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# 3 DAY

From the publishers of  
**International Aerospace**



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**International Aerospace**

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## Farnborough Upbeat Despite Niggling Supply Chain Issues



The recovery post the pandemic has been gradual for most sectors. Although the reasons have been many, the aviation sector owing to its passenger and cargo growths has shown promise for the industry and aircraft manufacturers. But despite these promises, the industry has been affected by supply chain issues, which came to the fore at the show.

Several OEMs have been airing the issue and how it has impacted the timelines of aircraft deliveries. Airbus is sitting with an aircraft backlog of 8,626 jets as of March 2024, while Boeing's backlog is 6,156 aircraft, the latter affected by regulatory issues, besides, of course supply chain. The new aircraft orders which total about 15,000 is likely to be cleared in about 13 years, keeping the 2023 production rates.

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## Airbus-Tata to manufacture Helicopters in India

Tata Advanced Systems Ltd. and Airbus Helicopters today sealed a deal at the show to set up a final assembly line (FAL) in India for single-engine H125 helicopters. The deliveries of the first 'Made in India' H125s are slated for 2026.

The joint venture will boost further India's aerospace sector as the choppers are meant not just for the domestic market, but also export.

The contract signing at Farnborough is a follow-up of the two companies which in January this year had announced the plan. The January announcement was by Airbus CEO Guillaume Faury and Tata Sons Chairman N Chandrasekaran.



▶ Continued on page 2 H125 Airbus helicopter



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►Continued from page 1 ... **Farnborough Upbeat Despite Niggling Supply Chain Issues**

The first two days of the show has seen orders for both aerospace majors - Airbus and Boeing - surpassing over 100, though way behind the orders of previous editions.

Embraer's President & CEO, Francisco Gomes Neto at the company's press conference at Farnborough did not mince words about what the company was facing with regard to supply chain and how it was impacting deliveries. Despite that Embraer is gung-ho about its growth and the prospects.

#### Engaging with supply chain critical

Francisco Neto mentioned how Embraer was strategising on global procurement and supply chain. It has set up a new organisation with a more holistic and combined approach; multidisciplinary teams working with critical suppliers; supply chain digital integration and transparency; suppliers C-suite engaged in recovery and deliveries etc.

The International Air Transport Association (IATA) said supply chain issues continue to affect global trade and business. Airlines have been directly impacted by unforeseen maintenance issues on some aircraft/engine types as well as delays in the delivery of aircraft parts and of aircraft, limiting capacity expansion and fleet renewal. Maybe that explains the aircraft orders which have not had headline grabbing deals. Many of the aircraft orders will not see early deliveries, for instance the Japan Airlines order

of Boeing and Airbus aircrafts are scheduled for 2028 onwards.

Another reason for supply chain disruption has been the geo-political scenario in some key zones, even while the governments are supporting the sector. In the United Kingdom, the new Prime Minister, Sir Keir Starmer has thrown his weight behind aerospace and defence sector, promised to enhance defence budget to 2.5% and creating more employment opportunities. In fact, the Farnborough Aerospace Consortium has urged the Prime Minister to continue the programmes undertaken by the previous government and not to disrupt the rhythm.

Adding to the challenge of supply chain is the issue of sustainability and all stakeholders in the supply chain falling in line. Some delegates mentioned how bringing on board stakeholders to the sustainability agenda did slow down the plans. Quality control issues, talent shortages and new regulations (with environment at the core) have to be complied with all along the supply chain and that means that much more investment in the supply chain.

A report by McKinsey said that aerospace executives were about 18 times more likely to mention supply-chain-related terms, such as "shortages", during earnings calls in 2022 than they were in 2014. Their views on supply chain performance also showed a dramatic negative shift starting in 2020.

#### Slow production rates

The concerns of aviation experts at Farnborough are real as OEMs continue to struggle with regard to sourcing components critical to aircraft manufacturing, finding raw materials, electronic components etc. The production rates of OEMs have indeed slowed down. However, the industry leaders, like how the Embraer President mentioned, express that the industry needs to innovate, become smart in sourcing and agile.

Even while the total number of travellers are expected to reach 4.96 billion in 2024, a record high and total air cargo volumes expected to touch 62 million tonnes, the industry has to get its act right by working on supply chain.

The IATA Director General, Willie Walsh said, "The airline industry is on the path to sustainable profits, but there is a big gap still to cover. A 5.7% return on invested capital is well below the cost of capital, which is over 9%. And earning just \$6.14 per passenger is an indication of just how thin our profits are - barely enough for a coffee in many parts of the world. To improve profitability, resolving supply chain issues is of critical importance so we can deploy fleets efficiently to meet demand. And relief from the parade of onerous regulation and ever-increasing tax proposals would also help. An emphasis on public policy measures that drive business competitiveness would be a win for the economy, for jobs, and for connectivity. It would also place us in a strong position to accelerate investments in sustainability."

- R. Chandrakanth

►Continued from page 1 ... **Airbus-Tata to manufacture Helicopters in India**



**CEO of Airbus Helicopters, Bruno Even and Sukaran Singh, Chief Executive Officer and Managing Director, Tata Advanced Systems Ltd.**

"We are pleased to partner with Airbus to establish the final assembly line for H125 helicopters in India," said Sukaran Singh, Chief Executive Officer and Managing Director, Tata Advanced Systems Ltd.

"This collaboration built on TASL's expertise in airborne platforms, and the strength of our ongoing partnership with the Airbus Group, aligns

with the 'Make in India' initiative and addresses India's growing helicopter market potential."

The CEO of Airbus Helicopters, Bruno Even said, "India is a country with great potential for helicopters and we believe that there is no better way to unlock this promising market than with a 'Made in India' H125 helicopter. We are confident that a locally assembled helicopter will open new

civil and parapublic markets such as the Helicopter Emergency Medical Services and other public services, making helicopters a critical component of nation-building."

The FAL will undertake the integration of the major component assemblies, avionics and mission systems, installation of electrical harnesses, hydraulic circuits, flight controls, dynamic components, fuel system and the engine, the TASL and Airbus statement said.

The facility is also set to carry out testing and qualification of the helicopters. "Helicopters assembled at this FAL will be delivered to customers in India and its neighbouring countries," the statement added.

"Tata Advanced Systems and Airbus Helicopters are well advanced in their joint selection of the location of the FAL, which will be communicated soon," it said.

The H125 is known to be the world's best-selling single-engine helicopter. This high-performing versatile helicopter is a member of Airbus' Ecureuil family which has accumulated more than 40 million flight hours worldwide. It can operate in high-and-hot and extreme environments and can be easily reconfigured for various missions, including aerial work, firefighting, law enforcement, rescue, air ambulance, passenger transport, and many others.

It said the H125 is the only helicopter to have landed on Mount Everest, demonstrating its agility in operating in high altitude, extreme environments. ■



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# Layering defences are key for defeating Adversaries

Recent examples globally have given us an idea of how coordinated attacks can maximise impacts. **Tom Laliberty, President, Land & Air Defense Systems, Raytheon** spoke to the **Show Daily** about how technologies they make save lives and more. Excerpts:

## What does your business do at Raytheon?

I lead a team of more than 6,000 people, and our mission is to deliver integrated air and missile defence systems, precision fires and manoeuvres and land warfare capabilities to the U.S. Army, the U.S. Marine Corps and to land and air defence forces around the world.

## What does an integrated air missile defence system mean in principle and practice?

It starts with the threat and in recent years, adversaries have demonstrated the ability to coordinate very complex attacks with a combination of hostile drones, aircraft, cruise missiles, and ballistic missiles. They do this in a 360-degree attack and since it is very well coordinated, such that it occurs almost simultaneously.

## How can you defend against such threats with capabilities?

What this type of threat requires is a layered defence. This encompasses the closest-in systems to counter drones, to medium range air-defence systems that deal with hostile aircraft and cruise missiles, and then to long-range air defence systems that counter tactical ballistic missiles. And what's really important is to have integration across these layers so that we provide a continuum of defence, from mud to space.

## Can you give us more idea with specific examples?

Our purpose is to support global defence forces and we offer a range of solutions, from integrated air and missile defence, Patriot and NASAMS to Stinger and the Sentinel radar, to name a few. Many of our solutions are used all over the world. For example, our National Advanced Surface-to-Air Missile System, or NASAMS, which is a medium-range air defence solution, is currently operated by 13 countries, and our Patriot partners now number 19 countries, the newest being Ukraine.

We recognise the growing threat of hostile drones, so we developed the KuRFS precision radar and Coyote Block 2 kinetic effector to detect and defeat them; and from a precision fires and manoeuvre perspective, our various solutions - including the Excalibur projectile, the Javelin weapon system, and the TOW missile - all of these systems are currently deployed around the world and are actively being used by military forces in support of their missions.



Tom Laliberty

It's very important that the capabilities that we provide work every time that they are needed, and we take great pride in ensuring that we partner with those warfighters who operate these systems and make them as capable as possible.

## Are there any other solutions that are being developed?

We're introducing the Lower-Tier Air and Missile Defense Sensors, known as LTAMDS, as the replacement radar for the Patriot air and missile defence system. This new radar will provide 360-degree coverage of the airspace, and it will provide significantly longer range, higher altitude capability.

## How are these platforms upgraded from a customer's perspective?

Many of the systems that we field have been around for decades, so these systems are under continuous improvement. For that to happen, we get feedback from operators. We add capabilities and solve obsolescence, while modernising with the most advanced technologies.

So, when we deliver these systems, they are able to meet the needs of the warfighter.

It's really very fulfilling to be able to engage with the customer, understand a real-world problem of significant consequence, and be able to bring something back to that customer that solves that need. ■



Raytheon's Patriot Missile System



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## Virgin Atlantic orders seven additional A330neo aircraft

Virgin Atlantic has placed a firm order for seven A330neo aircraft as part of its wider fleet transformation. The agreement takes Virgin Atlantic's commitment for the A330neo to 19 aircraft in total, providing improved economics.

The order was announced during the show onboard Virgin Atlantic's A330neo, named 'Ruby Rebel', and registered as GB-VSRB after founder Sir Richard Branson, to celebrate the airline's 40th anniversary.

Shai Weiss, CEO, Virgin Atlantic said, "Today, we complete our multi-billion-dollar fleet transformation, with the purchase of seven additional A330-900s, which we know our customers and our people love to fly. Flying the youngest fleet is the most readily available and significant lever towards decarbonising long-haul aviation and we are proud to already operate one of the youngest and most fuel and carbon efficient fleets across the Atlantic."

Our special partnership with Airbus began with the arrival of 'Lady in Red' in 1993, with our most recent arrival, 'Ruby Rebel', arriving to mark our 40th birthday this year. Virgin Atlantic has flown more than 60 Airbus tails in the last three decades. While not first to the party, they've been our main dance partner, making our customers smile ever since."

Airbus Chief Executive Officer, Commercial Aircraft, Christian Scherer said, "We are grateful for Virgin Atlantic's decision to expand its A330neo fleet as part of its strategy to have the youngest fleet



across the Atlantic. The A330neo not only delivers unbeatable operational seat mile cost and an exceptional passenger experience, it also greatly enhances Virgin Atlantic's fleet efficiency and contributes to their sustainability journey. We look forward to continuing this smooth and successful collaboration for many years to come."

The A330neo features the award-winning Airspace cabin, which offers passengers a unique passenger experience, high level of comfort, ambience, and design. This includes more individual space, enlarged overhead bins, a new lighting system and access to the latest in-flight entertainment and connectivity systems.

