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November 2021

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Aerospace Magazine

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Dubai Airshow
News and contracts as aviation industry regroups

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Dubai - charting a new course for the industry following the pandemic.

Photo: Dubai Airshow

Dubai highlights the importance of international cooperation

As the global aviation industry regrouped in the UAE for the return of the Dubai Airshow, there was a strong emphasis on international cooperation as an enabler for the return to pre-pandemic levels. His Highness Sheikh Ahmed bin Saeed Al Maktoum, Chairman of the Dubai Civil Aviation Authority and CEO of Emirates said the show's ability to bring together 1,200 exhibitors, including 370 new ones, representing 148 countries was a testament to the importance international companies placed on the industry event.

Certainly, the event was not short of opportunities to announce and explore new partnerships and alliances with sustainability high on the agenda in every sector of the industry. GE Aviation had a particularly good showing in this area, signing an MoU with Etihad for future opportunities to work on initiatives to lower CO2 emissions from Etihad's fleet of 787 aircraft as part of the airline's comprehensive sustainability programme. Emirates also signed an MoU with GE Aviation to develop a programme that will see an Emirates Boeing 777-300ER, powered by GE90 engines, conduct a test flight using 100% sustainable aviation fuel by the end of 2022.

It was refreshing to see a few orders coming from smaller emerging markets in Africa as well. Air Tanzania ordered another 787-8, one 767-300 Freighter and two 737 MAX jets at the show. It will be interesting to see them blending these with their current A220s. Embraer and Overland Airways from Nigeria also signed a firm order for three new E175 aircraft, plus three purchase rights and another Nigerian operator Ibom Air signed up a firm order for ten A220s. Also, fresh from signing a recent component support contract for Ethiopian's A350 fleet, OEMServices used the Dubai platform to announce an agreement to provide various spare parts units for Egyptair´s fleet.

We have news fresh from the Dubai Airshow in this issue with plenty more on our daily and weekly news platforms and on the website.

Keith Mwanalushi
EDITOR

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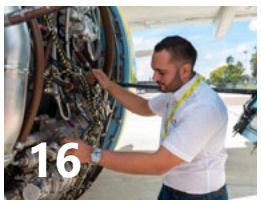

Etihad Engineering bags Virgin Australia 737 maintenance deal

Etihad Engineering will perform heavy checks on Virgin Australia'a 737 fleet *Photo: Etihad Engineering*

Etihad Engineering based in Abu Dhabi, has been awarded a heavy maintenance contract by Virgin Australia for its Boeing 737 fleet. The scope of the contract covers heavy maintenance and modifications on more than 30 nose to tail aircraft for the largest airline by fleet size under the Virgin brand.

The contract was announced during the Dubai Airshow. Abdul Khaliq Saeed, Chief Executive Officer, Etihad Engineering, said: "We are pleased to welcome another valued customer from Australia to our facility in Abu Dhabi. With Australian borders reopening and international flights resuming, we are all geared up to support the Virgin Australia team ensuring its Boeing 737 fleet continue to take to the skies in top shape as they meet the projected increase in passenger demand."

Stuart Aggs, Chief Operations Officer, Virgin Australia, said: "As domestic and international flying ramps up from an Australian perspective, Virgin Australia is as focused as ever on safety and on ensuring our aircraft operate at, and are maintained to, the highest possible standard."

ATR finalises multiple aircraft deals at 2021 Dubai Airshow

Afrijet has ordered three ATR72-600s *Photo: ATR*

At the Dubai Airshow ATR, the regional aircraft manufacturer, has signed a Letter of Intent (LoI) with Toki Air, a new regional commercial airline from Japan that will operate out of Niigata Airport. The cooperation with ATR will help Toki Air to achieve its higher purpose of revitalising the city of Niigata, by increasing mobility within and between surrounding regions. Through this LoI, ATR and Toki Air are engaging in consultations to add the ATR 42 aircraft to the airline's fleet and to introduce the ATR 42-600S variant – for STOL (short take-off and landing). This new version of the ATR 42-600, currently under development, will offer take-off and landing capabilities on runways as short as 800 metres with 40 passengers on board under standard flight conditions. First deliveries are expected for the beginning of 2025.

ATR has finalised the sale of three ATR 72-600 aircraft to Central African airline Afrijet which will use the aircraft to replace part of its ATR 72-500 fleet. From the second aircraft onwards, these ATR 72-600s will be equipped with the latest-generation P&WC engine, the PW127XT-M, which delivers increased efficiency and burns less fuel. The deal is further proof of the ATR 72-600's effectiveness at growing regional routes and networks, thanks to its cost-effective operation. Afrijet initially started with pre-owned ATR aircraft and then moved to a leased ATR 72-600 in 2020. This direct acquisition of brand-new aircraft will increase the ATR 72-600 fleet size to four, allowing the opening of new routes and increasing frequency.

Air Corsica and ATR have signed a firm order for five new ATR 72-600 aircraft to be powered by the new Pratt & Whitney Canada engine, the PW127XT. Deliveries will start by November 2022. The order means a full upgrade of Air Corsica's ATR 72 fleet. Thanks to its state-of-the-art turboprop engines, the Corsican airline will be able to optimise its operations, with increased capacity and reduced operating costs and contribute to the development of more responsible aviation.

Akasa Air orders 72 Boeing 737 MAX aircraft

New Indian carrier Akasa Air, a brand of SNV Aviation, has ordered 72 Boeing 737 MAX airplanes to build its fleet. Valued at nearly US$9 billion at list prices, the order is a key endorsement of the 737 family's capability to serve the rapidly growing Indian market. Akasa Air's order includes two variants of the 737 MAX family, the 737-8 and the high-capacity 737-8-200. Providing the lowest seat-mile costs for a single-aisle airplane as well as high dispatch reliability and an enhanced passenger experience, the 737 MAX will ensure Akasa Air has a competitive edge in its dynamic home market.

Jazeera Airways commits to 28 new A320neo-family aircraft

Airbus and Jazeera Airways signature for 20 A320neos and 8 A321neos
Photo: Airbus

Kuwait-based carrier Jazeera Airways and Airbus have signed an MoU for 20 A320neo and eight A321neo aircraft. Jazeera Airways commenced operations in 2005 and has since emerged as a leading carrier in the Kuwaiti region. It operates regionally and internationally serving the Middle East, Europe and Asia's top destinations from its home base Kuwait. The Kuwaiti airline supports the country's 2035 vision for further economic expansion and transformation into a commercial hub. Marwan Boodai, Chairman Jazeera Airways said, "Jazeera Airways is pleased to extend its long-term relationship with Airbus further with this significant new order. We will effectively double our current fleet size to 35 aircraft by 2026. The airline has pulled out of the pandemic strongly in Q3 with a return to profitability. We have exciting expansion plans ahead, which will further boost our contribution to the Kuwait economy and in particular the travel sector."

