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JAPAN INTERNATIONAL  
AEROSPACE EXHIBITION

# 2 DAY

From the publishers of  
**International Aerospace**



## Japan to focus on Space and Development



(L to R): MAEDA Nobuhiro, President & CEO, Tokyo Big Sight Inc.; ISHIKAWA Takeshi, Commissioner, Acquisition, Technology and Logistics Agency, Ministry of Defense; KITAZAWA Ayumu, Director, Aviation Safety and Security Department, Japan Civil Aviation Bureau, Ministry of Land, Infrastructure, Transport and Tourism; KIUCHI Minoru, Minister of the Cabinet Office; TANAKA Kazushige, Deputy Director-General, Manufacturing Industries Bureau, Ministry of Economy, Trade and Industry; UCHIKURA Hiroaki, Chief of Staff, Air Staff Office, Japan Air Self-Defense Force and NAKAMURA Tomomi, Chairman of The Society of Japanese Aerospace Companies

The 2024 edition of the Japan International Aerospace Exhibition (JAS) opened with high anticipation, as the new government led by Prime Minister Shigeru Ishiba has constantly reaffirmed its commitment to national security and technological advancement.

This year's JAS is the largest in its 58-year history, featuring increased participation. The 16th edition of the exhibition is the first since 2018, as the 2020 event was cancelled due to the COVID-19 pandemic. Approximately 679 companies from 23 countries are participating in the show, with over 300 Japanese firms, including many small and medium-sized enterprises that form the backbone of Japan's economy.

NAKAMURA Tomomi, Chairman of The Society of Japanese Aerospace Companies, highlighted the

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## Japan's firm commitment to GCAP

Japan is taking several steps to ensure the success of the Global Combat Aircraft Programme (GCAP), a joint development of a next-generation fighter jet by Japan, the United Kingdom and Italy. Announced in 2018, the GCAP is working towards its targetted in-service date of 2035 with Japan set to replace its ageing fourth-generation Mitsubishi F-2 fighter aircraft with the sixth-generation combat aircraft.

This year, Japan has taken major decisions with regard to the programme. In March, the Japanese government revised its implementation guidelines for the Three Principles on Transfer of Defense Equipment and Technology to allow

exports of next-generation fighter jets to countries outside the programme.

### Parliament approves GIGO

In June, the Japanese Parliament approved an international treaty to set up an intergovernmental organisation managing the joint development of the GCAP to be called GIGO or GCAP International Government Organisation. The entity will be headquartered in London. Its first leader of the GCAP Agency is set to be a Japanese national and the first chief executive officer of the joint business construct will be from Italy.

The organisation will be the body to conclude

related contracts with companies, unifying work that has been handled individually by the three countries. It is expected to help improve the efficiency of operations such as the management of development and production plans.

### New concept model unveiled in July

In July this year at the Farnborough International Airshow, the three nations of the GCAP unveiled a new concept model of their next generation combat aircraft. The three governments with their lead industry partners BAE Systems (UK), Leonardo (Italy) and Mitsubishi Heavy Industries (Japan)

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## ... Japan to focus on Space and Development

sector's impressive growth, noting that the industry's production value has significantly increased from 50 billion yen (\$337.84 million) in the early 2000s. With the International Air Transport Association (IATA) predicting a continued rise in passenger traffic, Japan's aerospace industry is well-positioned to seize new opportunities.

In his opening address, newly appointed Minister of the Cabinet Office, KIUCHI Minoru, emphasised Japan's growing focus on space exploration and development. He also extended heartfelt sympathy to those affected by the recent 7.6-magnitude earthquake that struck the Noto Peninsula on New Year's Day. Minoru underscored the critical role of Japanese satellite, such as ALOS II, in providing essential data to assess the damage caused by both the earthquake and subsequent torrential rains in the region.

In addition to space exploration, Japan is sharpening its focus on national security. The

country's first space security mission, established last year, aims to protect its vital space infrastructure. Minoru stressed the importance of safeguarding satellites and other space assets, explaining that Japan's Space Operations Group, alongside the Self-Defense Forces, has started sharing Space Situational Awareness (SSA) information with the private sector to prevent satellite collisions. "We are also strengthening cooperation with allied and friendly nations in the space sector," he added.

To meet the growing demands of space, the government has recently launched Japan's first comprehensive space technology strategy through the Japan Aerospace Exploration Agency (JAXA). This initiative aims to foster innovation and commercial development among domestic companies, further bolstering Japan's space industry. The minister also highlighted ongoing efforts to create a more conducive regulatory

environment for space transportation, enhance government procurement of private sector services, and push for advancements in satellite constellations.

Japan's defence, aerospace, and space sectors have undergone significant transformation in recent years, driven by geopolitical pressures and the need for technological self-reliance. The aerospace industry plays a dual role, contributing to both commercial aviation and national defence. And the country has steadily ramped up investments in military aviation, including next-generation fighter jets and unmanned aerial vehicles (UAVs). The defence sector is closely integrated with the aerospace industry, benefitting from innovations like advanced radar systems, missile defence technologies, and space-based surveillance. ■

- Bhavya Desai

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## ... Japan's firm commitment to GCAP

showcased the significant strides made in the delivery of the next generation combat aircraft.

The new concept model features a much more evolved design with a wingspan larger than previous concepts to improve the aerodynamics of the future combat aircraft. Engineers from across BAE Systems, Leonardo and Mitsubishi Heavy Industries are working together under a collaboration agreement on the design and development of the future combat aircraft using a range of innovative digital tools and techniques, including computer based modelling and virtual reality to evolve the aircraft's design during its conceiving phase.

