services to airlines, armed forces and other operators. Our expertise is based on the advanced analysis of flight data, and a slate of value-added consulting services from our seasoned experts. We are also developing innovative services 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.

Savviscon

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E: info@savviscon.com
Location: Germany

Our WARP services are the perfect supplements to WARP web. WARPBridge; and WARPservices enables lessors, operators and MRO companies to establish easy and efficient processes to manage aircraft records and lifecycle documentation. It integrates seamlessly into given MRO software using our WARPbridge integration engine and provides a safe data exchange and collaboration platform for all stakeholders of your aircraft. Our WARP services are the perfect supplements to WARP web. Scanning, automated document and data recognition as well as data entry and data quality checks will help you keeping your records in optimal condition, thus creating the fundament for smooth transition projects. IT-integration, project and change management.

Seabury Solutions

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Location: Ireland; Argentina

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.

Swiss Aviation Software

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E: marketing@swiss-as.com
Location: Basel, Switzerland; Miami, FL, USA; Singapore

Swiss Aviation Software unites 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 airlines 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.
Skypaq

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T: +353 (0) 449 350 360
E: info@skypaq.com

Location: Mullingar, Westmeath, Ireland (HQ); Vilnius, Lithuania

NAME OF PRODUCT MARKETED
• eLog; Integrated eLog; eCabLog; Device Management; API Management

KEY BUSINESS/SOFTWARE AREAS
• Electronic Technical Logs
• Aircraft Data Harvester
• eCabLog
• Device Management
• API Management

Since 2006 our product has been in use with varied airlines from regional to OneWorld operators, with over a million flights recorded. With Finnair, we are very proud to have worked with the airline since 2008 culminating in the deployment last year of our product on the new Airbus A350 aircraft. Our company has partnership arrangements with organizations such as IBM, Accenture, SITA and Swiss Aviation Software (AMOS) enabling us to provide airlines with integrated solutions from the flight deck to the hangar on any aircraft type. Key Business software areas covered include: Electronic Technical Log (Seamless and secure communication between flight crew and technicians); Aircraft Data Harvester (connect Flight Data + Technical Services Data through existing data sources and display latest aircraft data to both pilots and technicians); eCabLog (Allows cabin crew the ability to write and review cabin related fault reports); Device Management (Provide both Windows and iOS products plus we a full remote management solution for these devices); and API Management (We provide a mobile device platform for existing data sources with the airline).

TRAX

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Location: Miami, FL, USA; West Sussex, UK; Tokyo, Japan; Riyadh, Saudi Arabia

NAME OF PRODUCTS MARKETED
• eMRO
• eMobility

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. Offering in-depth knowledge of the sectors in which it operates, Ubisense has long-standing relationships with many customers across target markets including aerospace and defence, passenger and commercial vehicle manufacturing, communications and utilities. Since inception in 2002, we have built up a strong customer base including 6 of the top 10 Fortune 500 manufacturers, 9 of the leading 10 automotive manufacturers, 2 of the top 3 aerospace manufacturers and 5 of the major telecoms network operators around the world. Our company have partnership arrangements with organizations such as IBM, Accenture, SITA and Swiss Aviation Software (AMOS) enabling us to provide airlines with integrated solutions from the flight deck to the hangar on any aircraft type. Key Business software areas covered include: Electronic Technical Log (Seamless and secure communication between flight crew and technicians); Aircraft Data Harvester (connect Flight Data + Technical Services Data through existing data sources and display latest aircraft data to both pilots and technicians); eMobility (Allows mobile device platform for existing data sources with the airline).

Ubisense

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E: GLOBALenquiries@ubisense.net

Location: Cambridge, UK; Denver, USA, Düsseldorf, Germany; Paris, France; Tokyo, Japan; Vancouver, Canada

NAME OF PRODUCT MARKETED
• eLog; Integrated eLog; eCabLog; Device Management; API 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

Ubisense is the world leader in providing electronic logbook (eLog) solutions. Since 2006 our product has been in use with varied airlines from regional to OneWorld operators, with over a million flights recorded. With Finnair, we are very proud to have worked with the airline since 2008 culminating in the deployment last year of our product on the new Airbus A350 aircraft. Our company has partnership arrangements with organizations such as IBM, Accenture, SITA and Swiss Aviation Software (AMOS) enabling us to provide airlines with integrated solutions from the flight deck to the hangar on any aircraft type. Key Business software areas covered include: Electronic Technical Log (Seamless and secure communication between flight crew and technicians); Aircraft Data Harvester (connect Flight Data + Technical Services Data through existing data sources and display latest aircraft data to both pilots and technicians); eCabLog (Allows cabin crew the ability to write and review cabin related fault reports); Device Management (Provide both Windows and iOS products plus we a full remote management solution for these devices); and API Management (We provide a mobile device platform for existing data sources with the airline).

Vistair Systems

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Location: United Kingdom

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

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 organizations. Combining technology, development expertise and service delivery, 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.

Document Management: 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.

Safety/Quality Management: SafetyNet™ is an aviation reporting system and investigation solution that drives real change in the management of safety-related occurrences. It is currently deployed by a number of global airlines including Delta and also counts the military among its user base. Complementing this is RiskNet™ an advanced, change and aviation risk management solution that provides hazard identification, integrating with both, QualityNet™ is a comprehensive aviation compliance software that enables Quality Managers to manage audit schedules, checklists and non-compliances through an intuitive interface.

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