SR Technics signs multiple new MRO contracts at Dubai Airshow

MRO service provider SR Technics, has signed multiple new MRO contracts on the first day of this year's Dubai Airshow, including an engine services agreement with Constellation Aviation Services to provide engine MRO services for its CFM56-5B engines powering the luxurious A318-112 Elite aircraft. MNG Airlines has again selected SR Technics as its preferred PW4000 MRO provider. Since March 2020, MNG Airlines, a fast-growing Turkish cargo operator, based at Atatürk International Airport, Istanbul, has been sending its PW4000 engines to the Zurich facility.

Furthermore, SR Technics has signed an engine services contract with Somon Air, a private airline based at Dushanbe International Airport, Tajikistan, for its CMF56-7B engines repair. SR Technics will provide two Somon Air B737NG engine shop visits in its facility at the Zurich Airport, Switzerland, in November 2021. SR Technics has also been awarded a four-year extension of an existing contract to maintain, repair and overhaul private aviation company RoyalJet's CFM56-7B engine fleet, installed on the Boeing 737BBJs.

Pratt & Whitney Canada launches new PW127XT engine series

Pratt & Whitney Canada has launched its new regional turboprop PW127XT engine series, designed with the latest materials and technologies to deliver the next level of efficiency, time-on-wing and service. The company celebrated the launch with ATR, with the PW127XT-M engine that is purpose-built to offer world-class reliability and increased value for ATR 42/72 aircraft.

"Since its inception, ATR has exclusively turned to Pratt & Whitney to power its fleet of regional aircraft," said Maria Della Posta, President of Pratt & Whitney Canada.

"We are pleased to launch this exciting new PW127XT-M engine with ATR. Optimised for the ATR 42/72 aircraft family, it will deliver a significant improvement in operating costs, extending the already impressive operating economics and sustainability of this regional turboprop. The PW127XT engine series builds upon the success of the PW127M engine. We have injected into this new PW127XT-M engine the knowledge gained from Pratt & Whitney's history of transformation and continuous innovation and more than 2.5 billion hours of operational expertise to provide a step change in performance and customer service that helps regional airline customers achieve their business goals," said Della Posta.

ALC orders 111 Airbus aircraft – launches sustainability fund

ALC has ordered 111 Airbus aircraft at the Dubai Airshow *Photo: Airbus*

Air Lease Corporation (ALC) has signed a Letter of Intent (LoI) covering all Airbus jet families, highlighting the power of the company's full product range. The agreement is for 25 A220-300s, 55 A321neos, 20 A321XLRs, four A330neos and includes seven A350Fs. The order which will be finalised in the coming months, making Los Angeles-based ALC one of Airbus' largest customers and a lessor with the biggest A220 order book. Founded in 2010, ALC has ordered a total of 496 Airbus aircraft to date. With this order ALC and Airbus are launching a multi-million-dollar ESG fund initiative that will contribute towards investment into sustainable aviation development projects that will, in the future, be opened to multiple stakeholders from the aircraft leasing and financing community and beyond. "With this major order, we underscore our confidence not only in the strong future and growth of global commercial air transport, but in ALC's business model, in our specific aircraft purchase decisions including, for the first time, the new A350 Freighter and finally, in our long-term view, that ordering new aircraft is an optimum investment of our shareholder capital," said John Plueger, Air Lease Corporation CEO and President. "Moreover, we and Airbus hereby announce the first-ever joint ESG initiative in aircraft procurement by creating a multi-million-dollar fund for sustainable aviation development projects critical to the future".

Boeing signs purchase agreements with Emirates, Air Tanzania and Sky One FZE

Boeing has signed multiple new purchase agreements with various airlines, including Emirates which has signed an order for two 777 freighters at the 2021 Dubai Airshow, expanding the future capability of one of the world's largest cargo airlines at a time of significant global demand for air freight. The freighters will be operated by Emirates SkyCargo, which currently operates an all-Boeing fleet of ten 777 freighters and also carries cargo on Emirates' 134 777 passenger airplanes.

The United Republic of Tanzania has ordered one 787-8 Dreamliner, one 767-300 Freighter and two 737 MAX jets at the Dubai Airshow. The airplanes will be operated by Air Tanzania, the national flag-carrier of Tanzania, to expand service from the country to new markets across Africa, Asia and Europe.

The United Republic of Tanzania has ordered one 787-8 Dreamliner, one 767-300 Freighter and two 737 MAX jet
Photo: Boeing

Boeing's wholly owned subsidiary Boeing Capital Corporation and Sky One FZE have signed a sales agreement for three 777-300 airplanes. Terms of the agreement were not disclosed. Sky One FZE is a privately held aircraft leasing company based in the United Arab Emirates. Sky One FZE has a diverse business portfolio, namely dry and wet leasing, maintenance, repair and overhaul services, pilot training, operations, Air Operator's Certificate management as well as spares and logistics. The firm has a strong focus on growing airlines in Africa, the Commonwealth of Independent States and India.

IAI to convert four B777-300ERs for Emirates

Emirates and IAI sign a conversion agreement at the Dubai Airshow *Photo: IAI*

Israel Aerospace Industries (IAI) has signed an agreement to convert four B777-300ER passenger aircraft to cargo configuration for Emirates. The aircraft will be converted at the new site established in Etihad Engineering's MRO centre in Abu Dhabi and the first conversion of the Emirates plane is expected to begin in early 2023. The agreement has potential to provide passenger-to-freighter conversion services to more aircraft. Dubai-based Emirates is one of the largest operators of B777-300ER aircraft and Emirates SkyCargo is a leading player in the global air cargo industry. This agreement between IAI and the cargo division of Emirates is testament to the strong ties between IAI and the UAE.

Gulf Air entrusts AFI KLM E&M with CFM56-5B engine support contract

Gulf Air, the national carrier of the Kingdom of Bahrain and Air France Industries KLM Engineering & Maintenance have signed an engine maintenance contract for CFM56-5B engines. This contract includes total engine support for the carriers Airbus A320ceo family fleet. This full engine support contract includes shop visits, fleet engineering, condition monitoring, spare support and other additional services. Gulf Air can rely on the long and extensive CFM56-5B experience of AFI KLM E&M and the 'keep flying' approach which is supported by a strong On Wing/On Site service. Gulf Air will also benefit from the best class services through the predictive maintenance tool, PROGNOS® for engines.

Kuwait Airways partners with LHT for base maintenance

Kuwait Airways Airbus A330 *Photo: LTP*

Kuwait Airways has signed a contract with Lufthansa Technik regarding comprehensive base maintenance layovers for Airbus A330ceo aircraft. The agreement covers a total of four six-year checks for Airbus A330-200s, the first two of which have already been successfully completed at Lufthansa Technik Philippines (LTP) in Manila. The first and second of Kuwait Airways' aircraft arrived at LTP in October and could already be handed back to the customer on-time and on-budget. With the third A330 being serviced in Manila right now, the fourth aircraft will follow directly behind and is set to complete the layover sequence at the beginning of December.