Hitoshi Shiraishi, Senior Fellow - GCAP, Mitsubishi Heavy Industries, said, "The MHI considers any project to be a valuable opportunity to deepen our knowledge. In particular, since GCAP is a three-country joint development programme between Japan, UK and Italy, we expect to obtain better results and deeper knowledge than ever before by combining the different cultures, experiences and knowledge of the three industries involved. I also hope that this GCAP programme, with the broad participation of Japan's defence companies, will foster innovation in the country's industrial sector such as digital transformation, as well as the devel-

opment of human resources in the field of science and technology."

### Most advanced interoperable aircraft when deployed

The combat aircraft, set to be in service in 2035, will be one of the world's most advanced, interoperable, adaptable and connected fighter jets in service, boasting an intelligent weapons system, a software-driven interactive cockpit, integrated sensors and a powerful next generation radar capable of providing 10,000 times more data than current systems, giving it a battle-winning advantage. GCAP is set to employ tens of thousands of skilled people across the UK, Italy and Japan, growing industrial skills and technologies for the future.

In December last, the Italian Defence Minister Guido Crosetto, the then Japanese Defence Minister Minoru Kihara and the then UK Secretary of Defence Grant Shapps, met in Tokyo for a GCAP Trilateral Defence Ministerial to review the work till then and to set up GIGO.

The three Ministers also welcomed the progress made by industry partners to launch the joint business construct, which will be an industry counterpart of the GCAP International Government Organisation (GIGO), to support capable, affordable and timely programme delivery, including the 2035 in service date. The three Ministers confirmed the work distribution will be proportionate to each country's contribution by financial and technical means under the spirit of equal partnership. ■

-R. Chandrakanth



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# Pratt & Whitney awarded F135 Engine Core Upgrade contract

\$1.3 billion contract will enable continued design maturation and aircraft integration

**P**ratt & Whitney, an RTX business informed that they have been awarded a contract valued up to \$1.3 billion to continue work on the F135 Engine Core Upgrade (ECU), which will deliver enhanced durability to the engine. The ECU also provides power and cooling for Block 4 and beyond capabilities for all three variants of the F-35 global enterprise.

In July this year, Pratt & Whitney announced that it had completed the F135 ECU's preliminary design review which signified the alignment between Pratt & Whitney and the F-35 Joint Program Office on the upgrade's design. Today, more than 700 engineers and programme managers are working full-time on the programme.

"This contract is critical to continuing our positive forward momentum on this programme," said Jill Albertelli, President, Pratt & Whitney's Military Engines business. "It allows us to continue work in the risk reduction phase with a fully staffed team focussed on design maturation, aircraft integration, and mobilising the supply base to prepare for production," she added.



The F135 Engine Core Upgrade is easily retrofittable in all F-35 variants



The F135 is the world's most advanced fighter engine with proven readiness and reliability. The Engine Core Upgrade builds upon that same architecture with a fleet-wide upgrade.

The F135 programme is a major driver of economic growth in the states of Connecticut, Maine, and around the country; supporting more than 57,000 jobs across 43 states.

To date, Pratt & Whitney has delivered more than 1,200 F135 production engines, with more than 900,000 engine flight hours recorded. The F135 ECU will be incorporated into F-35s at the point of production or retrofitted at one of the multiple F135 depot sustainment facilities around the world and will be available to all F-35 operators.

With Japan being one of the programme participants in the F-35 programme, Japan's IHI Mizuho facility supports Pratt & Whitney F135 sustainment for the Asia Pacific region and the global F-35 enterprise.

"We are fortunate to have bipartisan and bicameral support from our congressional advocates, especially the Connecticut and Maine delegations led by senior appropriators Sen. Susan Collins and Rep. Rosa DeLauro," said Jeff Shockey, Sr. Vice President, RTX Global Government Relations. "Their steadfast commitment to the F135 ensures it will deliver critical capabilities for decades to come." ■

## JAL announces International Fare Fuel

**J**apan Airlines (JAL) recently requested for approval from Japan's Ministry of Land, Infrastructure, Transport and Tourism (MLIT) for the revision of fuel surcharge on international passenger tickets purchased in Japan between December 1, 2024, and January 31, 2025.

JAL sets fuel surcharge levels bimonthly based on the two month average price of Singapore kerosene type jet fuel. The price of Singapore kerosene type jet fuel during the two month period of August and September 2024 averaged USD 88.69 per barrel, which accounted for JPY 12,849 in the average exchange rate of JPY/USD 144.88 during the same period.

As a result, with reference to the fuel surcharge benchmark list for FY2024, this corresponds to Zone G from December 2024 to January 2025. ■

### Fuel Surcharge for the period: December 1, 2024 - January 31, 2025

	Current Level: Zone J (Applicable till November 30, 2024)	New Level: Zone G (Applicable on/after December 1, 2024)
Japan - Korea, Far East Russia	4,000 Yen	2,500 Yen
Japan - East Asia (excluding Korea, Mongolia)	9,200 Yen	6,200 Yen
Japan - Guam, Palau, Philippines, Vietnam, Mongolia, Russia (K)	12,000 Yen	8,000 Yen
Japan - Thailand, Malaysia, Singapore, Brunei, Russia (K)	18,500 Yen	13,000 Yen
Japan - Hawaii, Indonesia, India, Sri Lanka	22,500 Yen	16,000 Yen
Japan - North America, Europe, Middle East, Oceania	35,000 Yen	25,000 Yen

## JAL selected as operator of 'Future Society Showcase Project Exhibition' at Osaka

**J**apan Airlines (JAL) has been selected as the operator of the "Future Society Showcase Project Exhibition" "Smart Mobility Expo" "Advanced Air Mobility" at Expo 2025 Osaka, Kansai, Japan. Utilising electric vertical take-off and landing aircraft (eVTOL), JAL has been preparing for point-to-point operations connecting ports within and outside the Expo venue. Recently, JAL transferred the eVTOL business to Soracle Corporation, a joint venture established with Sumitomo Corporation to handle the air transport business using eVTOL.