Powered by the latest generation Rolls-Royce Trent 7000 engines, the A330-900 is capable of flying 7,200 nm / 13,300 km non-stop. At the end of June 2024, the A330 Family had accumulated 1,798 firm orders from more than 130 customers worldwide, including 319 A330neo from 30 customers.

As with all Airbus aircraft, the A330 family is already able to operate with up to 50% Sustainable Aviation Fuel (SAF). The manufacturer is targeting to have its aircraft up to 100% SAF capable by 2030. ■

## KNF makes its debut, among other Korean participants

Korea Non-Ferrous Metals announced that the year 2024 marks the 30th anniversary of its partnership with global Aluminium mill i.e. Arconic. This milestone was celebrated with the Arconic executives at the KNF booth during the show.

Twelve companies from Gyeongnam Province and GNTP, including KNF, are participating at the show this year alongside organisations such as the Korea Aerospace Industries Association, to promote Korean aerospace and defence products.

KNF is participating for the first time in the show to explore market opportunities for high-quality aluminium essential for the manufacture and development of aerospace, defence and aviation components. Korea Non-Ferrous Metals processes and supplies a variety of non-ferrous materials, including global high-quality aluminium brands like Arconic, Fusina, Novelis etc. as well as Korean and other Asian products. KNF feels that these products meet the timely needs of industries such as aerospace and defence, semi-conductors, marine, automotive and others.

Given the recent global trend of extended lead times making it difficult to source some materials,



L to R: Mr. KS Jeon (Sales Director at KNF), Mr. Jason Hinchman (Director, American Commercial Aerospace and Defense at Arconic), Ms. Diana B. Perreiah (Executive VP Rolled Products North America Arconic), Kelly Joonyoung Ahn (KNF Managing Director), Mr. Min Seok Kim (VP of Korea Aerospace Industries Association), Mr. Juseon Ok (Director of Aerospace Center GNTP), Ms. Seul Gi Lee (Buyer of KNF)

the demand for urgent small quantities of aluminium is increasing among customers, not only in Asia but also in Europe. And with the increase in

demand, KNF feels that they are a hidden Korean company that can provide aluminium materials at competitive prices. ■





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# Powering the Future: Parker's role in Aviation Electrification

In the changing realm of aviation, electrification is emerging as an advancement that offers a vision of more efficient, environmentally friendly and secure air travel. And Parker Aerospace feels that it is taking the lead in this shift using their engineering know how, innovative mindset and broad portfolio to contribute to a more sustainable future.

## Embracing Innovation

'Innovation' is at the core of their Purpose and they believe they've been pushing the boundaries of what is possible. The company is focussing on the challenges of the future, and the technological advancements in electrification today.

With the integration of Parker Aerospace and Parker Meggitt, the company says that their portfolio of technologies in this space is the broadest and most extensive in the industry. They continue to explore new technologies as new opportunities whether we are developing lightweight electric solutions or pioneering new technologies, we are helping our clients achieve their goals without compromising safety or performance.

The teams at Parker are looking at developing new ways to solve tomorrow's challenges. Electric aircraft demand more power storage and the modular lithium batteries that Parker offers not only enable higher energy densities, they also allow for fast and simple capacity changes. Their electrically powered hydraulic powerpacks utilise power-on-demand technology that can reduce power consumption and automatically deliver smart power when and where it is needed.

The Inertial Measurement Unit (IMU) in navi-

gation systems, based on MEMS technology, utilises smaller and lighter apparatus. And this solution is supposed to be as accurate as other high-cost solutions like fiber optic gyros. Parker is also developing smaller electric braking solutions for the from their proven pedigree found on the A220. All of these solutions allow for greener, safer, more sustainable electric aircraft.



Electrification Battery

## Commitment to Safety

Parker states that they are unwavering in their dedication to upholding safety standards. Through stringent testing procedures and quality control measures. Their team is working to guarantee that each component they manufacture surpasses industry safety standards.

The electrification sector also poses new challenges, especially when it comes to managing energy systems informs Parker. The engineers

are looking at creating and evaluating systems that are not just efficient, but are built with an eye to safety and security. Whether its mechanisms or innovative thermal management solutions at the component or system level, safety, is a top priority for Parker in the electrification endeavours.

## Engineering Excellence

The company feels that their success in electrification is built upon the engineering skills of their team. With a blend of knowledge and experience we can take on challenges and deliver top notch solutions in a collaborative work environment that nurtures innovation.

In addition, the aftermarket Service and Support Operations Team enhances the value to the clients. They provide support and maintenance services to ensure the reliability and effectiveness of their electrification solutions over time.

## Sustainability

Looking ahead Parker is enthusiastic about the potential of electrification, envisioning a future, where electric aircraft, combined with other expansive, environmentally conscious solutions, setting the new standards in the industry. The company's goal is clear; to continue working with their customers to achieve more secure and sustainable results that redefine aviation. This array of developments will ultimately make green regional and long-haul flight more attainable by reducing weight, burning less fuel, and prioritising safety and reliability. ■

# S3 AeroDefense expands OEM partnerships with Vertex Solutions, TAT Technologies, and Equiptec

Furthering its strategic initiatives to expand its product offerings to support its goal of becoming a "one-stop-shop" for military operators, S3 AeroDefense signed two additional exclusive distribution agreements with Vertex Solutions and Equiptec, Inc. S3 feels that these new partnerships position the company as a comprehensive provider of aerospace and defence solutions.

## Partnership with Vertex Solutions

S3 AeroDefense's new agreement with Vertex Solutions commenced in June 2024. This three-year agreement covers all current and future product lines, including development based on customer requests. This partnership leverages Vertex's experience, having delivered over 400 simulation devices to customers like the USAF and major commercial aviation entities.

S3 AeroDefense is now the exclusive partner for all Latin America and North Africa requirements. The collaboration began in 2022 with a

successful project involving Immersive Trainer Devices for critical platforms in key markets.

## Equiptec

Equiptec, based in Napier, New Zealand aims to establish strong relationships for aviation ground support equipment. S3's network and expertise will be instrumental in bringing this goal to fruition, ensuring Equiptec's successful entry into the defence market.

S3's new agreements with Vertex Solutions, Equiptec, TIGHITCO, Inc., Cocoon, Inc., and Espey Mfg. demonstrate S3 AeroDefense's dedication to listening to, understanding and, ultimately, addressing our customers' unique needs. By partnering with industry-leading OEMs, S3 AeroDefense feel that they are well-positioned to meet the evolving demands of global military aircraft operators, offering innovative solutions that enhance operational efficiency and reduce costs. ■







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# Collins Aerospace developing EPACS cooling system for F-35 modernisation

Power and thermal management systems (PTMS) for fighter aircraft are becoming increasingly important as next-generation capabilities are developed. Collins Aerospace is designing a new PTMS - the Enhanced Power and Cooling System (EPACS). **Show Daily** spoke to **Matt Pess, EPACS Chief Engineer, Collins Aerospace** to learn more. Excerpts:



Matt Pess

## Can you explain a little bit about the PTMS and what it does?

The PTMS provides three critical functions for an aircraft like the F-35 - cooling the pilot and avionics, providing power for main engine start and emergency power in the event of a main power loss.

The engine is the primary power source for everything on the aircraft, whether it's electrical, pneumatic or hydraulic, it's all taken off the engine in some way. The PTMS takes energy from the engine in the form of high-pressure air known as bleed air. Taking bleed air is essentially stealing energy from the engine that it can't use

to generate thrust, so the goal is to take as little as possible. The refrigeration portion of the PTMS converts this energy to cool and pressurise the crew station and other ancillary systems, and chill liquid for the high-power electronics.

A PTMS can also be its own power source as well by running the Auxiliary Power Unit (APU). This APU can generate bleed air to operate the cooling system or provide electrical power with an integrated generator. This allows the system to operate when the engine is off to provide start capability or in an emergency if there is a loss of main sources of power from the engine.

## What is EPACS and why is Collins putting it forward?

EPACS is made up of a compact, air-cycle cooling system and APU with a generator for electrical power. These normally separate systems are packaged together and operate as an integrated system which allows us to provide a very compact and highly efficient PTMS.

## The PTMS provides three critical functions for an aircraft like the F-35 - cooling the pilot and avionics, providing power for main engine start and emergency power in the event of a main power loss.

Enhanced mission capabilities for both current and future aircraft are demanding more from the PTMS, yet there is limited room and limited bleed air to power them. To solve this challenge, Collins is leveraging more efficient technologies we've proven out in service over the last several decades and integrating those capabilities into EPACS to support the warfighter's urgent needs. EPACS allows us to demonstrate that the required capabilities are not only feasible, but low risk.

## What is the progress on the development of the EPACS?

We've been looking at this challenge as it's evolved over the past decade and first began performing design trades in our Model Based Systems Engineering environment using digital twins several years ago. Digital engineering tools are critical for early development and risk reduction. The digital testing environment helps identify potential integration issues and prevent rework at later stages, but there's no substitute for testing actual hardware in the lab.

We've now been testing EPACS hardware in our labs for more than a year. This testing allows us to continue to validate the digital twins and run a broad range of test conditions to try to find the limits of the hardware. This mix of digital and lab testing is critical to prove out technology readiness levels and be ready to meet the demands of a complex integration effort when we're executing a programme.

## What other applications could the EPACS be used for?

While EPACS was initially developed to support F-35 modernisation, advanced PTMS will also be necessary to support sixth-generation fighters and commercial next-gen single aisle airliners. Like the F-35, these platforms will have to find a way to dissipate higher heat loads generated by more advanced onboard systems while drawing power from the engine in the most efficient manner possible. Consequently, the PTMS technology we're developing for EPACS will also have applications for a range of future defence and commercial platforms.

For a commercial transport, the benefits in efficiency translate to lower fuel consumption, more range and enhanced reliability, resulting in significant operating cost savings and a comfortable cabin environment. While much of the work we've done thus far is based on our existing commercial and military technologies, having the EPACS prototype in the lab allows us to push the boundaries of the hardware and the designer's imagination. In this way, we can advance beyond what's been put into commercial service in the past and prepare new technologies for the next commercial platforms. ■



EPACS system designed by Collins Aerospace



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 **MAKINO**  
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# Embraer gung-ho about future

**B**razilian aerospace and defence major, Embraer is gung-ho about the company's growth, driven by commercial and defence products and services and support. At Farnborough the Embraer big-wigs starting with the Embraer President and CEO, Francisco Gomes Neto talked about how the company had seen exponential business growth and how its profits were on an upward tick and it's stock price had shot up by 172% post the pandemic.

Embraer, he said, has had a good opening at Farnborough where on day 1, it sold C-390 millennium aircraft to the Netherlands and Austria. Today Embraer signed with Paraguay for 6 A-29 Super Tucano, with deliveries scheduled from 2025, includes mission equipment and an integrated logistics services agreement.

"We are honored by the Paraguayan Air Force (FAP) decision and very pleased to be able to announce more A-29 Super Tucano sales, which is a leading aircraft in the international market in its segment. We are confident that the A-29 meets the current and future needs of the FAP", said Fabio Caparica, Commercial Vice President for Latin America at Embraer Defense & Security.