Indigo Partners order further 255 Airbus A321 in Dubai

Phoenix, Arizona-based Indigo Partners has placed an order for 255 new Airbus A321 jets which, at list price, is valued at US$33 billion (£24.6 billion). The agreement was signed on Sunday, November 14, at the Dubi Airshow 2021. The private equity firm, which has controlling interests in America's Frontier Airlines, JetSmart, Volaris and European low-cost carrier Wizz Air, has now placed orders for 1,145 Airbus A320-family aircraft. This latest order includes 102 aircraft for Wizz Air, 91 for Frontier Airlines and 39 aircraft for Volaris. In addition, Volaris and JetSmart will be up-converting previous orders for 38 A320neos to the A321 variant.

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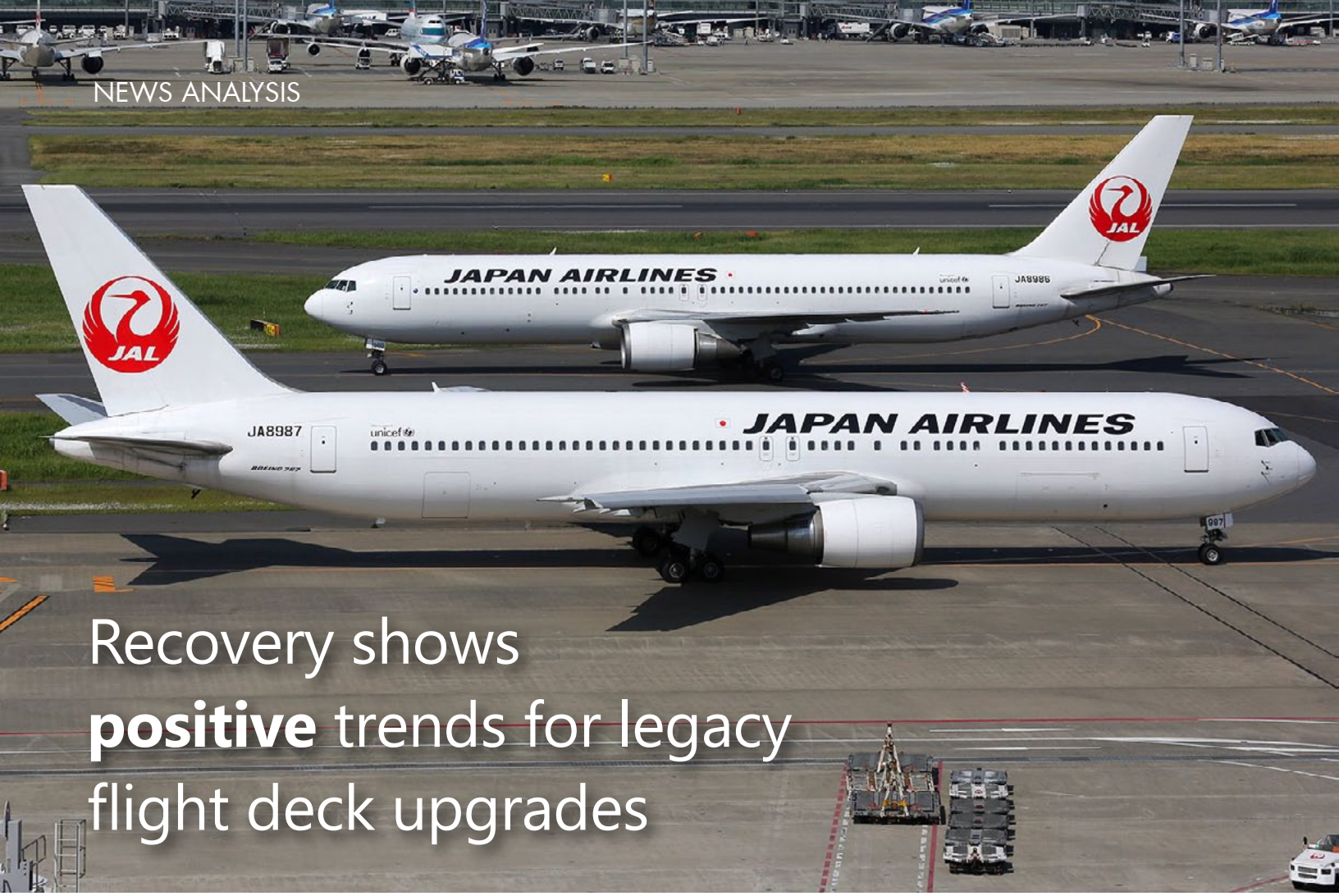

Recovery shows **positive** trends for legacy flight deck upgrades

Japan Airlines is upgrading flight displays on its Boeing 767-300s. *Photo: JAL*

Keith Mwanalushi speaks to Angus Hutchinson, Chief Executive at Thomas Global Systems to discuss the cockpit flight display retrofit market following a contract to equip Japan Airlines' Boeing 767 fleet.

In October, Thomas Global Systems announced it signed a contract with Japan Airlines (JAL) that will see it upgrading the airline's Boeing 767-300/300ER fleet with the TFD-7000 series drop-in liquid crystal display (LCD) flight displays.

After the initial shock to the global air travel industry early last year, Angus Hutchinson, CEO at Thomas Global Systems says the commercial aviation supply chain contracted quickly to conserve cash and align supply with the dramatic downturn in demand. "Passenger operators placed a substantial portion of their legacy fleets into storage or retirement and deferred discretionary investment in the remaining fleet, which has predictably affected the market for avionics retrofit, including flight displays."

With that backdrop, the Japan Airlines contract is encouraging news for the industry. In fact, since the 2018 product launch by long-term customer Delta Air Lines and through the downturn, Hutchinson reports the TFD-7000 series plug-and-play LCD flight displays upgrade for the B767/757 and 737-Classics has continued to gain market share and acceptance as the practical and low-risk LCD technology solution for CRT obsolescence.

"Over the past 18 months, a range of new operators including Eastern Airlines, Japan Airlines, and several major US and international cargo operators have contracted with us to install TFD-7000 LCD displays in their respective B757 and B767 flight decks."

During that time, Thomas Global has also expanded TFD-7000 series availability, adding regulatory approvals from EASA, JCAB, ANAC, and CAAC to their FAA and Transport Canada STC certifications, and is now pursuing FAA certification for their TFD-4000/4100 LCD flight displays for Bombardier/MHI CRJ Series jets and Proline 4 equipped business aircraft.

Throughout the industry downturn, Thomas Global has worked closely with its current and new customers to schedule deliveries of TFD-7000 orders, while managing its supply chain to ensure dependable on-time performance and customer support.