Moving forward, Soracle will act as the main sponsor for the eVTOL operations at the Expo 2025 Osaka, Kansai, Japan, continuing preparations for the event. JAL will remain a shareholder in Soracle and will continue to support and sponsor the eVTOL initiative at the Expo 2025 Osaka. ■



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# BAE Systems: Innovating Space for advantage on Earth

Today, the space domain has become increasingly critical to national security and society at large. From everyday applications such as GPS and weather forecasting to its growing role in military operations, space has become fundamental to our way of life.

From a defence and national security perspective, the increased dependency on - and access to - commercial space capabilities is enhancing multi-domain operations - with space and cyber joining the traditional domains of land, sea and air.

The challenge is finding ways to deal with vast volumes of data - which has the potential to reduce the pace at which informed decision making occurs by overwhelming the user - and establish the right partnerships deliver shared capabilities that provide customers with intelligence rather than just information.

## From data to intelligence

It's easy to see the value of defence context. Global coverage; the provision of secure and rapid access to critical information from anywhere on Earth; the ability to capture one moment in time for one location with multiple sensors - these are all critical to running effective multi-domain operations.

With the right infrastructure in place, BAE feels that the users can leverage space assets to collect data from a range of sensors - such as optical, radio frequency (RF) and synthetic aperture radar (SAR) data - and then analyse this data



John Young

in-orbit using on-board machine learning. This can give users near-real-time access to insights that simply wouldn't otherwise be available.

BAE Systems Digital Intelligence through their Azalea programme offers such a capability feels John Young, Head of Market Development, Space, BAE Systems Digital Intelligence.

The core of their mission is to deliver space-enabled solutions for security and future prosperity, Azalea will deliver adaptable multi-sensor intelligence, surveillance and reconnaissance capabilities direct to users.

The first step on this journey is their RF Mapping

capability, providing early functionality that detects and geo-locates radio frequency transmissions from space to identify and uncover hidden and illegal activity. This gives customers around the world the power of perspective, so that they can confidently make the critical decisions required to keep society safe and able to thrive.

## Prioritising partnerships

BAE believes collaboration is key to success - both for nurturing space skills and scaling innovation across supply chains. "That's why we're focussed on partnering for a global market and empowering the wider space ecosystem to create solutions that provide customers with insights and intelligence when it matters most," says Young.

They want to help build an ecosystem of innovation - within Japan and beyond - and support the development of commercially viable capabilities at pace. Achieving this will require collaboration across the space domain at a national and international level. Without that, as a collective risk missing out on critical expertise and inhibiting our ability to create solutions that positively impact society.

Ultimately, the global space mission is complex and constantly evolving. Only by embracing a collaborative mindset can we truly take advantage of the opportunities on offer and drive a new era for the space sector, Young concludes. ■

# Hokkaido looking to promote the Aircraft Industry

The Hokkaido Aerospace Business Network (HAB) is exhibiting at the show and is located at the booth W2-023. There are 11 companies exhibiting at the show, which include Chimera Corporation, Konno Ironworks, Kushiroseisakusho Corporation, Sapporo Electroplating Industry Corporation, Chuo Nameplate Manufacturing, DBC System R&D Corporation, Nagasawa Machinery Corporation, Nishino Manufacturing Corporation, Miyata Giken Industries, Medic Corporation, and World Yamauchi Corporation.

Starting with the 2016 METI-sponsored "New Entry Seminar for Aircraft Components", eight companies have acquired JIS Q 9100 (equivalent to AS9100/EN9100) and NADCAP certifications by 2024 and have now started receiving orders. With the increase in the orders, some companies are just beginning to outsource to regional firms, who are likely to become core players in the market.

The participating companies are also maximising their efforts through 'B2B Meetings' to deepen their understanding of the aircraft industry - through interviews with experts in the industry.

## Future Challenges and Future Outlook

The prefecture believes in the importance of enhancing their corporate value, technological capabilities and commercial products to sell them to buyers. And in order to do that they are promoting initiatives to improve the quality control capabilities and cost competitiveness. With the goal of entering the global supply chain, they believe that overcoming challenges one by one will lead to the growth of manufacturing companies.

Companies that increase their domestic and international orders will also outsource to regional companies and increase their orders in other industrial sectors, becoming a core presence and expanding their supply chain. The regional governments are also looking to support, attract and locate companies to Hokkaido and encourage their concentration. The prefecture is hoping



Exhibitors of The Hokkaido Aerospace Business Network (HAB)

that this kind of step-up effort by the public and private sectors together will boost manufacturing in Hokkaido and contribute to Japan's aircraft industry.