The A-29 Super Tucano boasts over 260 orders, surpassing 550,000 flight hours, with 60,000 of those in combat. The number of air forces operating the A-29 Super Tucano steadily expands due to its unmatched combination of features, making it the most cost-effective, accessible, and versatile choice. For Air Forces seeking a proven, comprehensive, efficient, reliable, and cost-effective solution on a single platform, coupled with great operational flexibility, the A-29 Super Tucano offers a wide range of missions such as close air support, air patrol, special operations, air interdiction, JTAC,



**Super Tucano Paraguay**

forward air controller (FAC), air and tactical coordinator (TAC), Armed ISR, border surveillance, reconnaissance, air escort, basic, operational and advanced training, transition to air superiority fighters, JTAC/LIFT and FAC training.

Similarly, the Embraer Services & Support is accelerating its growth pace and consolidating its role as one of the main drivers of growth for the next years, by offering high-skilled agnostic services combining operational excellence, customer experience, and innovative solutions. Today the business unit announced several new initiatives, including new MRO facilities, full-flight simulators network expansion, Pool Program growth, AHEAD (Aircraft Health Analysis and Diagnosis) update, and connectivity solutions for E-Jets.

The business unit doubled its maintenance service capacity for Executive Jets in the United States, through the addition of three Maintenance,

Repair, and Overhaul (MRO) facilities in Dallas Love Field, Cleveland, and Sanford. In Europe, Embraer Services & Support also announced that will double its capacity for Executive Jets in Le Bourget (France).

"Our business unit has reached a US\$ 3.1 billion record backlog in 2024, by offering the best-in-class agnostic services in key market areas such as MRO (Maintenance, Repair, and Overhaul), Engines, Aerostructures, Training, Materials, Modifications, and Conversions. Embraer Services & Support aims to continue expanding its global footprint, strengthening its position as a growth driver for Embraer" said Carlos Naufel, President and CEO, Embraer Services & Support.

The full-flight simulator global network is also growing. Embraer Services & Support will open three new Commercial Aviation simulators worldwide. ■

# Honeywell demonstrates Advanced Ground Control Station for Evtol Aircraft

**H**oneywell and Frequentis reached a milestone in advancing the operation of remotely piloted aircraft in European airspace as part of the SESAR Joint Undertaking OperA (Operate Anywhere) project consortium. Through a successful flight test, Honeywell showcased a new ground control station for eVTOL (electric vertical takeoff and landing) aircraft. This development paves the way for safer and more efficient uncrewed aircraft operations and further supports Honeywell's alignment with the trends of automation and the future of aviation.

The successful flight test took place in Amstetten, Austria recently and leveraged new functionalities of the two-display ground control

station that is also operated from Honeywell's Brno research and development facility. With a collaborative interface with air traffic control, the ground control station operator was able to receive commands originated by air traffic control to increase operational efficiency through real-time data exchange with different systems.

Frequentis provided enhanced U-space services for the flight test, including mission conformance monitoring and tactical conflict detection. U-space, a new air traffic management environment for unmanned aerial systems, uses a set of new services based on a high degree of digitisation, automation of functions and specific procedures created to safely allow a large number

of drones within an airspace.

Using both simulated and real drones, Honeywell's ground control station also demonstrated the initial implementation of a ground-based detect and avoid solution, a safety tool designed to make drone flights safer and more reliable, especially in uncontrolled airspace.

These demonstrations mark an important step for Project OperA, one of the two Honeywell projects awarded through the latest round of funding from the European Union's SESAR 3 Joint Undertaking. Project OperA focusses on building solutions for complex operations of advanced air mobility, piloted eVTOL aircraft and uncrewed cargo aircraft in real-life European airspace. ■

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# India's Defence Budget

## Focus continues on Self-Reliance; US\$75 billion allocation

- US\$2.9 billion allocated for capital acquisition; US\$1.9 billion for sustenance & operational readiness
- US\$91 million for coastal security
- Plans to achieve US\$3.58 billion in defence manufacturing
- US\$ 358 million export target by 2028-29



Indian Finance Minister Nirmala Sitharaman who presented the Indian Budget

India's Finance Minister, Nirmala Sitharaman today presented the annual budget and the Ministry of Defence gets the highest allocation among all Ministries – approximately US\$75 billion, 4.79% higher than the previous year.

MoD is engaging with start-ups/MSMEs and innovators to develop Def-Tech solutions and supply the Indian military with innovative and indigenous technological solutions. A grant of up to 50% of Product Development Budget with enhanced limit (Max) of US\$2.9 million per applicant will be awarded as per extant iDEX guidelines.

Out of the budgetary allocation, a share of 27.66% goes to capital; 14.82% for revenue expenditure on sustenance and operational preparedness; 30.66% for Pay and Allowances; 22.70% for Defence Pensions, and 4.17% for civil organisations under MoD. The total allocation comes out as approx. 12.90% of Budgetary Estimate of Union of India.

The allocation is aimed to promote self-reliance (*Aatmanirbharta*) in defence technology & manufacturing and equipping the Armed Forces with modern weapons/platforms along with creation of job opportunities for the youth.

### Modernisation of the forces at the centre

In absolute terms, budgetary allocation under capital head to the Defence Forces for FY 2024-25 is US\$2.9 billion, which is 20.33% higher than the actual expenditure of FY 2022-23 and 9.40% more than the Revised Allocation of FY 2023-24. The allocation is aimed to fill the critical capability gaps through big ticket acquisitions in current and subsequent FYs. The enhanced budgetary allocation will fulfil the requirement of annual cash outgo on planned Capital acquisitions aimed at equipping the Armed Forces with state-of-the-art niche technology, lethal weapons, fighter aircraft, ships, submarines, platforms, unmanned aerial vehicles, drones, specialist vehicles etc.

### Strengthening domestic capacity

MoD has earmarked 75% of modernisation budget amounting to US\$1.29 billion for procurement through domestic industries during this FY. This will have a multiplier effect on GDP, employment generation and capital formation, thus providing a stimulus to the economy.

### Enhanced allocation for sustenance & operational readiness

The continued higher allocation for operational readiness boosts the morale of the Armed Forces with the sole motive of keeping them battle ready

at all times. The Government has allocated US\$1.9 billion during the current FY under this head, which is 48% higher than the budgetary allocation of FY 2022-23. This is aimed to provide best maintenance facilities and support system to all platforms including aircraft and ships. It will facilitate procurement of ammunition; mobility of resources & personnel as demanded by the security situation, and strengthen the deployment in forward areas for any unforeseen situation.

### Enhancing the capability of Indian Coast Guard

The allocation to the Indian Coast Guard (ICG) for this FY 2024-25 is US\$ 910 million crore, which is 6.31% higher over the allocation of FY 2023-24. Out of this, US\$417 million is to be incurred only on capital expenditure, adding teeth to the arsenal of ICG for addressing the emerging maritime challenges and providing humanitarian assistance to other nations. The allocation will facilitate the acquisition of fast-moving patrolling vehicles/interceptors, advance electronic surveillance system and weapons.

### Self-reliance through research & innovation

The budgetary allocation to Defence Research and Development Organisation (DRDO) has been increased to US\$2.84 billion in FY 2024-25 from US\$2.77 billion in FY 2023-24. Out of this allocation, a major share of US\$1.57 billion is allocated for capital expenditure. This will financially strengthen the DRDO in developing new technology with special focus on fundamental research and hand-holding of the private parties through Development-cum-Production partner.

The Indian Defence Minister Rajnath Singh has termed the full year Budget for FY 2024-25 as excellent and outstanding, which will help in moving towards a prosperous and self-reliant '*Viksit Bharat*' (prosperous *Bharat*). In a post on X, he stated that inspired by Prime Minister Shri Narendra Modi's vision of inclusive and fast-paced development, the budget will accelerate the country's economic transformation. It will go a long way in making India a \$five trillion economy by 2027, he added.

### Industry reactions

Mr. Baba Kalyani, Chairman & MD, Bharat Forge said the budget allocation for Defence Industry is in expected lines, creation of the Critical Minerals Mission and articulation of India's strategy on Small Modular Nuclear Reactors will go a long way in bolstering the *Aatmanirbhar Bharat* agenda.

Rajit Rathor, Chief Financial Officer, Star Air said, "We heartily applaud the Union Budget 2024, especially its focus on bolstering the aviation industry. The government's pledge to improve infrastructure and offer tax breaks is a significant step in supporting the expansion of our sector. Improved infrastructure will lead to better operations, shorter turnaround times, and an enhanced passenger experience."

The Regional Connectivity Scheme (UDAN) allocation, although reduced, highlights the government's commitment to balancing budget constraints while still aiming to enhance regional connectivity. Moreover, the investment in infrastructure projects, such as new airports in Bihar, demonstrates a clear commitment to expanding access to air travel and supporting regional development. The introduction of better regulatory frameworks is another encouraging step. Simpler and clearer regulations will enable us to work more efficiently, guaranteeing dependability and safety while encouraging innovation in the industry. By adopting a progressive strategy, we will be able to adjust to the ever-changing demands of the global aviation sector, thereby increasing accessibility and convenience of air travel for all."

Rajit Rathor also said the industry was glad that the incentives proposed to boost MRO activities will provide much-needed support to the sector. ■

- R. Chandrakanth



# C-130J Super Hercules fleet passes 3 million flight hours Worldwide

Lockheed Martin informed that the worldwide C-130J Super Hercules fleet recently surpassed 3 million flight hours. With 545+ Super Hercules delivered worldwide, this achievement reflects the C-130J's unmatched global reach, multi-mission versatility and proven tactical performance capabilities.

Operators and crews from 21 nations contributed to this achievement, logging hours through 18 different mission requirements including combat, transport, aerial refuelling, special operations, medevac, humanitarian relief, search and rescue, weather reconnaissance, firefighting and commercial freight delivery.

## 3 million flight hours highlights

- These hours were logged beginning with the C-130J's first flight on April 5, 1996, through the beginning of July 2024.
- Countries with C-130Js contributing to these flight hours include (in order of delivery) the United Kingdom, United States (the U.S. Air Force, Marine Corps and Coast Guard; Pallas Aviation), Australia, Italy, Denmark, Norway, Canada, India, Qatar, Iraq, Oman, Tunisia, Israel, Kuwait, South Korea, Kingdom of Saudi Arabia, France, Bahrain, Bangladesh, Indonesia and Germany.
- Also contributing to these flight hours is the Lockheed Martin Flight Operations team, whose crews are the first to fly every C-130J produced, and the U.S. Air Force Defense Contract Management Agency crews that support C-130J test flights at Lockheed Martin's Aeronautics site in Marietta, Georgia, home of Super Hercules production line.
- Super Hercules variants used to log these hours include: C-130J and C-130J-30 (tactical airlifter), KC-130J (tanker), WC-130J (weather reconnaissance), EC-130J (information operations), MC-130J (Special Operations), HC-130J (search and rescue, U.S. Air Force and U.S. Coast



Lockheed Martin C-130J Super Hercules

- Guard variants), AC-130J (gunship) and LM-100J (commercial freighter).
- Hours flown include test, training and operational missions on all seven continents.

These discriminators include proven operational readiness with the greatest ease of transition, increased reliability, superior tactical airlift and combat airdrop capabilities, certification by more than 20 airworthiness authorities, and engine-out performance with extended range. The C-130J also delivers unmatched interoperability with NATO and global air forces, robust industrial partnerships and verified low life-cycle costs with significant fuel savings resulting in a reduced carbon footprint compared to other medium-sized jet airlifters. ■



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# Washington State - Launching your business



**W**hile some US States are new to the space business, Washington State informs that they have played a central role in space exploration for more than 60 years. They built the Apollo moon buggies, ferried tourists to the outer reaches of inner space and have propelled every major interplanetary mission without a single thruster failure.