As previously stated, several operators have placed aircraft into storage over the pandemic so the projections for cockpit retrofits especially for classic fleets was

Angus Hutchinson, Thomas Global Systems, CEO

initially somewhat uncertain. However, we now see that cargo operators have rebounded quickly, and there are signs of sustained recovery of travel demand, particularly in the US and Asia Pacific domestic markets. Hutchinson also observes that airlines are transitioning (primarily narrowbody) aircraft back into service.

"As the recovery continues, we expect operators to remain focused on conserving cash and investing practically and for tangible benefit. As a result, we see strong interest in our product portfolio as the recovery continues."

Hutchinson remains positive about the outlook for 757/767 fleets, and the continuing need for practical solutions to extend flight deck life. And data from *ch-aviation* shows there are some 525 757s still in operation, predominately in the express freighter market and similarly 702 767s operating with 77 carriers, this confirms a considerable market for active aircraft.

Thomas Global stresses that the TFD-7000 series displays provide a high-performance, cost-effective LCD retrofit that resolves critical issues around cathode ray tube (CRT) obsolescence, increases operational efficiency and provides a growth platform for new functionality.

Thomas Global indicates it offers B767/757 and 737-Classic operators the most practical, efficient, and low-risk LCD displays solution for their CRT-equipped fleets. "Market interest and acceptance suggest that the TFD-7000 series and our other LCD flight display upgrades will continue to compete well on these platforms through the industry recovery and beyond," Hutchinson states.

The company is continuing to expand its TFD-series product family of practical LCD flight display upgrades as part of its commitment to help operators maximise the return from their existing flight deck investment. Hutchinson further reveals that the TFD-4000 drop-in LCD for CRJ series flight decks is expected to achieve certification this quarter and is being launched by a prominent North American CRJ operator.

With respect to the Japan Airlines contract, Hutchinson says he was honoured that the airline had chosen the TFD-7000 series to upgrade their 767 flight decks and in terms of product support he emphasises that the LCD flight display upgrades all include a product reliability (MTBF) guarantee and a five-year comprehensive warranty. And, as

> *"As the recovery continues, we expect operators to remain focused on conserving cash and investing practically and for tangible benefit. As a result, we see strong interest in our product portfolio as the recovery continues."*
>
> **Angus Hutchinson**

Thomas Global has developed extensive avionics display MRO capabilities in addition to extensive avionics design and manufacturing expertise, the company manufactures and supports the TFD-7000 series and their other LCD display products in-house.

The JAL award follows TFD-7000 Supplemental Type Certificate (STC) approval from the Japan Civil Aviation Bureau (JCAB). "We look forward to providing JAL with the dependable and high-integrity technology, service and support our customers and partners have come to expect from Thomas Global," Hutchinson states.

The JAL award follows TFD-7000 STC approval from the Japan Civil Aviation Bureau. *Photo: Thomas Global Systems*

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Flight hour solutions **power** post-pandemic recovery

Flight hour services are popular on new engines platforms.
Photo: Safran

Pierre Berthelot, Head of Product Management at SR Technics gives *AviTrader MRO* an overview of the flight hour programmes sector explaining how the pandemic affected the market and the new opportunities from start-up airlines.

Aviation is currently going through one of its most challenging and fundamental crises, both due to the global COVID-19 pandemic and the climate urgency. Airlines must solve the impossible equation of cash conservation, gaining agility, and dropping emissions. New engine types, therefore, gain focus but come with costs uncertainties, mitigated by flight hour programmes which are hugely popular on the new engines' platforms.

Legacy products, however, have completely shifted in the last couple of years to T&M (Time & Materials) because removal schedules and maintenance costs are sufficiently predictable. The other reason is that flight hour services have shown their limits when utilisations drop and lease-end conditions are modified, not to mention availability of green-time equipment.

Start-up airlines have flourished during the pandemic. They have a lot to deal with and must focus on their core business, even more than established airlines. They need turnkey solutions provided by reliable partners. Flight hour services are one way of achieving it but have the significant drawbacks of limited flexibility and upfront cashflows.

Start-up airlines may consider alternative options, depending on which generation of aircraft they chose to operate. MRO providers can support airlines during the entire life cycle of the equipment and use creative solutions to minimise costs of ownership while postponing cash flows and maintaining quality. SR Technics has developed such a solution under the name BRAVO (Beyond Residual Asset Value Optimisation), and the overwhelmingly positive response from the market proves its relevance.

Pierre Berthelot, Head of Product Management at SR Technics

Paying a service on a "by the hour" basis means a complete risk transfer to the service provider. Like any insurance policy, it comes at a cost to the client, but more importantly, it pushes the service provider to mitigate such risks. As such, the industry has been able to gain significant efficiency while maintaining and improving in-flight reliability.

Airlines safely gain experience when operating under flight hour services and become prepared for sourcing alternative commercial models like Fixed Pricing or NTEP (Not-To-Exceed-Pricing), which demand a good understanding of the different costs' drivers and maintenance strategies.

Regular engine inspections are crucial.
Photo: VivaAir

AI improves functionality for engine **inspections**

Keith Mwanalushi checks in on the application of artificial intelligence for engine inspections and the growing momentum for AI functionality in digitising MRO operations.

When Dutch start-up company Aiir Innovations developed smart, AI-based software systems for engine inspections it put the spotlight back on the sustained development of modern technologies to make the engine inspection process more efficient.

Back in May this year, UK low-cost carrier easyJet teamed up with Aiir Innovations to optimise its engine inspections. EasyJet is exploring how computer vision and artificial intelligence can speed up borescope inspections and cut out errors by providing automated damage detection.

The theory is, after Aiir Innovations' software has analysed borescope footage, multiple parties can view, comment on, and share its findings via an online platform.

Bart Vredebregt, Aiir Innovations CEO and Co-Founder

EasyJet believes this may help to improve leased engine transitions by smoothing the process of stakeholder alignment – providing a common page for MRO provider, lessor and lessees to work from.

"Getting the right results, the first time is what makes AI a great time saver in engine inspections, combined with great repeatability and consistency AI will make engine inspection more efficient and objective," Bart Vredebregt, Aiir Innovations CEO and Co-Founder tells *AviTrader MRO*. He says the biggest time saving is generated when the AI is embedded in the right software setup to manage things like reporting and data management. "So, to benefit optimally from AI we need to have the right solution supporting the AI and the human working with it."

Having AI and machine learning will help pinpoint the exact location of the engine issue. *Photo: AFI KLM E&M*

Rik van Lieshout, Digital Products & Services Manager at AFI KLM E&M

There are around 20,000 components in any engine and one way of getting inside the engine to look at them is with a borescope. The tech wizards at Rolls Royce say the intelligent borescope is an industry first AI engine inspection which dramatically reduces the time taken to complete the measurement and sentencing part of certain inspections. This technology does not only speed up inspection times, but also transforms many aspects of their business through the capture and analysis of high-quality standardised data from all their engines, which can be exploited to maximise the efficiency of their entire fleet and improve future design.