The space industry has been dominated by JAXA and other major companies, but opportunities for private companies to enter the space industry are expanding. The 'Hokkaido Spaceport' launch site in Hokkaido is one such example that can be used by the private sector, and a number of venture companies that are developing rockets, including Interstellar Technologies, which develops rockets, Letara Ltd., which develops propulsion systems for small satellites, and IWAYA Inc., which develops vehicles that can take a cruise into the stratosphere, the gateway to space. ■



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# A Look at Japan's Commercial Aviation Market

In the Asia Pacific region, Japan dominates in the aviation sector and it continues to grow year on year. As of 2024, there were about 650 registered commercial aircraft in Japan, addressing the needs of the international and domestic markets. All Nippon Airways and Japan Airlines are two dominant players, the former having a fleet of 241 and the latter 147.

aging. In 2023 alone, there were 118 million domestic and international passengers with total RPKs reaching 119 billion, ranking Japan third in the region after China and India. Post Covid-19 pandemic, in 2022, the sector witnessed a rebound with both domestic and international markets opening up and in 2023, domestic traffic touched the 2019 pre-pandemic level, while international air travel is on course for full recovery.



**Bombardier Challenger 3500**

JAC, ANA Wings, RAC, New Central, Amakusa, and Toki Air investing in turboprops to address the intra-regional segment. ATR is the favourite among the players and the OEM expects about 100 ATR aircraft flying in the region in the near future.

It was indeed disappointing to see that the regional aircraft project of Mitsubishi Heavy Industries named Mitsubishi Regional Jet (MRJ) and renamed later as Mitsubishi Spacejet did not see the skies. The programme which was announced in 2007 was to address the needs of the regional market with a jet of 70-90 seats configuration. As of 2014, it had secured sales contracts of 375 MRJ aircraft with five companies in three countries, but sadly it did not fructify. In February 2023, MHI announced that the project had been scrapped due to delays and project cost overruns.

## Next-gen aircraft plan

But Japan seems not to give up. It has unveiled a plan to launch a next-generation passenger aircraft that would be run alternative energy sources such as hydrogen, at an estimated project cost of over \$30 billion. A Ministry of Economy, Trade, and Industry statement said, the project will utilise "new environmental technologies" including hybrid-electric or hydrogen and it would be a collaborative effort involving several players.

Japan has the capabilities to produce a sustainable aircraft considering the fact that it has a good aircraft supply chain. Some of the OEMs, including Japanese Tier-1 suppliers, are investing in Maintenance, Repair and Overhaul (MRO) market, while some airlines await new aircraft. The growing MRO demand in Japan has led to the rise of new MROs, such as MRO Japan, to support the local and East Asia fleet.

Both the two big aerospace majors - Airbus and Boeing - are well embedded in Japan as Tier 1 suppliers such as Mitsubishi Heavy Industries (MHI), Kawasaki Heavy Industries, Subaru and IHI Corporation provide critical components to them including wings, fuselages, and engines, as well as various other components like cabin elements.

As a major aviation market, Japan is growing rapidly. As per Mordor Intelligence, the Japan aviation market size is estimated at 7.07 billion USD in 2024, and is expected to reach 13.83 billion USD by 2030, growing at a CAGR of 11.82% during the forecast period (2024-2030). This growth has enthused many international companies to collaborate with Japanese companies, both in terms of supply chain integration and investment opportunities. ■

- R. Chandrakanth



**Airbus A380**

Recently at the Farnborough International Airshow, the Japanese flag carrier Japan Airlines placed an order for up to 20 additional 787 Dreamliners, however deliveries are to start only after 2028. The need for more aircraft has been necessitated by the fact that both domestic and international passenger growth has been encour-

## Hybrid Carrier Concept

The two carriers getting a sense of the market growth, have introduced a hybrid carrier plan. In 2020, Japan Airlines launched ZipAir, while ANA established Air Japan only this year. ZipAir was born during the pandemic, initially focussing on freight, while Air Japan started operating Boeing 747, the first connection was between Narita International Airport and Bangkok.

ZipAir and Air Japan have been expanding their destinations. Air Japan has recently connected Bangkok, Seoul and Singapore, whereas ZipAir connects nine international destinations of Bangkok, Singapore, Seoul, Manila, Honolulu, Los Angeles, San Jose and Vancouver. ZipAir has plans of adding more routes in South-east Asia and the West Coast of North America.

In the intra-regional market, Japan is also witnessing significant growth with several players expanding their network. Operators such as HAC,



**Boeing 787**

## Participation of Japanese Companies in International Aircraft Programmes

Aircraft Programme	Area of Participation	Participation
Boeing 767	Forward fuselage, aft fuselage, main landing gear door, etc.	15% programme partner
Boeing 777, 777X	Center section, center fuselage, aft fuselage, etc.	21% programme partner
Boeing 787	Wings, center wings, front fuselage, etc.	35% program partner
Bombardier Challenger 350	Wings, main landing gear	RSP
Bombardier G 5000 / 6000	Wings, center wings, center fuselage	RSP
Bombardier CRJ 700 / 900	Nose and main landing gear system	RSP
Embraer 170 / 190	Wings and center wings	RSP
Gulfstream	Flaps and landing gear operation devices, etc.	Supplier
Airbus A350	Premium seats, ICE galleys, carbon fiber, etc	Supplier
Airbus A380	Cargo doors, vertical stabilizer structure material, carbon fiber, water tanks, etc.	Supplier

Source: SJAC



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Hokkaido Aerospace Business Network (HAB)

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3. 耐熱・耐食性コーティングの研究・開発・試作・販売



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企業情報

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企業情報



# Eve Air Mobility working with Japan on AAM regulations



**E**ve Air Mobility, a company spun out of Embraer, is contributing to the development of a robust advanced air mobility (AAM) ecosystem in Japan. As a member of Japan's Advanced Air Mobility Public-Private Committee, Eve is working closely with the Japanese Ministry of Economy, Trade & Industry and Ministry of Land, Infrastructure, Transport & Tourism on AAM regulations and policies for Japan.