Washington's space industry is currently in high growth mode, from long-time players such as Aerojet Rocketdyne and Boeing to the newer ones like Blue Origin, SpaceX and Spaceflight. The space industry generates \$4.6 billion in

revenue annually and is growing exponentially as businesses develop new ways to connect, communicate and explore.

The satellite industry can be looked as an example. Today, one-half of all the satellites in low-earth orbit were manufactured in Washington. SpaceX's Starlink and Amazon's Project Kuiper promise to provide Internet and phone service to everyone around the globe. Companies like LeoStella, are on the opposite end of the spectrum, building custom satellites for discerning customers at a scalable rate of 40 to 60 a year.

The industry is also supported by research and development driven by two universities, a national research laboratory and private-sector R&D teams. Nearly a dozen educational, non-profit and science-related institutions are dedicated entirely to space exploration.

This research has been able to spawn a new generation of value-added services and groundbreaking technologies. Spaceflight books mission rideshares aboard commercial space flights. They also launched BlackSky, which provides high-resolution, near-real-time imaging to customers.

At Aerojet Rocketdyne, workers are also exploring new propulsion systems such as resistojets, gridded-ion thrusters and rockets powered by hydroxyl ammonium nitrate, which is safer and more efficient than traditional fuels. A relative newcomer, Starfish Space, is focussed on servicing space vehicles to extend their useful life and removing debris that could pose a danger to future missions.

Washington State believes that the industry benefits from their rich history of innovation and collaboration. A deep pool of engineering and manufacturing talent is drawn to the state in a wide range of fields, including aerospace, software, hardware, Artificial Intelligence, propulsion, composites, big data and telecommunications.

New opportunities are arising on all fronts, from supply chain partners and original equipment manufacturers to space launch services and end-user providers of telecommunications, Earth mapping and other space-dependent applications. ■

## Consumers can access environmental information while booking flights in the UK

**P**assengers should be able to make more informed travel choices when booking flights and package holidays from, to or within the UK, by accessing information on the environmental impact of flights.

In a consultation launched by the UK Civil Aviation Authority at the show, proposals have been put forward to make clearer the environmental information consumers could expect to see when booking flights in the future. The regulator has outlined that environmental information consumers receive should be accurate, understandable, and accessible.

Metrics reported to consumers would also use standard units, such as kg CO<sub>2</sub> or kg CO<sub>2</sub>e per passenger journey. The UK Civil Aviation Authority is also looking at how the information should be standardised and

consistent across the industry and outlets that sell flights.

Tim Johnson, Director of Policy at the UK Civil Aviation Authority, said, "Providing consumers with accessible, transparent, and accurate environmental information is essential to making more informed travel choices.

"Our new proposals aim to standardise this information across all platforms, enabling passengers to more easily compare the environmental impact of their flights. This initiative is a significant step towards greater transparency and improved sustainability in the aviation industry."

Harry Armstrong, Head of Sustainability at the UK Civil Aviation Authority, added, "All of us want to do our bit to lower our environmental impact, but making informed choices is difficult to do when the data is not avail-

able. That is why we've put forward proposals to ensure that consumers can make decisions about their travel plans by having environmental data available at the point of booking."

The UK Civil Aviation Authority's Environmental Sustainability Strategy includes its role in the provision of environmental information to consumers and the public generally. An essential part of this work is ensuring that consumers can make informed choices about their flight booking selections.

The proposals set out come following a previous call for evidence from the regulator in 2023, which informed the draft principles for airlines and other companies that advertise or sell flights to follow when calculating and providing environmental information to consumers on their flight. ■



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# Dealing with aircraft turbulence

On May 21 this year, a Boeing flight from London to Singapore was hit by turbulence over the Irrawaddy Basin in Myanmar, killing one person and injuring over 100, said to be one of the worst turbulences in the history of aviation. The aircraft dropped 178 feet in less than one second, which 'likely resulted in the occupants who were not belted up to become airborne' before falling back down, the Singapore Transport Ministry has said.

The plane which was cruising at 37,000 feet experienced 'sudden extreme turbulence', resulting in the unavoidable disaster. The Singapore flight which was carrying 211 passengers and 18 crew members, made an emergency landing in Bangkok, not before the harrowing time the crew and the passengers went through. In 2016, Singapore Airlines Singapore-Mumbai flight was also hit by turbulence when 22 people were injured, but it was not this scary.

The Ministry of Transport, Singapore said in a statement that investigators, including those from the U.S. National Transportation Safety Board, Federal Aviation Administration and Boeing, had sequenced the events based on the preliminary analysis of the flight's data and cockpit voice recorders.

The preliminary report said that the plane cruising at about 37,000 feet over southern Myanmar when it began to experience slight vibration due to changes in the gravitational force. Due to a likely updraft and not due to any action of



Photo: Joe Justice/Twitter

Chaos after plane hit by Turbulence

the pilots, the jet's altitude increased suddenly, thus resulting in the autopilot system getting activated to push the plane back down to the selected altitude.

The report said that pilots also noticed an 'uncommanded' increase in airspeed, which they tried to check by extending panels called speed brakes, and "a pilot called out that the fasten seat belt sign had been switched on." A few seconds later, the plane entered the sharp drop that caused unbelted passengers to come out of their seats before falling back. "This sequence of events likely caused the injuries to the crew and passengers," the report said.

The pilots disengaged the autopilot to stabilise the plane, the report said, and flew it manually for 21 seconds before going back to autopilot. The plane made a normal, controlled descent and didn't encounter further turbulence until it landed in Bangkok almost an hour later, the ministry said, adding that investigations are ongoing.

Almost everyone who has flown must have experienced some form of turbulence or the other and the importance of using the seat belt.

## What is turbulence? That question has cropped up even more after the Singapore incident

As per *Wikipedia*, in fluid dynamics, turbulence or turbulent flow is fluid motion characterised by chaotic changes in pressure and flow velocity. In meteorology, clear-air turbulence (CAT) is the turbulent movement of air masses in the absence of any visual clues such as clouds, and is caused when bodies of air moving at widely different speeds meet.

The atmospheric region most susceptible to CAT is the high troposphere at altitudes of around 23,000–39,000 feet as it meets the tropopause. Here CAT is most frequently encountered in the regions of jet streams. At lower altitudes

it may also occur near mountain ranges. Thin cirrus clouds can also indicate high probability of CAT.

In aviation, CAT is defined as "the detection by aircraft of high-altitude inflight bumps in patchy regions devoid of significant cloudiness or nearby thunderstorm activity". It was first noted in the 1940s. CAT can be hazardous to the comfort, and occasionally the safety, of air travellers as the aircraft pilots often cannot see and anticipate such turbulences, and a sudden encounter can impart significant stress to the airframe.

## CAT is almost undetectable

CAT is almost undetectable. In an article in *The Telegraph*, pilot Steve Allright has said, "You cannot see it, you cannot detect it on radar and you cannot accurately forecast it." With climate change, scientists are forecasting that CAT incidents are likely to increase.

Some reports suggest that CAT can be remotely detected with instruments that can measure turbulence with optical techniques, such as scintillometers, Doppler LIDARs or N-slit interferometers.

## Further research needed

The late David Atlas, meteorologist who was at University of Chicago has said in a conference paper (which is cited in Springer Link) that of the various methods proposed for CAT detection, only ground-based ultrasensitive radars have demonstrated partial success. However, their size and cost make an operational system of doubtful economic feasibility. It can now be predicted with some assurance that a 20 db improvement in sensitivity of airborne radars will permit CAT detection at a range of about 10 nautical miles, although not with 100% confidence. Serious efforts should thus be made to advance radar technology sufficiently to provide the required improvement.

US-based Radio Technical Commission for Aeronautics, now known as RTCA, has talked about the future of detecting CAT. It mentions airborne LIDAR (laser, imaging, detection and ranging) for CAT. Every pilot who has experienced severe CAT would like to hear the news that alerts will no longer need to come from other pilots in the area, but from accurate onboard turbulence detection systems. In 2020, RTCA said though this is still a long way off, detection systems moved another step forward within the last two years, thanks to a feasibility study on Light Detection and Ranging (LIDAR) that piggybacks onto the previous work of RTCA SC-230: Airborne Weather Detection Systems.

In 2018, the Japan Aerospace Exploration Agency (JAXA) and Mitsubishi approached the FAA requesting information on how to get the LIDAR detection system they had flown as a prototype in a Boeing aircraft approved for use in the U.S.

"We had already completed the first RTCA Feasibility Study in 2017 (AFS-1: Feasibility Study Weather Radar for Ice Crystal Detection), so we had a good idea on an approach," said Venkata Sishtha of Collins Aerospace. "A couple of folks from Mitsubishi came to Cedar Rapids (Collins) and we did an extensive white board session to kick it off, with help from my Co-Chair on WG-11, Shumpei Kameyama."

The presentation to Collins looked through various aspects of LIDAR technology with the goal to be able to detect clear air turbulence to 12 Nautical Miles (12NM) in front of an aircraft. It further looked to determine realistic goals for an airborne LIDAR system when used for clear air turbulence detection, aircraft manufacturer needs for an airborne LIDAR clear air detection function and the feasibility that LIDAR systems can meet aircraft manufacturer needs.

"We wanted to look at what Original Equipment Manufacturers (OEM's) want, what are the capabilities of LIDAR independent of OEM's needs, and how can capabilities of LIDAR meet OEM 12NM detection for OEM. Was the technology there or not?" said Sishtha.

Still needed as this new technology advances are simulation studies, additional data collection, research for use of LIDAR for precision altitude measurement and further research, and eventually MOPS, for coupling LIDAR to flight control systems for gust load alleviation.

"As a weather radar engineer, it was extremely enlightening," said Sishtha. "We hope that as technology develops, that there is a chance for sensor detecting clear air turbulence. With Direct Detect, we only have equations on paper, and we'd want simulation and flight tests, similar to what was done for the ice detection feasibility study."

At the end of the day, despite the quality of weather radar systems, manufacturers are always looking for ways to improve the technology to make flying even safer for everyone. ■

- R. Chandrakanth



# RTX's StormBreaker goes 14 for 14 from the F-35C in U.S. Navy flight tests

**R**aytheon, an RTX business announced 28 tests of its StormBreaker smart weapon in 2023, including a 100% success rate on 14 of 14 planned jettisons from the F-35C. The additional 14 tests throughout the year included employment from the F/A-18E/F, F-15E, and F-35B across the U.S. Navy, Marines, and Air Force.

"Service-members need trusted weapons that are highly survivable, network enabled and keep them as far from harm's way as possible," said Paul Ferraro, president of Air & Space Defense Systems at Raytheon. "StormBreaker's unique capabilities position it as the right choice for multiple generations of weapons systems."

StormBreaker is an air-launched, precision-strike standoff weapon that enables the service-members to defeat moving and fixed targets. It can operate in adverse weather conditions through its tri-mode seeker that employs infrared and millimeter wave radar to see through fog, smoke and rain. The weapon has the capability to receive updated target coordinates mid-flight via two-way datalink communications. Using these network options, StormBreaker allows airborne or ground controllers the ability to send in-flight target updates. ■



StormBreaker

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# GA-ASI flies MQ-9B with Pratt & Whitney Engines

**G**eneral Atomic Aeronautical Systems, Inc. (GA-ASI) flew a company-owned MQ-9B SkyGuardian Remotely Piloted Aircraft recently, with a PT6 E-Series model turboprop engine supplied by Pratt & Whitney Canada. Representatives from GA-ASI and Pratt & Whitney witnessed the first flight of the PT6 engine on MQ-9B, which lasted 44 minutes and demonstrated exemplary handling and acceleration.