Rik van Lieshout, Digital Products and Services Manager at AFI KLM E&M reckons that collecting data, having the AI and machine learning helps them pinpoint the exact location of the engine issue and by doing so minimises ground time for inspection and decision-making process to repair on-wing or remove the engine at the end resulting in extended on-wing.

In Germany, the Lufthansa Technik 'autoinspect' team who are experts in inspection procedures for automated diagnosis of dismantled components, they say AI will assist the engine mechanic in his inspections. This assistance will be modular so that more approved functions may be added to the system. They emphasise that the final decision is always up to the mechanic and the usage of AI will steadily increase. Some of the interesting use cases that they pursue vary from a blade counting and tracking function to an anomaly detection and finally a defect classification system. The Lufthansa team explains that this allows more data collection on the behaviour of specific engine parts and with this information they can adapt and further improve maintenance services for operators.

Engine predictive maintenance and regulatory processes for AI

Vredebregt believes that AI solutions will have an influence on engine predictive maintenance decisions, as it adds another objective data source to the process. "So, it becomes possible to include knowledge about cracks developing over time such that you can fix it when it suits the operator. But what might be an even bigger game changer is that we might get new insights on the relations between defects and other metrics, potentially changing the way we look at certain damages."

The usage of AI by engine mechanics will steadily increase. *Photo: Lufthansa Technik*

> **"It becomes possible to include knowledge about cracks developing over time such that you can fix it when it suits the operator."**
>
> *Bart Vredebregt, Aiir Innovations*

With regards to regulatory processes for deploying AI, Vredebregt feels that by having man and machine working together we can already bring AI into the workshop. "In the long term, documents like the EASA artificial intelligence roadmap are already offering a decent perspective on how we can safely roll out AI even further."

At AFI KLM E&M Van Lieshout adds that also, workscoping can be optimised by using the on-wing engine data and reduce repair costs by early detection of engine issues. He says that is why, PROGNOS their predictive maintenance in-house suite, combined AI and having the airline-MRO experience allows them to predict engine defects and avoid operational issues and it is more precise than ever.

Quality assurance is a key priority at Lufthansa Technik and they strive to achieve the same or better results with new methods or tools they want to implement. "For sure there will be challenges with the regulatory processes for deploying AI in aircraft maintenance," the team tells us. As it is common in the automation of processes in general, there must be direct comparisons between AI-assisted inspections and inspections conducted in the classic way. Lufthansa Technik stresses that these tests must be thoroughly reviewed before a regulatory authorisation can be issued. However, there are guidelines and processes available that need approval to be applied for new technologies.

AI functionality and digitising operations

Digitalisation and AI go hand in hand. Vredebregt explains that to be able to use AI in an inspection, software is needed to collect the AI's input digitally, any output therefore will also be digital which in turn can easily be linked into the rest of the operator's digital environments. He says that is exactly why Aiir opted to focus their energy both on making AI for engine inspection a reality as well as making software around it to provide the best possible engine inspection experience.

With larger engines generating more power designs become more complex and critical which can lead to new undiagnosed issues. By developing AI for instance with PROGNOS by AFI KLM E&M, they can detect early signs of engine issues and prevent operational disruptions, reduce maintenance, and repair costs.

Ultimately, AI will contribute positively to optimising maintenance planning and workscoping.

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- FBO Fuel Services
- On-Call Maintenance

Aircraft operators continuously review how best to optimise their engine removal scheduling. **Keith Mwanalushi** looks at the tools available and the key considerations before performing the task.

Unscheduled engine removals can be costly. Photo: Lufthansa

Optimised processes for engine **removal** drive need for greater efficiencies

Procedures for removing and installing aircraft engines can vary depending on the aircraft and the engine type but deriving efficiencies from the process is increasingly essential. Jeff Poirier, VP and GM at StandardAero Turboprops and Fleets says the most important thing is for operators to plan ahead and reserve their slots well in advance – "With the market's recovery having taken hold, any operators hoping to induct an engine at short notice are likely to be surprised to discover how long they have to wait for a slot." He explains that this is due to a combination of increased demand – stemming both from increased flight activity and from operators beginning to get to grips with deferred maintenance – and from reduced available capacity, as MRO providers struggle to ramp back up to full levels of output, in the face of skilled labour shortages.

In terms of available tools, Poirier observes that most operators will already be using some form of maintenance tracking software. He says engine health monitoring (EHM) systems can further ease the process of planning for engine removals, both by automatically logging and – in many systems – downloading engine hours, and by making the operator aware of any potential unscheduled removals which may be necessitated.

Jeff Poirier, VP and GM StandardAero Turboprops and Fleets

Engine removal scheduling is driven by multiple factors, for instance, structural parts subject to life limits, engine performance and mechanical conditions that can cause a removal. "Operators use tools to monitor and analyse engine performance, on top of this they use advanced planning tools that take the life limited parts expiration dates into account and calculate an optimised engine removal schedule for the entire fleet of engines," explains Michael Grootenboer, SVP Engines Product at Air France Industries KLM Engineering and Maintenance.

Grootenboer indicates that the data

provided by the latest generation of engines is a major asset for managing this optimisation. "Health monitoring and predictive maintenance tools such as PROGNOS for Engines allow an increasingly detailed analysis of the condition of the engines and therefore the adaptation of the deposits or the search for green time."

Alfredo Alvarez, Director of Technical Services at Kellstrom Aerospace adds that it is vital that the operator already has the relevant asset data and that they are tracking and closely monitoring the criteria as defined by the OEM specifications for their engine.

At the Kellstrom Aerospace Technical Services (KATS) division, the power plant engineers help provide expert opinion and independent guidance on the optimised removal and staggering of engine fleets. "Initially, if an asset is leased, we must understand the lease return conditions to prevent triggering any clauses that would result in larger repair workscopes; often an engine can be removed, and spare engines utilised to avoid a large shop visit expenditure mandated by some lease agreements," Alvarez states.

Also, Alverez stresses that when reviewing a fleet of engines, it is important to consider the overall stagger patter to ensure the operator has optimised coverage of spare engines and is not left with too many off wing at any given time. "We often come across instances where it is better to remove an engine a few months earlier to ensure the overall fleet is covered. Through KATS Engine Fleet Management services, the entire fleet is analysed—both commercially and technically—to determine and maximise the full financial benefit of the assets, all while ensuring safety."

Michael Grootenboer, SVP Engines Product at AFI KLM E&M

> **"Unscheduled engine removals can be costly and adopting the correct MRO partner to support the mission of that engine is a critical decision for engine maintenance managers."**
>
> ***Alfredo Alvarez, Kellstrom Aerospace***

Alfredo Alvarez, Director of Technical Services for Kellstrom Aerospace.