In 2023, it was announced that Japan's Nidec Corporation and Embraer will form a joint venture company to develop Electric Propulsion Systems for the aerospace sector. The company, Nidec Aerospace, combines the complementary synergies and distinct areas of expertise of two world-class engineering companies to spearhead a new era of air mobility. The joint venture's Electric Propulsion System launch-customer is Eve Air

Mobility as it develops its Electric Vertical Take-off and Landing (eVTOL) vehicle.

Embraer's participation in the show highlights its long-term vision for the Japanese market and its dedication to delivering innovative and sustainable aerospace solutions that benefit the nation and the broader region.

Earlier this year, Eve Air Mobility had signed a letter of intent with AirX Inc. Japan's largest public helicopter air charter service, for up to 10 firm and up to 40 optional electric vertical take-off and landing (eVTOL) aircraft. The order will support the continued development and scaling of innovative transportation operations in Japan.

## Secures USD\$88 million from BNDES to Finance eVTOL Manufacturing

Eve Air Mobility on October 15 announced

that the company secured a USD\$88 million loan agreement with Brazil's National Development Bank (BNDES) to fund the development of the company's electric vertical take-off and landing (eVTOL) aircraft production facility in Taubaté, in the state of São Paulo, Brazil. Under the BNDES Mais Inovação programme, the financing reinforces BNDES' commitment to supporting innovative projects and Eve's advancements in fostering decarbonisation and the urban air mobility (UAM) industry.

"We are profoundly grateful for the continued support and confidence that BNDES has shown in Eve as we advance in our mission to reimagine mobility through efficient and sustainable urban flight experiences. This financing will be instrumental in setting up our eVTOL manufacturing facility, which will be not only the first of its kind in Brazil, but also powered by clean, renewable energy, aligned with our commitment to sustainability," said Johann Bordais, CEO of Eve.

With an eventual total expected output of up to 480 aircraft per year, Eve plans to expand the site's production capacity on a modular basis, with four equally sized modules of 120 aircraft per year. This will provide for a disciplined, capital-efficient investment approach as the market grows.

Eve boasts the industry's largest backlog with letters of intent (LOI) for 2,900 eVTOLs from 30 customers in 13 countries, representing a potential USD\$14.5 billion in sales revenue. Its aircraft utilises eight dedicated propellers for vertical flight and fixed wings to fly in cruise, with no change in the position of these components during flight. The concept includes an electric pusher powered by dual electric motors that provide propulsion redundancy to ensure the highest performance levels, safety, dispatch reliability, and low operation costs. ■

# Seoul ADEX 2025: All geared

**T**he Seoul International Aerospace and Defense Exhibition (Seoul ADEX 2025) is all geared up for its 2025 edition, scheduled to be held from October 29th - November 2nd, 2025 at Seoul Airport in Seongnam, Gyeonggi Province. This biannual event is expected to showcase innovations in the aerospace and defence industries, featuring both indoor and outdoor exhibitions that include a range of aircraft, ground military equipment and flying/static display.

As a fast-growing expo, the exhibition has more than doubled in size over the past decade. The 2023 edition of Seoul ADEX was the largest to date. Approximately 95,000 professionals from the aerospace and defence sectors, including key military personnel, visited the exhibition. In addition to the exhibition, Seoul ADEX 2023 held 31 business events, such as symposiums, seminars, forums, and conferences, providing valuable opportunities for industry stakeholders to discuss emerging trends and technologies.

The event also included 1,900 G2B and B2B meetings matched by the organiser during its business days, highlighting its importance as a key marketplace for collaboration and partnerships.

The 2025 exhibition is expected to expand by including the Space and Advanced Air Mobility (AAM) sectors, with the deadline for exhibitor applications likely set for the end of January 2025. ■





# Philippines' Berthaphil eyes Clarks International Airport as a Regional Hub

**W**ith the Philippines' economy and passenger traffic growing steadily each year, Clarks International Airport (CIA) aims to attract more airlines and businesses to operate from one of the country's three major airports. "The airport was originally built with one of the longest runways in Asia, designed to accommodate the landing of a space shuttle. It spans over 3,200 meters," said **Peter Herman, CEO, Berthaphil Inc.**

Initially established as a military airport, CIA has since expanded its role to serve commercial aviation. Today, it boasts a brand-new terminal with the capacity to handle 60 million passengers annually, though it currently services just 2 million. Passenger numbers are expected to rise significantly with the upcoming launch of a new rail link, which will reduce travel time to approximately 45 minutes and connect directly to the seaport.

Despite its commercial operations, the airport still functions as a military base for both the U.S. and Philippines, hosting American-made F-16 fighter jets. Herman highlights that this dual role as a secured military facility adds an extra layer of security for commercial operators.

While the airport remains a hub for military aircraft, recent years have seen it expand into logistics, maintenance, repair, and overhaul (MRO), and

other infrastructure-related operations. Its strategic location - just a few hours from key markets like Singapore, Japan, Taiwan, Thailand, South Korea, and China - makes it an ideal base for businesses looking to establish a regional hub.