"We're excited to see the PT6 engine on our MQ-9B aircraft," said GA-ASI President David R. Alexander. "We've worked with Pratt & Whitney for years, specifically on our jet-powered Avenger, and we've enjoyed a very productive partnership. The first flight marks an important milestone for MQ-9B SkyGuardian and SeaGuardian customers and missions that require additional power. In addition, customers who choose the Pratt & Whitney engine will benefit from low sustainment costs from best-in-class Time Between Overhauls, as well as 50+ maintenance and overhaul facilities around the globe."

The PT6 E-Series is a reliable and versatile turboprop engine family that delivers key performance enhancements applicable to future MQ-9B missions. PT6 delivers a 33% increase in power over MQ-9B's current engine, with a highly



MQ 9B SkyGuardian

mature dual-channel Full Authority Digital Engine Controller.

MQ-9B is GA-ASI's next generation RPA, delivering exceptionally long endurance and range, with auto take-off and landing under SATCOM-only control, and will be able to operate in unsegregated airspace using the GA-ASI-developed Detect and Avoid system.

Deliveries of MQ-9B have begun for the United Kingdom, with contracts in place with

Belgium, Canada, Taiwan, and the U.S. Air Force in support of the Special Operations Command. The Japan Coast Guard is currently operating MQ-9B for maritime operations, and the Japan Maritime Self-Defense Force (JMSDF) selected MQ-9B for its Medium-Altitude, Long-Endurance (MALE) Remotely Piloted Aircraft System Trial Operation Project. MQ-9B has also supported various U.S. Navy exercises, including Northern Edge, Integrated Battle Problem and Group Sail.

# GKN Aerospace expands composite and electrical wiring systems capabilities

**G**KN Aerospace has officially opened an expansion to its facility in Mexico, Chihuahua, representing a significant advancement in the company's aerospace manufacturing capabilities for the North American market.

The upgraded site will now focus on both the assembly of composite aerostructures as well as manufacturing electrical wiring interconnection systems (EWIS). The enhanced production capac-

ities will strengthen partnerships with customers in the region, including HondaJet and Gulfstream, and will position the site for future growth.

John Pritchard, President Civil Airframe of GKN Aerospace said, "The expansion of our Chihuahua facility is an important milestone for us. It will supplement our already established aerostructures footprint in the region, embedding our industry-leading EWIS capabilities into North

America for the first time. Combined, lightweight structures and advanced EWIS systems are critical for both our customers' platforms today, as well as to enable the future of sustainable flight. Having this multi-technology site in Chihuahua is an important step forward in enabling this."

Maria Eugenia Campos, Governor of the State of Chihuahua, said, "We take immense pride in having GKN Aerospace as a cornerstone of Chihuahua's aerospace industry. The company's expansion in Chihuahua is a testament to the trust and confidence placed in our state. My administration is fully committed to supporting GKN Aerospace's ongoing and future projects, providing the resources and infrastructure necessary for success and growth."

By diversifying the site, with the addition of electrical wiring systems capability alongside its existing aerostructures capabilities, Chihuahua will be repositioned as a multi-technology aerospace manufacturing centre with the creation of more than 200 new jobs.

GKN Aerospace currently operates three facilities in Mexico, catering to both civil aircraft and the business aerospace markets in the United States and Europe. The Chihuahua facility specialises in providing the assembly of advanced composite and metal structures, specialised processes, and engineering services. ■





# Airbus and partners invest in Sustainable Aviation Fuel fund

**A**irbus, the Air France-KLM Group, Associated Energy Group, LLC, BNP Paribas, Burnham Sterling, Mitsubishi HC Capital Inc. and Qantas Airways Limited co-invested in a Sustainable Aviation Fuel (SAF) financing fund to accelerate the production of SAF.

The corporate partners worked with investment manager Burnham Sterling Asset Management to establish the Sustainable Aviation Fuel Financing Alliance (SAFFA) investment fund in which Airbus is the anchor investor. The commitment from the seven partners is amounting to an aggregate of approximately US\$200 million.

Each partner brings experience and financial expertise to the fund with the ambition to accelerate the availability of SAF by investing mainly in technologically mature SAF-producing projects using for instance waste-based feedstocks. Investments will be diversified across various SAF's production pathways and also by region.

Each partner may then enter into priority contracts to secure SAF offtakes from the various projects SAFFA will invest in, for its allocated volumes. SAFFA is focussing on SAF that is eligible for RefuelEU Aviation or CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation) certification.

SAFFA made its first investment in Crysalis Biosciences, a tech company dedicated to renewing U.S. chemical manufacturing infrastructure with innovative fuel and chemical production technologies.

The company's recent accomplishments include the acquisition and renovation of the Monarch facility, an ethanol plant located in Sauget, Illi-



nois, USA, which was shuttered in 2019. As of the first quarter of 2024, the plant has completed the upgrades and received the necessary environmental authorisations to resume operations with the aim to produce low carbon intensity SAF and biochemicals. ■

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# Japan Airlines finalises commitment with Airbus for 31 aircraft

Japan Airlines (JAL) has signed a firm order with Airbus for 20 A350-900 widebody aircraft and 11 single-aisle A321neo, finalising a commitment announced earlier this year.

The order was announced at the show during a signing ceremony with Yukio Nakagawa, Executive Officer and Senior Vice President Procurement of Japan Airlines, and Christian Scherer, Chief Executive Officer of Airbus Commercial Aircraft business.

The new A350-900s will join the carrier's A350 fleet serving international routes, while the A321neo will operate on domestic services within Japan. To date, JAL has ordered a total of 52 A350s, with 18 in service. The A321neo contract represents JAL's first order for the Airbus single-aisle product line.

Executive Officer and Senior Vice President Procurement of Japan Airlines Yukio Nakagawa said, "We are delighted to have signed the firm order for the introduction of additional A350s and new A321s. We will accelerate the introduction of the state-of-the-art and fuel-efficient aircraft to provide our passengers with excellent service and to reduce CO<sub>2</sub> emissions. We believe that this additional introduction of Airbus aircraft will further deepen our partnership."

Chief Executive Officer of the Commercial Aircraft business, Airbus, Christian Scherer said, "We thank Japan Airlines for placing its confidence once again in the A350. In addition, we celebrate a new milestone in our partnership with the airline following its order for the A321neo. We are committed to providing our full support to Japan Airlines as its growing fleet is deployed on more routes across its network, both domestically and internationally."



The A350 is the world's most modern and efficient widebody aircraft and the long-range leader in the 300-410 seater category. The A350's all-new design includes state-of-the-art technologies and aerodynamics delivering unmatched standards of efficiency and comfort. By the end of June 2024, the A350 Family had won more than 1,300 firm orders from 60 customers worldwide, making it one of the most successful widebody aircraft ever.

The A321neo is the largest member of Airbus' best-selling A320neo Family, offering unparalleled range and performance. By incor-

porating new generation engines and Sharklets, the A321neo brings a 50% noise reduction and more than 20% fuel savings and CO<sub>2</sub> reduction compared to previous generation single-aisle aircraft, while maximising passenger comfort in the widest single-aisle cabin in the sky. To date more than 6,400 A321neos have been ordered by more than 90 customers across the globe.

As with all Airbus aircraft, the A350 aircraft is already able to operate with up to 50% Sustainable Aviation Fuel (SAF). Airbus is targeting to have its aircraft up to 100% SAF capable by 2030. ■

## British Airways funds £21 million to train aspiring pilots

British Airways announced a £21 million investment at the show to expand its Speedbird Pilot Academy, which would educate up to 200 prospective pilots. This effort solves the burden of the £100,000 training expense, hence increasing access to a career in aviation.

The Speedbird Pilot Academy, which opened last year, aims to improve social mobility and diversity in the airline's pilot community. Initially, 100 candidates were chosen from over 20,000 applicants to have their training costs reimbursed. The additional financing will double this figure for the 2025 programme.

Sean Doyle, British Airways' Chairman and CEO, emphasised the airline's commitment to attracting top talent from diverse backgrounds, saying, "We've increased the 2025 cohort to give as many people as possible the chance of realising their dream."

Among the current cadets is Ryan Street from Stockport, whose journey began in the air cadets and continued through various roles at Manchester Airport. Reflecting on his acceptance, Ryan said, "Being selected for the Speedbird Pilot Academy was a dream come true. Without British Airways' support, I might not have been able to afford the training, so I am thankful for this incredible opportunity." He expressed gratitude for the opportunity, acknowledging that without the academy's support, the high cost of training might have been prohibitive.

Melanie Odden from Hertfordshire, another cadet, highlighted the challenges she faced as a working mother. She shared her excitement and determination, stating, "It is hard work, and trying to juggle family life with study can be difficult, but I know it will be worth it." ■

## UK to host International Symposium on Remote Sensing of Environment

The UK will host the 40th International Symposium on Remote Sensing of Environment (ISRSE-40) at the Farnborough International Exhibition and Conference Centre, Hampshire, from 17 to 21 March 2025. ISRSE-40 will run alongside the inaugural Farnborough International Space Show, an event which will pioneer the commercial space age.

Titled 'Synergy in Sight: Harnessing Earth Observation for Sustainable Development', the symposium will emphasise the integration of scientific and technological disciplines through Earth observation to promote sustainability, as well as nurturing the next generation of space professionals in the sector.

Organised by the International Committee for Remote Sensing of Environment (ICORSE), the biennial symposium will run alongside the Farnborough International Space Show 2025 thereby uniting key constituents of the international space community. Collaboration will foster innovation across the fields of remote sensing, Earth observation, and the wider international space ecosystem to drive sector advancements and accelerate new technologies.

A partnership between a consortium of UK-based organisations, including Farnborough International, National Centre for Earth Observation and Space South Central, and ICORSE, the event will foster international collaboration, drive innovation, and address key global challenges including climate change, resource management, and disaster response. Figures from ADS Group indicate significant growth to the UK space industry which directly employs 48,800 people, delivering high value jobs for a highly skilled workforce, and supports 2,300 apprentices across the sector. Turnover growth continues to increase year on year, reaching £17.5 billion in 2022 and adding £7 billion to the UK economy, with space exports valued £5.9 billion to the UK in 2022. ■





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## Lufthansa Technik, Boeing sign agreement for 787 Dreamliner Cabin Modifications

**B**oeing and Lufthansa Technik announced an agreement to designate Lufthansa Technik as the first Boeing-licensed Service Center (BLSC) for cabin modifications on 787 Dreamliner airplanes, bringing additional choice and capacity to the market.

As a BLSC, Lufthansa Technik is licensed to perform interior modifications on the 787 as an external MRO (maintenance, repair and overhaul) service provider.

"We are pleased to bring additional interior modification capacity to 787 owners and operators by designating Lufthansa Technik as a Boeing Licensed Service Center. Through this novel collaboration, customers will benefit from Lufthansa Technik's decades of MRO experience, and familiarity with the 787 platform," said Doug Backhus, vice president of Boeing Cabins, Modifications and Maintenance.