Of the various tools in the market, Alverez says the most basic and key is the day-to-day trend monitoring, which involves day-to-day tracking of the engines on how they are operating and performing to determine its health.

"When an abnormality is detected, quick and decisive corrective measures must be put in place to avoid any safety issues." For example, as Alverez explains: if a pilot or the engine control trend monitoring (ECTM) data reveals low exhaust gas temperature margin (EGTM) readings, an immediate review of the data is conducted which may include a full gas path borescope inspection, water wash of the gas path or other trouble shooting techniques to determine cause or corrective remedy.

Challenges and considerations

One of the most important steps is to ensure ahead of time that the operator has a rental engine (or a spare engine asset) available for use while the removed engine is off-wing, notes Poirier from StandardAero. "Their maintenance provider may be able to provide a rental engine and will also be able to provide a reliable estimate of how long the rental engine asset will be required. The operator should also talk through the entire process with their maintenance provider, to ensure that any potential paperwork issues, such as required importation- or credit-related documentation requirements are addressed ahead of time."

Grootenboer advises the maximisation of engine time on wing for the best possible economical balance without ever jeopardising safety and avoiding unscheduled engine removals as much as

Engine health monitoring systems can further ease planning for removals. *Photo: KLM UK Engineering*

> **"Health monitoring and predictive maintenance tools such as PROGNOS for Engines allow an increasingly detailed analysis of the condition of the engines."**
>
> *Michael Grootenboer, AFI KLM E&M*

possible. "Determination of the required spare level is absolute key, since aircraft engines are extremely high-cost assets, there must be a balance between sufficient spares to avoid AOG situations but also to avoid high-cost assets for longer periods of time unused on the ground," he states.

At Kellstrom Aerospace, they highlight one consideration before engine removal would be to monitor the engine health and perform the allowable and necessary corrective actions to extend the full operating life of the engine or aircraft such as the scheduled maintenance planning document (MPD), mandatory borescope inspection of gas path sections and other inspections. The MPD is governed and managed by the aircraft manufacturer.

"Reviewing the contractual and lease agreements is key to understanding what the lease return requirements are to avoid costly overruns regarding times and cycles. This would avoid expensive maintenance shop events," mentions Alvarez.

Unscheduled engine removals can be costly and adopting the correct MRO partner to support the mission of that engine is a critical decision for engine maintenance managers. "A one size fits all engine maintenance strategy of selecting one long-term engine MRO reduces the needed flexibility in today's market as asset owners and air operators search for ways to effectively manage the operation of their engines and the subsequent maintenance requirements to keep the engines flying in a cost-effective manner," Alverez suggests.

Interestingly, earlier this year several 777s were grounded following the engine failure on a United P&W powered aircraft. This incident is still being investigated by the FAA and without speculating, Alvarez feels that on an initial assessment, the engine removal process is not the best method to detect defects on an engine. He explains to *AviTrader MRO* that the abnormal condition would need to be external for one, and obvious for a technician to discover any anomalies or defects visually noticeable with the naked eye to make that determination. Alvarez states that the United 777 incident could only have been detected if, for instance, a re-occurring inspection was required, like the mandatory ultrasonic inspection (USI) for the CFMI CFM56-7B model engine fan blade which calls for certain cycle intervals inspections to reveal the metal fatigue or crack occurring internally.

He adds: "Prior to the United incident, the culprit fan blade and all PW4000 model blades were required to have the non-destructive inspection (NDI) performed once the fan blade was removed from the engine and at the piece part level. This process had been performed at MRO and shop maintenance facilities before the incident."

Grootenboer agrees that in general, the engine removal process itself should not play a significant role in detecting defects with an engine, in fact, he says the engine removal planning is a result of inspection findings and the technical condition of the fleet – "Airlines together with OEMs are constantly monitoring their fleet regarding technical issues. Findings worldwide on-wing or during shop-maintenance can cause stricter limits resulting in removal criteria to be adjusted," he comments.

With the engine removal process unlikely to play a significant role in detecting defects, Poirier also highlights that the repair and overhaul process itself will allow any unknown faults to be identified, such as defects that are in the process of developing but which have not yet resulted in a major failure. Non-destructive inspection testing techniques such as fluorescent penetrant inspection (FPI), magnetic particle inspection (MPI) and eddy current testing all assist with the identification of potentially critical defects. Engine health monitoring (EHM) systems also play an important role in identifying potential failures ahead of time, which is clearly preferable to failures revealing themselves in flight.

Engine removal scheduling is driven by multiple factors. *Photo: AFI KLM E&M*

Q&A

In the hot seat...

Erkki Brakmann, Founder and CEO, SkySelect

Erkki Brakmann, Founder and CEO, SkySelect

What attracted you to this industry?

What attracted me to this industry was the tremendous opportunity that exists to improve the entire ecosystem from airlines, MROs, and suppliers to the end passenger. There is so much we can do to improve the aviation supply chain.

The way buyers are used to purchasing parts was perfectly suited for the 1970s, but that world no longer exists. However, buyers are still stuck with manual and time-consuming processes run by emails, spreadsheets, phone calls and sometimes even fax machines. Confounding those issues is the market is extremely fragmented and constantly changing.

The aircraft material market is attractive to me because of the size and the amount of waste that is created because of inefficiencies. Every year $40B worth of aircraft material gets bought and up to ⅕ is estimated to be a waste because of the industry's overall inefficiencies. This has led to overproduction, mismatch and excess in inventories, extra shipping costs and avoidable operational disruptions which all add up.

All of this is what energizes me and excites me about what we are achieving at SkySelect. We are truly making a difference by bringing greater efficiency to a process and industry that so desperately needs it. Our goal at SkySelect is to help make commercial aviation leaner by building a world-class aircraft material supply chain using the latest technology to automate most of the purchasing decisions.

What does a typical day involve in your role?

We are a rapidly growing team, so we pride ourselves on our agility and ability to move quickly. That also includes me as the CEO. I find myself involved in everything from product development and sales to hiring and customer success. What I enjoy the most is connecting with the best minds in the industry whether they are at the airlines, MROs, OEMs or suppliers, understanding what is top of mind for them, identifying patterns and translating that back into innovative solutions to drive transformation.

Although it sounds cliche, no two days are truly the same for me, and that's what excites me about my job and this industry - it's constantly evolving.

Briefly, tell us about your current solutions for the aviation industry?

SkySelect is an automated purchasing system for aircraft parts using algorithms and machine intelligence to automate over 90% of the purchasing operations. Our mission is to connect aircraft material buyers and suppliers through touchless transactions and make the commercial aviation industry leaner by building a world class aircraft material supply chain.