The commercial aviation market in the Philippines is also witnessing consistent growth, driven by rising domestic and international demand. As a key player in Southeast Asia, the Philippines is positioned to become a crucial hub for regional air traffic. Low-cost carriers (LCCs) like Cebu Pacific and AirAsia Philippines dominate the domestic scene, fuelled by a burgeoning middle class and a flourishing tourism industry. Meanwhile, Philippine Airlines (PAL), the country's flagship carrier, focusses on premium services and long-haul flights. The government has responded to this growth by investing in airport infrastructure, including new terminals and upgrades to regional airports.

In parallel, the Maintenance, Repair, and Overhaul (MRO) sector is gaining momentum, with airlines seeking cost-effective fleet management solutions. Established MRO providers, such as Lufthansa Technik Philippines, offer world-class services, cementing the country's position as a regional MRO hub. Herman is optimistic that the growing commercial fleet and anticipated aircraft



**Peter Herman**

deliveries will continue to drive demand for increased MRO capacity.

Additionally, the Philippines benefits from a skilled and productive workforce, offering cost-effective labour that is highly trained in aviation. According to Herman, this presents a significant advantage for the industry, as aviation specialists can be employed at a fraction of the cost seen in other countries. As a freeport and Special Economic Zone, companies that set up operations at CIA are also entitled to incentives, such as a seven-year tax holiday and a 5% income tax rate thereafter.

Herman envisions CIA becoming the aviation capital of the Philippines, providing a single location where businesses can access logistics, passenger services, OEMs, and a full supply chain to support the aviation ecosystem - similar to the hubs found in Singapore and Japan.

- Bhavya Desai

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# GA-ASI's SeaGuardian showcased at RIMPAC

Sonobuoy Dispensing System and LRASM among the new capabilities featured

**W**ith the completion of the U.S. Navy's Rim of the Pacific (RIMPAC) flight operations on July 28th 2024, the MQ-9B SeaGuardian Unmanned Aircraft System (UAS) self-deployed back to its home base in El Mirage, Calif., but only after introducing an array of new capabilities. The flight home followed close to 100 flight hours supporting RIMPAC 2024 over the four-week exercise in and around the Hawaiian Islands.

RIMPAC is the world's largest international maritime exercise. RIMPAC 2024 featured 29 nations, 40 surface ships, three submarines, 14 national land forces, more than 150 aircraft, and 25,000 personnel.

In the exercise the SeaGuardian provided real-time intelligence, surveillance, and reconnaissance (ISR) data feeds to the US Pacific fleet Command Center using Signals Intelligence (SIGINT) parametrics and full-motion video to the watch floor and intelligence centers for real-time dynamic tasking. This was similar to the effort in the RIMPAC 2022 exercise.

This year, SeaGuardian delivered some new features and capabilities, including Long Range Anti-Ship Missile (LRASM) targetting and a new Sonobuoy Dispensing System (SDS) to support its Anti-Submarine Warfare capability. SeaGuardian was configured with a prototype SDS pod capable of deploying 10 A-size sonobuoys per pod (SeaGuardian can carry up to four SDS pods or up to 40 sonobuoys) and the SeaVue Multi-role radar from Raytheon, an RTX business. Upon dispensing, the sonobuoys were successfully monitored and controlled by the SeaGuard-



GA-ASI SeaGuardian at RIMPAC 2024 exercise

ian's onboard Sonobuoy Monitoring and Control System (SMCS).

The SeaGuardian is a maritime derivative of the MQ-9B SkyGuardian and remains the first UAS that offers multi-domain Intelligence, Surveillance, Reconnaissance, and Targeting (ISR&T) as an internal payload that can search the ocean's surface and depths in support of Fleet Operations. At RIMPAC 2024, SeaGuardian showcased all operational payloads, which includes the SeaVue, SNC's Electronic Support Measures (ESM) solution, an Automatic Identification System (AIS), and a self-contained Anti-Submarine Warfare (ASW) system.

For RIMPAC 2024, SeaGuardian added Link 16 Joint Range Extension Application Protocol (JREAP) "C" (internet protocol) and an integrated Minotaur Mission System to provide real-time sensor data for the various Maritime Operations Centers, ships, and aircraft with Minotaur nodes.

"For RIMPAC, the MQ-9B effectively passed ISR&T information to various surface and air units, such as the Nimitz-class carrier USS Carl Vinson, Guided Missile Destroyers (DDGs), Littoral Combat Ships (LCS), frigates, patrol boats, P-8s, P-3s, and numerous other U.S. and foreign units that took part in the exercise," said David R. Alexander, President, GA-ASI. ■

## GEC appoints NAICO as Strategic Partner



MoC exchange between GEC and NAICO for strategic partnership to widen the reach of LIMA

**G**lobal Exhibitions & Conferences Sdn Bhd (GEC), the Official Co-Organiser of Langkawi International Maritime and Aerospace (LIMA) 2025 announced a strategic partnership with National Aerospace Industry Corporation (NAICO). This collaboration aims to leverage both parties' strengths to drive innovation, expand market reach, and deliver enhanced value to aerospace industry players.

As part of this strategic alliance, GEC and NAICO will work together on

initiatives to widen the reach of LIMA to both local and foreign counterparts of both parties.

The strategic partnership has commenced from 21st August 2024, with both companies engaging in promoting LIMA 2025 as the basis of the partnership. This collaboration underscores GEC's commitment to innovation and growth. And reinforces NAICO's dedication to providing exceptional value to its clients.

Prof Ts. Shamsul Kamar, CEO, National Aerospace Industry Corporation added, "Partnering with GEC, the Co-Organiser of LIMA 2025, is an exciting opportunity for us. Their leadership matches our experience in the aerospace business, and we believe this partnership will benefit our customers and stakeholders significantly. Our expertise in business technology, competency development, supply chain growth, and investment and trade will be valuable assets as we collaborate closely with GEC to accomplish our joint goals as partners."