Operators, lessors and other companies with 787 cabin modification needs will now have the choice to work with Lufthansa Technik. As a BLSC for 787 cabin modifications, Lufthansa Technik can design a new cabin interior, provide the associated engineering and perform the integration in accordance with the customer's wishes. Along with the license granted by Boeing, Lufthansa Technik will also cover certification of the modification projects. The cabin modifications on the popular long-haul widebody will be performed at one of the MRO provider's global network facilities.

"This is a great endorsement from Boeing of Lufthansa Technik's outstanding cabin modification services. Customers looking to modify the interior of their Dreamliner will be able to find the full range of services from us. As Boeing's licensed Service Center for cabin modifi-



Boeing and Lufthansa Technik leaders

cation of the 787, we are pleased to contribute our expertise in this area and to create additional capacity in the market as the world's largest MRO provider," said Harald Gloy, chief operating officer at Lufthansa Technik.

The two parties will continue to make the necessary preparations to enable Lufthansa Technik to start its first 787 cabin modification project in 2025. The BLSC will complement Boeing's existing 787 Interior Modifications offerings with additional capacity for the market.

This agreement on 787 cabin modifications follows the completion of the first base maintenance event on a 787 Dreamliner this April at Lufthansa Technik Malta. ■

## ITP Aero extends MRO contract with Pratt & Whitney Canada

**I**TP Aero has announced the extension of its maintenance, repair, and overhaul (MRO) services contract with Pratt & Whitney Canada, an RTX business, for the mid turbine frame (MTF) and low-pressure compressor (LPC) modules of the PW800 engine. This agreement, effective until 2028, aligns with ITP Aero's strategic focus on expanding its presence in the MRO market and enhancing aftermarket capabilities for key engine platforms currently in operation.

This agreement is an extension of the contract signed by both companies



in 2021, which marked the first MRO contract with civil programmes in which ITP Aero is a risk and revenue partner (RRSP). This contract also positioned ITP Aero as the exclusive supplier of original equipment MRO services for the MTF and LPC modules of these engines.

For the PW800 engine family, ITP Aero is responsible for the design, development, production, and assembly of the LPC and MTF modules.

PW800 engines power the Gulfstream G500 aircraft with the PW814GA, the Gulfstream G600 aircraft with the PW815GA and Dassault's 6X with the PW812D. The PW812GA will also power the Gulfstream 400 aircraft.

The PW800 engine family embodies the latest advances in technology and is the most modern, efficient and environmentally responsible engine in its class. It offers double-digit improvements in fuel burn, emissions and noise as compared to the current generation of engines. It also offers 40% less scheduled maintenance and 20% fewer inspections than other engines in its class.

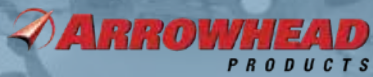
Mikel Lantero, Executive Director of ITP Aero's Civil business unit, commented, "This milestone adds to our long-standing collaboration with Pratt & Whitney and is in line with our strategy to grow our aftermarket capabilities on some of the most important engine platforms currently in service. I am confident that our maintenance services will bring added value to Pratt & Whitney; both companies share strong synergies, and I am convinced that we will continue to leverage our shared capabilities going forward". ■



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# Boom announces updates, speeds up Overture and Symphony Engine programmes

**B**oom moved one step closer towards realising their dream of bringing back supersonic travel to consumers. At the show they announced numerous milestones for its Overture aircraft and the indigenously developed Symphony engine programmes.

Blake Scholl, Founder and CEO, Boom Supersonic informed, "Passengers and airlines are hungry for supersonic flight" and that the demand for a supersonic platform like Overture is approximately 1000 aircraft, with nearly 97% of the passengers opting to fly it and 87% of the consumers willing to change their preferred airliner. Boom is also looking to make supersonic travel more affordable to the passengers, nearly 75% cheaper than what it would take to travel on a supersonic flight before.

In terms of updates the company has made rapid progress on its Symphony engine, with hardware testing underway and the first full-scale engine core to be operational in just 18 months. The first 3D-printed parts have been produced for Symphony, including fuel nozzles and turbine center frames. They will conduct more than 30 engine hardware rig tests, allowing for validation and optimisation of all key engine components, ranging from fan and nozzle acoustics to combustor fuel efficiency.

More importantly they have also expanded their agreement with StandardAero for the assembly of the Symphony in San Antonio, Texas. The total area set aside for this assembly is approximately 100,000 sq. ft. and at full capacity the facility expects to be able to produce 66 engines a year. Scholl also stated that there is a possibility



**Blake Scholl**

of the engine also being used beyond commercial applications, perhaps military as well.

Today's announcements come following the recent successful tests of its first flight of its XB-1 supersonic demonstrator and the completion of construction of its Overture Superfactory in Greensboro, North Carolina in June this year.

Boom has also redesigned the cockpit for the aircraft, provided by Honeywell, which includes head-worn vision system from Universal Avionics, who joined the Overture programme recently. Boom has worked with BAE Systems to integrate

Active Control Sidesticks into the Overture flight deck simulator displayed at the show.

Building on the system flown on XB-1, Overture has an advanced augmented reality vision system for take-off and landing, eliminating the need for the droop nose used on Concorde. Pilots can safely land using autoland or augmented reality views provided on a head-worn device and on the pilot's primary flight display.

The full scale engine will be operational in late 2025 and Overture remains on target to achieve FAA and EASA certification by 2029. ■

- Bhavya Desai

## Ethiopian MRO to develop ATR Maintenance & Repair Capability for Africa and The Middle East

**A**TR and Ethiopian MRO announced the signature of a Letter of Intent aimed at developing Ethiopian MRO's ATR aircraft maintenance and training capabilities. This agreement marks the expansion of ATR's presence in Africa and the Middle East, enabling enhanced support to local operators and fostering market growth.

The cooperation would cover the development of Ethiopian MRO's maintenance capabilities for ATR aircraft types and the establishment of a local spares' stock to reduce response time for ATR operators in the region. It would also explore collaborative ways to train new ATR pilots with the Ethiopian pilot academy.

With its extensive aircraft maintenance and repair capability, an international network for seamless spare parts delivery, multiple hubs across the continent, and an aviation training university, Ethiopian MRO is a key player in the aftermarket and the ideal local partner to cater to the needs of the 36 airlines operating 131 ATR aircraft across Africa and the Middle East.

While some parts of Africa and the Middle East have flourishing regional aviation networks, with turboprops playing a key role for local businesses, goods transport and tourism, the region remains widely under connected: 67% of the routes under 500NM are operated once daily or less, representing only 11% of seats.

Most traffic is concentrated on a few well-served trunk routes, while connectivity from secondary cities is declining. Flying turboprops offers a reliable cost-effective solution for domestic and subregional connectivity,



eliminating the need for expensive and environmentally disruptive ground infrastructure development.

As part of its strategy to empower customer satisfaction and regional expertise, ATR also established at the end of 2023 a Regional Field Service Representative in Ethiopia as a key initiative to create more intimacy with its customers. ■



# RTX collaborates on hybrid-electric system for Airbus PioneerLab helicopter demonstrator

**P**ratt & Whitney Canada and Collins Aerospace have been selected by Airbus Helicopters to support the development of a hybrid-electric propulsion system for its PioneerLab technology demonstrator. Based on a twin-engine H145 helicopter, PioneerLab aims to demonstrate the potential of hybrid-electric propulsion as well as aerodynamic improvements to enable up to 30% improved fuel efficiency and reduced CO2 emissions compared to a conventionally powered aircraft.

For the PioneerLab demo, the helicopter's existing engines will be replaced by a hybrid-electric propulsion system comprised of a Pratt & Whitney Canada PW210 engine derivative linked with two Collins Aerospace 250 kW electric motors and controllers through a common gearbox. This hybrid-electric configuration is designed to enable optimised engine performance and improved efficiency, with the electric motors providing high torque capability during flight conditions such as take-off and landing. Test flights of the hybrid-electric propulsion system are targeted to begin in 2027 at Airbus Helicopters' site in Donauwörth, Germany.

"To help achieve the goals of this innovative project, we'll draw on expertise from our growing list of hybrid-electric demonstrator programmes, including the RTX Hybrid-Electric Flight Demonstrator, STEP-Tech and SWITCH," said Maria Della Posta, President, Pratt & Whitney Canada.

"The combined 250 kW motor and controller we're designing for PioneerLab are part of our family of electric motors and controllers that can be scaled up or down to meet the future electrification needs of aircraft across multiple segments," said Henry Brooks, President, Power & Controls, Collins Aerospace. "By serving as part of hybrid-electric propulsion architectures or helping to electrify onboard systems, these motors



The H145-based PioneerLab - Airbus Helicopters

and controllers will support the aviation industry's commitment to reduce carbon emissions from future platforms," he added.

PioneerLab is supported by Germany's Federal Ministry for Economic Affairs and Climate Actions (BMWK) through its aerospace research programme LuFo. Collins will develop the programme's 250kW motor and controller at its Electronic Controls and Motor Systems center of excellence in Solihull, UK, with support provided by the UK's Aerospace Technology Institute. ■



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# PTI supporting a Greener Future

While the aviation industry today is a small contributor to total global emissions, the nature of aviation inherently requires our industry to be a leader in addressing how to become carbon neutral by 2050. This objective has challenges in terms of what is the technology that's needed to be developed to support new aircraft designs and when will this technology be ready? How do we address

compatibility with the existing industry standard seals and epoxy materials, and the effect of the fluid on the filter media with changes in temperature and viscosity are the biggest engineering issues. PTI Technologies has tested the effect of multiple SAF mixtures on current seals, epoxies and filter media to ensure full performance and compatibility, and will continue to do so as new SAF products develop.

meet these tough environments, PTI Technologies is applying their proprietary 421 Metal Fiber Media technology to provide fuel and lubrication systems filtration at 600oF or higher temperature, or for use with more corrosive high-speed lubricants.

Another potential propulsion technology for a more sustainable future is hydrogen (either liquid or gaseous) for use in fuel cells or directly in engines. In this line PTI offers a significant range of filtration capabilities for use with hydrogen, which is comprised of their extensive expertise in "all metal" filtration solutions. This includes sintered metal fiber media for in-depth filtration, metal mesh media and etched disc filters for surface filtration and metallic propellant management devices to manage the flow of cryogenic propellant.

For electric, hybrid electric and fuel cell systems, thermal management systems are critical to system health and use a variety of different coolants including Ethylene Glycol Water (EGW), Propylene Glycol Water (PGW), Midel, Polyalphaolefin (PAO) and others. These coolants need filtration to remove contaminants, and in some cases, the coolant loop also needs deionization filters to remove ions to prevent coolant breakdown informs PTI.

The very thin membranes used in hydrogen fuel cells are sensitive to contaminants, which can rapidly degrade performance. This phenomenon necessitates the need for the air stream entering fuel cells be as free as possible of contaminants like ammonia, sulfur dioxide, hydrogen sulfide and nitrogen dioxide, as well as particulates (PM 2.5 and PM 10) and entrained liquids.

PTI Technologies first developed special air filtration technology starting in the 1980's for military and space applications, and this work continues today for both military and commercial applications. They've invested heavily in developing special filter media and customised, proprietary adsorbents, and we are applying this capability to air filtration for fuel cells to prolong the life and performance of the fuel cell stacks.



Fuel Cell Filtration



Thermal Management Filtration

carbon neutrality in the existing fleet of over 25,000 aircraft, of which around half may still be flying by 2050?