We partner with airlines and MROs to implement a dependable and efficient around the clock purchasing process that eliminates 30-50% of the manual effort and cuts the purchasing turnaround times from days to minutes on most purchases. SkySelect does this by identifying the best options available that meet the buyer's business requirements and consolidating the purchases into PO by optimizing for the lowest overall cost. This allows buyers to truly focus on purchasing and relationship building with suppliers, instead of constantly hunting and following up.

The algorithms and machine intelligence unlock savings thanks to sophisticated computing power. SkySelect eliminates waste and allows airlines to take a major step towards just-in-time inventory management by carrying less inventory, reducing AOGs and optimizing shipping costs.

What impact has the pandemic had on the busines?
The pandemic has been an incredibly challenging time for the entire aviation industry. However, a positive aspect can always be found. With air travel demand down and airlines having to think out-of-the-box on how to build more sustainable processes, we found that it opened airlines up to try innovative technology and processes. Combining that with the fact that airlines have also been tasked with doing more with less, created a real opportunity for us to highlight our platform, as it helps airlines and MROs make their parts purchasing process more efficient and easier to scale up and down, compared to having to constantly balance labour resources.

In what way can airlines streamline their parts purchasing with SkySelect?
In an ideal scenario, as many orders as possible should be flowing automatically. This is because machines can run 10-100x faster than manual purchasing. This means from the moment when the part requirement is identified, for example by the mechanic, until the moment of delivery. To achieve this, the supply chain needs to be much better connected than it is today.

Technically SkySelect acts as an API that allows airlines to connect their demand in real-time with the external suppliers and vice versa. On top of that, based on the airline's business rules, the algorithms enable airlines to automate the following purchasing operations. Overall, SkySelect's automated purchasing can save 70-80% of time spent on sourcing and order follow-up.

Tell us about your recent contract with Azul and S7 Technics?
Azul Linhas Aéreas and SkySelect have been working closely together to transform their aircraft parts purchasing process. Leveraging our advanced aviation material purchasing system powered by algorithms and machine intelligence, Azul has restructured its parts purchasing and tracking, bringing greater efficiency to its aircraft maintenance processes, saving the carrier both time and money. Given the size and scale of the carrier's operations (as one of the largest airlines in South America), it is imperative to have a parts purchasing system and service that is transparent, trusted and scalable.

We also most recently announced S7 Technics as a customer. We are collaborating to promote the accelerated transformation of the parts purchasing process for S7 Technics' air transportation and maintenance operations. Like Azul, S7's size and scale excite us as it provides an exceptional opportunity to demonstrate the power of our technology and services.

The algorithms and machine intelligence unlock savings thanks to sophisticated computing power says Brakmann.
Photo: SkySelect


SkySelect and S7 Technics recently announced a collaborative relationship.
Photo: S7

What key trend are you seeing with inventories since the pandemic started?
Pre-Covid, there was a shortage of both feedstock and supply of USM. In 2020 there were a lot more aircraft retired compared to recent years, which means a lot of extract parts from these aircraft can be used to repair active aircraft.

This influx of aircraft inventory coupled with a sharp decline in demand due to a significant reduction in flying has resulted in an unprecedented number of aircraft and aircraft parts supply. These new market developments have created a huge opportunity for MROs and airlines to leverage the surplus of parts to sharply reduce material costs. However, capturing these opportunities can be challenging as purchasing is manual and headcounts have been sharply reduced — that is where automation can really help to drive savings.

What is next in the pipeline at SkySelect?
Growth is happening in four key areas. Product: We will be adding more features and enhancements to our software for both buyers and suppliers, to bring even greater value to the aircraft supply chain. Customers: We have a number of very existing customers we have yet to officially announce, while several others are close to signing. Partnerships: We are working on finalising strategic partnerships with well-known and respected companies in the industry. Team: We continue to scale our team by acquiring not just more talent, but top talent from across the globe from the Americas all the way to Asia.

Ambry Hill President and Founder, Paul Stewart.

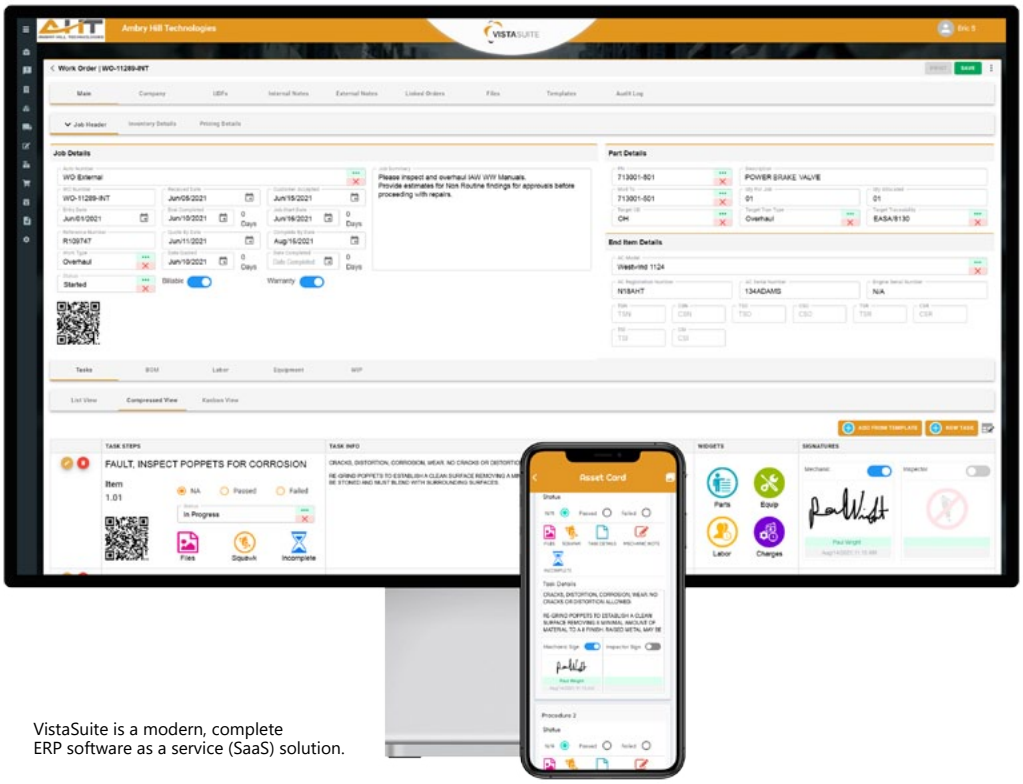
A New **Approach** Cleared for Take-off

Thousands of businesses still rely on legacy ERP programmes, which were engineered over two decades ago, to run their daily operations. That is back when fax machines and pagers were in their prime. Today, those same legacy ERP programmes still carry a hefty price tag, require expensive, on-premises computer hardware for hosting, and demand the attention of a highly skilled professional for even the simplest of modifications (e.g., adding custom fields, forms, reports, dashboards).