Abd Hafiz bin A Bakar, Managing Director, Global Exhibitions & Conferences commented, "We are happy to collaborate with NAICO. The cooperation is ideally aligned with our strategic goal, allowing us to combine our experience and resources to produce ground-breaking solutions. NAICO has a demonstrated track record of excellence in acting as a focal point for aerospace sector stakeholders, appropriate government ministries and agencies, universities, and research institutes to collaborate on enhancing the competency and capacity of the local aerospace industry. Together, we will make tremendous advances in the aerospace sector." ■

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## ANA introduces first AeroSHARK-equipped aircraft

All Nippon Airways (ANA), Japan's largest airline has welcomed another marine-life-inspired aircraft to its fleet: Boeing 777 equipped with AeroSHARK. This surface technology is inspired by shark skin, reduces drag, and enhances fuel efficiency. ANA is the first airline to operate both passenger and freighter variants of the Boeing 777 with this innovation.

The first modified Boeing 777F (JA771F) began scheduled cargo flights in September this year, with plans to extend the AeroSHARK

hundreds of square meters of these riblet films to the fuselage of JA771F, which re-entered commercial service today with the first AeroSHARK-optimised flight from Tokyo-Narita to Chicago-O'Hare.

Although the riblet modification is almost invisible, it is expected to deliver significant fuel and emissions savings. The contracted Boeing 777F and 777-300ER aircraft will have nearly the entire fuselage covered with the sharkskin-inspired film, resulting in estimated annual savings of approximately 250 metric

passenger and freighter version of the Boeing 777, reinforcing our dedication to delivering excellence and reducing our carbon footprint."

As ANA begins operations with two Boeing 777 equipped with riblet films, the airline is to validate the effectiveness of this technology in ANA's daily operation, with plans to expand its use across other aircraft of the same type. This initiative is part of the ANA Group's medium-to long-term environmental strategy, which includes the broader "ANA Future Promise" initiative aimed at realising a sustainable society and promoting ESG management.

"Drawing inspiration from nature is deeply rooted in Japanese arts and culture. Therefore, what airline could be a better fit for our nature-inspired AeroSHARK than the world-famous 'Inspiration of Japan'?" said Dennis Kohr, Senior Vice President Corporate Sales Asia Pacific at Lufthansa Technik. "We are delighted to extend our long-lasting and fruitful cooperation with All Nippon Airways onto a proven solution to reduce their carbon footprint. I am confident that AeroSHARK will support ANA in becoming an ever-greener 'Inspiration of Japan'."

Lufthansa Technik currently holds Supplemental Type Certificates (STCs) for the AeroSHARK modification of various types of Boeing 777, which is now being adopted by various airlines across the globe. Approximately 20 long-haul aircraft are already operating with the technology in worldwide service, with this number growing steadily.

BASF and Lufthansa Technik are committed to further developing AeroSHARK to help more airlines achieve their sustainability goals. Current efforts include expanding approvals to additional aircraft types and covering larger surface areas. Initial model calculations suggest that sharkskin technology could potentially reduce CO2 emissions by up to three percent in its maximum expansion stage. ■



ANA's Boeing 777F

technology to a passenger aircraft (JA796A) by next spring, furthering ANA's commitment to investment in fuel efficient technologies that reduce emissions.

AeroSHARK, a joint development by Lufthansa Technik and BASF, is a functional surface film inspired by the drag-reducing structure of sharkskin. The film features ribs around 50 micrometres in size, called riblets. Closely guided by Lufthansa Technik, ANA's MRO partner has recently applied several

tons of fuel and 800 metric tons of CO2 for each aircraft.

"The introduction of AeroSHARK technology on our Boeing 777 aircraft marks a significant milestone in our sustainability strategy, in support of our broader goal of reducing carbon emissions across our fleet," said Kohei Tsuji, Executive Vice President, Engineering and Maintenance Center at ANA. "We are proud to be the first airline in the world to implement this innovative technology to both

## CAE Maestro, Intuitive and Flexible Guided Lessons

CAE, a technology company which deploys software-based simulation training and critical operations support solutions is showcasing CAE Maestro at the show.

CAE Maestro is a tool that allows students to learn how to fly with self-paced and interactive technology. Instructors or courseware designers can record a custom training event in any CAE training device, such as the CAE Sprint Virtual Reality (VR) Trainer, to deliver an intuitive and flexible guided lesson. CAE Maestro records all outputs of a CAE training device, including procedures, video, voice/audio briefing, cockpit layout, and flight dynamics to support all types of flight and procedural training. Instructors or courseware designers can edit sessions by overlaying visual or audio prompts to create a fully immersive, small-scale portable training accelerator.

The tool allows students to complete guided lessons through virtual reality, mobile, or PC

devices, learning basic theoretical knowledge and advanced applied techniques at their own pace. From automated demonstrations to interactive guided lessons, CAE Maestro delivers an unlimited number of tailored training scenarios to develop and support pilot readiness.

### Live-Virtual-Constructive (LVC) Training

CAE is also presenting the Live-Virtual Constructive (LVC) training, an extensive exper-

ience in delivering live and simulation-based training, and support services, that ensures global defence forces are supported with advanced training systems that adapt to rapidly changing requirements.

At the show, experts in multi-domain training operations will be present to explain the training processes to help potential candidates discover a range of LVC solutions that deliver a fully integrated, interoperable, and immersive training experience to help develop and maintain operational readiness.