In looking at these challenges to reach carbon neutrality, PTI feels, an important aspect is the process of fluid management. Whether it is the management of fuels (hydrocarbons, SAF or hydrogen), coolants, air or other fluids, how do we prevent contamination? The risks from contamination are significant – poor systems performance, increased maintenance costs, loss of aircraft availability (readiness) and even aircraft failure.

One near-term solution may be Sustainable Aviation Fuel (SAF). SAF is a critical part of decoupling carbon growth from market growth, provided we can get to production volumes and economics that are cost-competitive. Looking at SAF from a fluid control perspective, the

Today PTI is seeing activity in new propulsion system concepts including batteries, electric, hybrid-electric, advanced engine concepts and hydrogen fuel cells to make aviation more sustainable. All of these concepts still need filtration and fluid flow control for fuel, thermal management, lubrication and air systems to remove contaminants and prolong the life of the systems. The company brings their deep filtration knowledge and engineering experience to all of these systems to provide superior technology and designs to enable new propulsion capability.

As the engine OEMs have begun developing advanced engine designs, the supporting subsystems are being pulled closer to the core causing temperature increases and a need to filter fuel above 600oF. New engine designs also require high-speed gearboxes, and these require high-temperature lubrication systems. To

## RTX's Pratt & Whitney delivers F100 engine to Poland's F-16

Pratt & Whitney, an RTX business, announced the delivery of an F100 engine to Poland. This delivery supports Poland's ongoing efforts to strengthen the readiness of its F-16 fleet, which is powered exclusively by Pratt & Whitney engines.

"This is the first of several engines we'll deliver to our Polish ally this year to ensure they have the propulsion power they need to address current and future threats," said Josh Goodman, Senior Director of the F100

Programme at Pratt & Whitney. "The Pratt & Whitney F100 is the mainstay powerplant for 23 global air forces, and we are seeing increasing demand of our latest generation F100 engine."

Currently produced in Middletown, Connecticut, the original F100 engines powering the Polish F-16 fleet were manufactured at Pratt & Whitney's Rzeszow facility. Today, nearly 20 years later, that facility produces F100 static structures and critical rotating

parts in support of new F100 engines and worldwide sustainment.

The F100 boasts operationally proven technologies, such as advanced materials and thermal coatings, improved turbine cooling capabilities and prognostic health management. Across global F-16 and F-15 fleets, the F100 has flown over 30 million engine flight hours, which is nearly three times as many hours as other fourth-generation fighter engines. ■



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# Boeing forecasts need for nearly 2.4 million new aviation professionals

Over the next 20 years, Boeing projects a continued significant demand for aviation personnel as the global commercial airplane fleet continues to expand. The company's 2024 Pilot and Technician Outlook (PTO) shows the industry will require nearly 2.4 million new professionals to support the growing commercial fleet and meet the long-term increase in air travel.

According to the latest PTO, commercial carriers will need the following new personnel through 2043 to sustain the global commercial fleet:

- 674,000 pilots
- 716,000 maintenance technicians
- 980,000 cabin crew members.

"Driven by aviation traffic trending above pre-pandemic levels, personnel attrition and commercial fleet growth, the demand for aviation personnel continues to rise," said Chris Broom, vice president, Commercial Training Solutions, Boeing Global Services. "We are focussed on being a reliable and innovative partner in the lifecycle of aviation training. Our offerings are rooted in competency-based training and assessment programmes to help ensure high quality aviation training starting in flight schools and in commercial operations while helping enhance aviation safety through immersive and virtual training solutions."

Through 2043, the PTO projects Demand for new personnel driven primarily by single aisle airplanes, except in Africa and Middle East where widebody airplane demand leads; Eurasia, China and North America drive demand for more than half of new industry personnel; South Asia, Southeast Asia and Africa are the fastest-growing regions for personnel with staffing demand expected to more than triple over 20 years; and two-thirds of new personnel will address replacement due to attrition, while one-third supports growth in the commercial fleet. ■



The PTO forecast includes these projections for industry needs through 2043:

Region	New Pilots	New Technicians	New Cabin Crew
Global	674,000	716,000	980,000
Africa	23,000	25,000	28,000
China	130,000	137,000	163,000
Eurasia	155,000	167,000	240,000
Latin America	39,000	42,000	54,000
Middle East	68,000	63,000	104,000
North America	123,000	123,000	184,000
Northeast Asia	25,000	30,000	43,000
Oceania	11,000	12,000	18,000
South Asia	40,000	40,000	49,000
Southeast Asia	60,000	77,000	97,000

## De Havilland Aircraft of Canada announces Dash 8 Roadmap

For more than four decades, the Dash 8 family of aircraft has established the benchmark for regional turboprops accumulating over 46 million flight cycles of experience in operations globally. The aircraft type has delivered unequalled performance, robustness, value, and efficiency to a wide range of operations in some of the most demanding and harsh environments on the planet.

With new DHC production facilities at De Havilland Field near Calgary, Alberta, coming on stream in the latter portion of the decade, the time is right to determine what operators are looking for in their fleet planning, and where a new Dash 8 might fit in.

To best understand the customer's needs, De Havilland Canada has assembled a Product Strategy Council and has been meeting over the past months with operators in North America, Oceania, Japan, Africa and Europe, to understand their requirements and expectations as their businesses objectives and passenger preferences evolve into the future.

Once these discussions are complete, De Havilland Canada will be considering the feedback they have received from their Product Strategy Council to determine the roadmap for the Dash 8 programme strategy. This is the same approach DHC undertook prior to developing new production programmes for the DHC-515 and the Twin Otter Classic 300G.

"De Havilland Aircraft of Canada would like to thank the operators who have participated in this important initiative," said Ryan DeBrusk, Vice President of Sales and Marketing for De Havilland Canada. "It's clear the Dash 8 continues to be a highly valued fleet for operators around the world whether in an airline's network or performing a specialised mission. Our teams have been energised by the valuable feedback we have received and are working

hard to provide a roadmap to our customers that outlines the future of the Dash 8 programme."

While this work is underway, the company remain committed to enhancing the platform through in-service support and new features such as cargo conversion upgrades, cabin enhancements, avionics upgrades, their ESP+ life extension programme and their OEM Certified Refurbishment Programme. ■

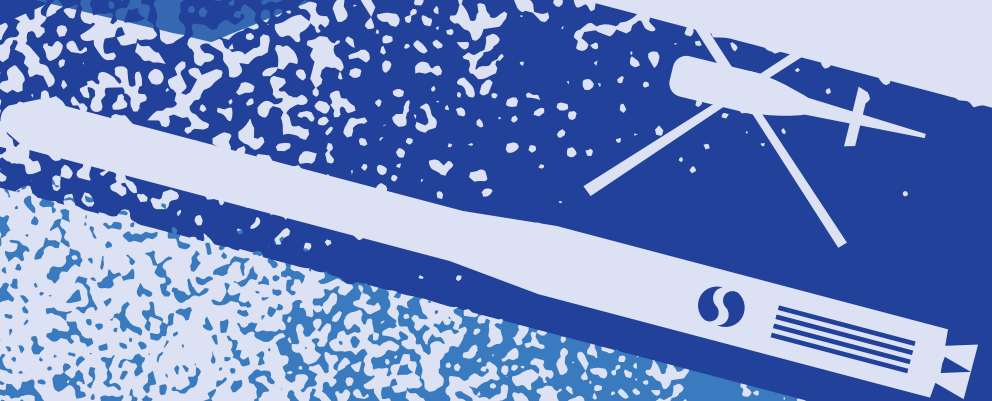
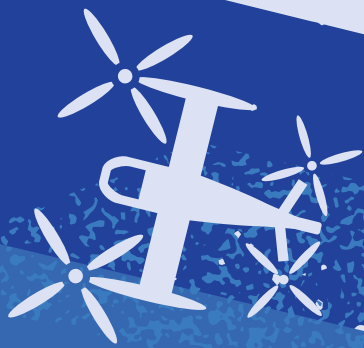




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# Boeing, Antonov to collaborate on Defence Projects

- MOU represents Boeing’s commitment to work with Ukrainian industry
- Includes exploring opportunities for collaborating on Unmanned Aerial Systems

**B**oeing and Antonov Company signed a Memorandum of Understanding to explore opportunities to collaborate on defence-related projects. “We’re pleased to continue working with the Antonov Company to support Ukraine development and economic growth,” said Ted Colbert, president and CEO of Boeing Defense, Space & Security. “This agreement demonstrates our ongoing efforts to find more opportunities to work with Ukrainian industry, which was underscored by our signing of the Ukrainian Defense Industry Compact earlier this year.”

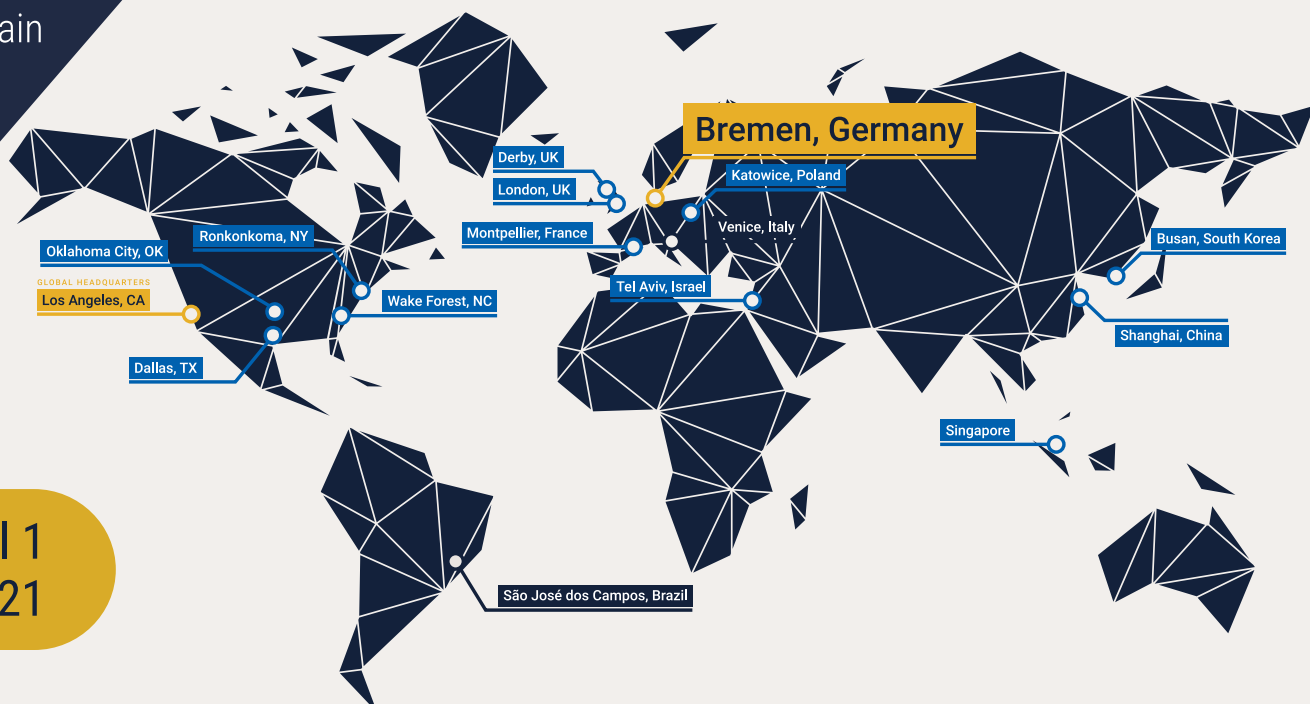
The areas of potential collaboration identified in the agreement consist of training, logistical support and overhaul services for tactical Unmanned Aerial Systems utilised by the Ukrainian Armed Forces, which includes the ScanEagle. In addition, the companies will also explore opportunities for Antonov to provide engineering support to Boeing.