Ambry Hill has introduced a groundbreaking solution for this, and many other relentless problems that plague old business ERP systems. One of the challenges that companies face when selecting new ERP software is the migration of their data. Traditionally, the process of switching from one ERP system to another includes extracting data from the old system and importing it into the new system. This is often very expensive and time consuming and rarely produces good results.

Ambry Hill offers an entirely new approach by simply connecting into the old dataset and integrating that information right into the screens of VistaSuite so that it appears to be part of the system. "Of course, we offer the traditional data migration if a customer chooses this, but our technology offers a very flexible and low-cost alternative for rapid deployment of our software," said Paul Stewart, President of Ambry Hill, "and the beauty of this approach is the data displays can be changed on demand to accommodate the user's changing needs."

So, what exactly is VistaSuite? It is a modern, complete ERP software as a service (SaaS) solution that is affordable for all business sizes. A mission critical SaaS product, VistaSuite is built on the Amazon Web Services (AWS) platform and provides users around the world with best-in-class security and reliability. In short, VistaSuite is a cloud-based replacement for old, legacy ERP programmes.



VistaSuite is a modern, complete ERP software as a service (SaaS) solution.

Cole Davisson, VP of Software Innovation commented, "We built our software for the current, modern age. The post-COVID world will see more workforces that are mobile, agile and highly productive." Ambry Hill comprises aviation industry veterans that know the detailed job functions of every user of their software.

Meticulous effort went into the design and functional flow of the user interface, including the mobile applications. "We are excited to bring to market a rich suite of features that include inventory management, RFQ and quote automation, order processing, logistics, invoicing, analytics dashboard, custom reporting and more," said Richard Frisk, VP of Sales.

"The team at Ambry Hill has elevated the game and is addressing the pain points that users have been asking other vendors to solve, for years. Our mission is to provide the aviation aftermarket industry with affordable, easy to use software that is mobile and very fast to adopt." Said Neil Prodger, Director of European Sales. He adds: "Even the newer systems on the market are not doing the things that we are."

Today's businesses, with their agile and mobile workforces, demand a more thoughtful, purpose-built, and truly comprehensive software. "We are just getting started. Our team of aviation industry experts are an amazing pedigree, and they are developing some of the most advanced tech the aviation software industry has ever experienced." said Stewart.

VistaSuite currently has two subscription levels, VistaSuite Essentials and VistaSutie Plus. Core features found in VistaSuite Essentials include inventory control, RFQ and quote management, order processing, invoicing, and accounting integrations.

VistaSuite Plus expands the offering to include work order management with labour recording, mobile photo capturing, task management and much more.

As the development road map for VistaSuite continues to unfold, the Ambry Hill team says customers will regularly see the addition of more features and capabilities at every subscription level.

Ambry Hill Technologies is a state-of-the-art software company specialising in cloud-based and mobile business management applications that are tailor made for parts traders and MRO operations.

Cambridge, Minnesota based Ambry Hill, is led by aviation industry experts whose aim is to improve your operational efficiency and strengthen your competitive edge by delivering affordable, common-sense cloud-based software solutions that alleviate your real-world operational challenges that no other software company has been willing or able to address.

As the only SaaS company with real-world aviation industry experience, coupled with OEM technology experience, Ambry Hill's software solutions are well informed and thoughtfully designed.

Ambry Hill is a wholly owned subsidiary of AirT (NASDAQ: AIRT) an industrious American holding company established in 1980 and consists of ten companies with over 400 employees.

PEOPLE

on the move

Greg Mariotto

AMETEK Singapore has appointed **Greg Mariotto** as Director of Operations, Singapore. Focused on driving the facility to be best in class from an operational performance perspective, he will be responsible for production, engineering, purchasing and quality. Mariotto foresees a significant focus on the development, implementation and use of lean manufacturing and continuous improvement protocols over the next 12 months. He joins AMETEK MRO with more than twenty years' experience within the aviation MRO sector, most recently with Collins Aerospace and he is a qualified AS9100 and AS9110 trainer.

Steve Skerrett

Steve Skerrett, formerly Quality Director with Collins Aerospace, has been appointed to the role of Director of Quality at Acro, further strengthening the senior team at the global aircraft seating company following its move last year to all-new headquarters at Crick in Northamptonshire. As Quality Director, Skerrett will champion and lead the company wide Acro quality drive in the delivery of business objectives, playing a critical role in driving positive and sustainable cultural change centred on quality, integrity, compliance and customer service excellence. A professional Chartered Engineer, he launched his career as Head of Quality Assurance with a prominent aircraft seating company, followed by high-profile roles as Quality Director with Goodrich, UTC Aerospace and, most recently, Collins Aerospace.

IAG Engine Center U.S.A. has appointed **Joe Ujczo** as the new Vice President of Operations, effective October 2021. Ujczo will be responsible for all production activities including engineering, material procurement and logistics. Ujczo brings more than 25 years of aerospace engineering, MRO turbine engines and component repair experience to IAG Engine Center U.S.A. He has served as Operations Manager, Component Repair of Rolls-Royce Engine Services Oakland, Commercial Business Unit Manager of Pratt & Whitney San Antonio along with other key positions in industry leading aerospace companies.

Ricky Vongsiprasom

Stevens Aerospace and Defense Systems (Stevens) has appointed **Ricky Vongsiprasom** to Maintenance Director of its AOG (Aircraft On Ground) division. Vongsiprasom joined Stevens in early 2018 as a technician on the AOG team, quickly advancing to AOG team coordinator and now serving as maintenance director for the division. Vongsiprasom brings to Stevens a decade of experience maintaining corporate aircraft from manufacturers such as Textron, Embraer, Pilatus and more.

Inmarsat, a leader in global, mobile satellite communications, has announced that **Philippe Carette** will be joining the company as president of its Aviation Business unit on November 22, 2021. Carette joins Inmarsat from Thales, where he had held several roles since joining the company in 2013. This includes the position of CEO of Thales' InFlyt Experience Business Line (IFE), where he led a digital transformation of the business, leveraging cloud-based disruptive applications and achieving a significant increase in customer satisfaction. He has over 30 years' experience in the technology and aerospace industries which, in addition to his tenure at Thales, includes 14 years with the Safran Group, a major French aerospace engineering company. **Philip Balaam**, currently business unit president for aviation, is moving into a new strategy role at Inmarsat, where he will be working with Chief Strategy Officer (CSO) **Fredrik Gustavsson** to reinforce the company's growing, broad-based commercial momentum.

AviTrader MRO

The leading industry publication linking aircraft maintenance, the aftermarket, and aircraft operators

AviTrader MRO is a monthly digital magazine providing news and senior level analysis on the global commercial aviation MRO industry. Over the past decade the publication has grown to be a leading source of insight and analysis on the key issues facing the aircraft maintenance and aftermarket sectors.

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