“A strong, innovative, and efficient defence industry is key to sustainable economic development and national security, and we are extremely excited to collaborate with Boeing,” said Ievhen Gavrylov, CEO of Antonov Company. “This agreement brings a whole new level of opportunity to implement the latest and most effective solutions – in addition to the possibility of future projects with Boeing in the aerospace and defense industry.” ■



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# Dohop, Tranzer, enable Air France's intermodal connections with Swiss Federal Railways

**D**ohop, in collaboration with Tranzer, is powering Air France's new, seamless intermodal connections in Switzerland, offering passengers a convenient end-to-end travel experience and highlighting Dohop's cutting-edge travel technology.

## Innovative Travel Solutions

Travellers flying between Paris and the Swiss hubs of Geneva and Zurich can now book flights and rail services in a single transaction. These integrated offers are available through Air France's Smart Connect platform powered by Dohop and can include additional ancillary services for a comprehensive travel package. Dohop's connection service also covers rail connections with SBB, providing travellers with tailored, real-time protection in case of delays or cancellations.

Dohop's innovative technology replaces traditional interline and code-share agreements, simplifying connectivity between Air France and SBB. This enables greater flexibility and faster market implementation. Tranzer's mobility solution further enhances this integration by including international rail offers in Dohop's network. These new connections are a significant addition to the rapid growth of intermodal connectivity across Europe as the industry seeks to improve and offer customers wider travel options.

## Initial Routes

This new partnership launches with the following routes with plans to add more connections in the future: 1. Paris CDG to GVA (airport train station) connecting to/from Bern, Lausanne, Fribourg, and Biel/Bienne (SBB railway stations). 2. Paris CDG to ZRH (airport train station) connecting to/from Bern, Thun, and St. Gallen (SBB railway stations).

Oana Savu, Chief Strategy Officer at Dohop, said, "At Dohop, we're



proud to help airlines unlock new connection opportunities with seamless intermodal journeys, enabling them to broaden their market reach. This collaboration with Tranzer enables us to access more railway offers, so we can connect and create seamless bookings for flights and trains in Switzerland. These new connections are helping to transform the industry, impact the future of travel, and elevate passenger experiences."

Leila Laidani, Country Director DACH & France at Tranzer added, "We are delighted to partner with Dohop, enabling international rail travel to be integrated into its network. This provides a more sustainable solution for passengers and supports our philosophy of any kind of green mobility, for everyone, anywhere, anytime. Our collaboration is another significant step in our mission to make sustainable mobility available as easily and conveniently as possible, thus doing our part in the green transport revolution." ■



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# Lockheed Martin, UK Space Agency to drive space economy

The Space Zone at Farnborough International Airshow has been a hub of hectic activity and UK Space Agency along with Lockheed Martin is at the forefront of helping to drive the space economy agenda to the next level.

The Regional Director of Lockheed Martin Space UK, Nik Smith said at Farnborough that Lockheed Martin is totally committed to supporting the British Government in its endeavours to build a space industry, with the aim of the country becoming a science and technology superpower along with making real inroads into levelling up the economy. These ambitious plans include delivering end-to-end onshore space satellite capabilities – offering every stage of the journey from idea and concept all the way through to manufacturing and launch.

Recognising that none of this is possible without a skilled workforce, we are taking great strides to imbue young people with a sense of excitement and possibility, thanks to initiatives like our Space Camps. Last year we teamed up with satellite communications firm, Viasat, and ran camps in both Sunderland and London for students in years six and 12. Here they were given the opportunity to find out more about space – from making rockets to listening to inspirational talks from people within the industry – to hopefully encourage them down this career path.

Nik Smith, Regional Director of Lockheed



**Nik Smith Regional Director, Lockheed Martin Space, UK**

Martin Space UK, believes these kinds of experiences are crucial. “We want to inspire and support students through their educational journey and broaden their understanding of what space really means to them.

Lockheed Martin is also at the forefront of one of the most exciting developments for the growth of space-related skills - NESST, the North

East Space Skills and Technology Centre. This £50m project being developed with Northumbria University and the UK Space Agency will be a purpose-build facility in the North East and will become essential to world-leading space experts. At its heart is combining academia with those at the cutting edge of this industry – which will play an active role in boosting the UK space economy.

Nik Smith said the plans were to “broadening the industry across the UK and in particular, in the North East. As part of that commitment, we have partnered with Northumbria University in Newcastle and the UK Space Agency and have invested £15m to help build the North East Space Skills and Technology Centre (NESST) a £50m project.”

Working together, the plan is to create a hub for space technology and to provide a range of opportunities and the chance to learn relevant skills to an area of the UK where it will have a significant and positive economic impact, he said.

Lockheed Martin’s partnership with the Government has led to a project with the UK Space Agency to conduct a vertical satellite launch from SaxaVord Spaceport in the Shetland Islands, injecting a further commitment to the UK economy. The value of having a robust space economy cannot be underestimated, particularly when it comes to defending and protecting our country and its assets. ■

## CATAGEN submits SAF sample to EU SAF Clearing House

CATAGEN is the first company to submit a sample of its sustainable aviation fuel (SAF) to the recently established EU SAF Clearing House. CATAGEN is developing sustainable aviation fuel (SAF) from wind, water and air (e-SAF) and from wind and sustainable organic waste (bio-SAF). International Air Transport Association (IATA) estimates SAF to account for approximately two thirds of aviation’s carbon mitigation in 2050 which would require 449 billion litres.

Dr Andrew Woods, CATAGEN CEO and Founder, said, “Our purpose is to clean and decarbonise the air and submitting our SAF sample to the EU SAF Clearing House gets us one step further on our roadmap to launching SAF from CATAGEN’s pioneering ClimaHtech E-FUEL GEN production model. The machine can produce clean fuels like SAF and e-diesel from renewable hydrogen (from water, H<sub>2</sub>O) and sustainable carbon dioxide (from the air) and is powered by renewable electricity. It presents a significant economic and decarbonisation opportunity.”

Director of the EU SAF Clearing House, Dr Stephen Dooley, TCD, said, “Launched in July 2024, the EU SAF Clearing House is here to guide SAF producers in the development and deployment of sustainable aviation fuels. The Clearing House is a one-stop-shop providing everything SAF Producers need for ASTM D4054 evaluation, including testing and Prescreening, and everything needed for sustainability certification.” ■



**(L-R) Dr Mohammad Reza Ghaani, EU SAF Clearing House Pre-screening Lead, Liam McGrane, ClimaHtech E-Fuel Technical Lead, Dr Andrea Ahern, ClimaHtech SAF Lead, CATAGEN, Dr Stephen Dooley, EU SAF Clearing House Director. Taken at Trinity College Dublin**

# CAE announces Elle Betchley as Women in Flight Ambassador 2024

- Elle joins a movement that inspires future generations of women aviators
- CAE will train up to 200 easyJet pilots annually through 2028

**G**lobal aviation training leader, CAE, confirmed at the show that Elle Betchley has been named the fifteenth CAE Women in Flight Ambassador. She joins a growing movement and network of female pilot professionals in raising awareness of the possibilities for women in the aviation sector.

CAE launched the CAE Women in Flight programme in 2018 to encourage women to pursue a career in aviation. It has quickly evolved to become the CAE Women in Flight Ambassador Programme which aims to encourage girls and women to dream big and have no limits, raising awareness of the opportunities for women to follow professional pilot careers.

Elle is currently participating in the CAE Generation easyJet Pilot Training Programme designed by CAE exclusively for easyJet. The competency-based programme includes aircraft-type-specific training on CAE's Airbus A320 Flight Training Devices (FTD) and Full Flight Simulators (FFS) and is subsequently complemented by base and line training with easyJet. Upon successfully completing the programme, Elle will join the airline as a co-pilot on the Airbus A320.

CAE will train up to 200 easyJet pilots annually through 2028. As a CAE Women in Flight Ambassador, Elle receives a full scholarship worth more than €100,000 to complete her training. Elle has just completed her ground training at CAE's London Gatwick training centre and is about to start her foundation flight training in tandem with her CAE Women in Flight Ambassador role. As an



Elle Betchley

ambassador, her responsibilities include encouraging women to pursue an aviation career. The programme aims to achieve much more than supporting future female pilots. It is also focussed on developing a network of like-minded ambassadors and professionals who illustrate that diversity in aviation should be the norm, not the exception.

"We have established a reputation for delivering the highest standards of pilot training, and

we recognise that it is our responsibility as an industry leader to support the advancement of women in aviation and broaden the civil aviation talent pool," explains Marie-Christine Cloutier, CAE's Vice-President, Performance, Strategy, and Marketing. "Women make up only between four and six percent of professional pilots worldwide, and as CAE's 2023 aviation talent forecast shows that some 300,000 new pilots are needed by 2032, we want to help attract more women to join the profession. Through shining role models like Elle, we believe we can truly influence the next generation."

Initially trained as an agronomist, Elle has pursued a career in agriculture for the last seven years. She has always admired pilots but never considered herself a candidate. Her inspiration came from her husband, who also took the CAE Generation easyJet Pilot Training Programme, but Elle wants to do so much more than fly. "I wanted to become a CAE Women in Flight Ambassador from the day I applied for the pilot training at CAE. This is not just about inspiring women; it's about changing how people think. Being a CAE Women in Flight Ambassador will allow me to show young women what is achievable and shape the future of the aviation industry's workforce," says Elle.

Selection of the Women in Flight Ambassador is a rigorous process that requires multi-layered applications, written tests, video interviews, with input from Women in Aviation International, and the airline. Elle hopes to lead the way for more female recruits. ■

## Safran selected by Boeing for X-66 NASA Sustainable Flight Demonstrator

**S**afran Electrical & Power has been selected by Boeing to provide the electrical power generation system for the X-66 flight demonstrator, part of NASA's Sustainable Flight Demonstrator project. Safran Electrical & Power will also support ground and flight tests, slated to start in 2028.

The Sustainable Flight Demonstrator is part of NASA's broader Sustainable Flight National Partnership, which is dedicated to developing the technologies needed to achieve net-zero CO2 emissions for commercial aviation. Boeing's X-66 programme is focussed on developing the Transonic Truss-Braced Wing (TTBW) concept, which could enable significant improvements in fuel efficiency and reduced emissions for future single-aisle aircraft.

This electrical power generation system




consists of a variable frequency generator and its associated control unit, integrating the most advanced technologies developed by Safran Electrical & Power. It has been adapted

to integrate directly on the Pratt & Whitney GTF engine and provides more than 100kW of electrical power. This modern system features an unmatched weight and efficiency, and enables a reduction in hydro-mechanical losses of close to 50%, resulting in significant fuel burn and carbon emission savings.

"We are very honoured to further expand our thriving partnership with Boeing under this NASA programme, and to develop breakthrough technologies for the Sustainable Flight Demonstrator. Safran Electrical & Power is thrilled to be collaborating with Boeing, NASA and other industry partners to drive innovations and to embrace latest advancements in technologies aiming to achieve our industry-wide goal of zero-emissions," said Bruno Bellanger, executive vice president of Power division at Safran Electrical & Power. ■





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