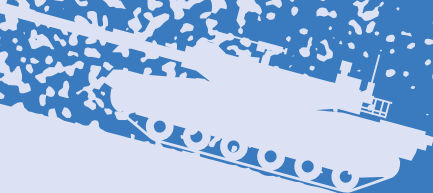
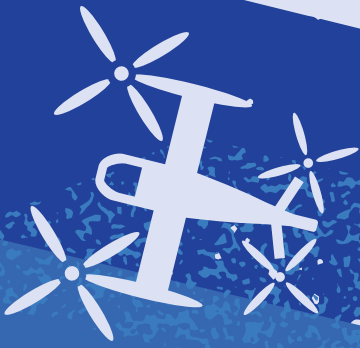
CAE has been empowering pilots, cabin crew, maintenance technicians, airlines, business aviation operators, and defence and security forces to perform at their best every day and when the stakes are the highest. CAE represents more than 75 years of industry firsts - the highest-fidelity flight and mission simulators as well as training programmes powered by digital technologies. ■



# Seoul ADEX 2025

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## Embraer upgrades on E2

**E**mbraer has revealed wide ranging upgrades and performance improvements across its commercial jet product line-up. The upgrades on the E195-E2, E190-E2, and E175, including fuel burn and range improvements, avionics and cabin upgrades.

Arjan Meijer, President and CEO, Embraer Commercial Aviation, said, "We aim to continually improve our aircraft and these upgrades announced today – reducing fuel burn and emissions; increasing range; improving the passenger and cabin experience; and adding new technology and connectivity – is great news both for our customers and their guests. Embraer is committed to providing the safest, most efficient, most comfortable, and most commercially savvy jets to our customers."

The E2 Improvements include Fuel burn; Improved range; GTF time on wing improved; Enhanced take off system; and Cabin optimisation. A release said the upgrade results in 2.5% reduced fuel burn, making the E195-E2 12.5% more fuel efficient than the closest competitor aircraft. On entry into service the E2 was notably more fuel efficient than advertised. The better burn rates airlines experienced in real world operations have now been ratified. This is also helped by an improvement to the bleed management system which extracts less bleed, demanding less from the engine and therefore saving fuel. The improvement worth US\$1 million per aircraft and reinforces a E2's position as the most sustainable aircraft in single aisle market.



Embraer's E195 E2

The upgrade also brings about improved range - from 2600NM to 3000NM and the new Max Take Off Weight of 62,500kg has been recently certified, which combined with the lower fuel burn provides this range improvement.

### GTF time on wing – up 10%

Engine improvements on the E2s GTF engines will increase time on wing by 10%. This is achieved by optimising climb thrust which demands less of the engine, therefore reducing engine degradation and increasing time on wing. It is expected this will save operators US\$0.5million over 15 years.

Embraer also unveiled its E2 Enhanced Take Off System for the first time. This automatic take off system produces a more precise and efficient rotation moment and flight trajectory, reducing the

required field length and pilot workload; meaning more payload and more range from challenging airports. This gives the E2 best in class performance from airports like London City, Florence, and Santos Dumont. Adding 350NM in range from LCY for example.

### Cabin optimisation - reducing gaps, adding one row, Recaro seats

Cabin optimisation on the E195-E2 has allowed Embraer to fit in an extra row of four seats to most configurations. For example, an aircraft configured for 136 seats, would now be able to seat 140 passengers. Max seating remains 146. Recaro seats will now also be an available option. One extra row of seats can generate extra revenue to airlines equivalent to US\$4.5m per aircraft over a period of 15 years. ■

## MQ-9B completes Full-Scale Fatigue Test for Second Lifetime

**G**A-ASI completed a major milestone with the full-scale fatigue testing of an MQ-9B Remotely Piloted Aircraft (RPA) recently. The team completed the "second lifetime" of fatigue testing, which is equivalent to 80,000 operating hours and represents an important step in the design of the airframe system. The testing is part of the aircraft certification to NATO standard STANAG 4671, where the aircraft will ultimately be tested through three lifetimes, thereby proving the 40,000-hour lifetime of the airframe.

The testing was conducted from 31st Jan, 2024 through 30th Sept, 2024 at the Wichita State University's National Institute for Aviation Research in Wichita, Kansas. The airframe tested is a production airframe purpose-built to support the test campaign.

The full-scale fatigue test simulates the aircraft's design service through the application of repeated structural loading on the assembled airframe. The testing identifies any potential structural deficiencies ahead of fleet usage and assists in developing inspection and maintenance schedules for the airframe. The results of the test will be used as part of the documentation for certification and will form the basis for in-service inspections of structural components.

The MQ-9B includes the SkyGuardian and SeaGuardian models as well as the new Protector RG Mk1 that is currently being delivered to the United Kingdom Royal Air Force (RAF).

This is the second of three lifetimes of testing for the airframe. Two of the lifetimes simulate the operation of an aircraft under normal conditions, and the third has intentional damage inflicted on the airframe's critical components to demonstrate its resistance to operational damage that may occur over the lifetime of the air vehicle.



Protector RG Mk1

In addition to the RAF, contracts have been signed for MQ-9B with Belgium, Canada, Japan, Taiwan and the U.S. Air Force in support of the Special Operations Command. The Japan Coast Guard is currently operating the SeaGuardian for maritime operations, and the Japan Maritime Self-Defense Force (JMSDF) selected SeaGuardian for its Medium-Altitude, Long-Endurance (MALE) RPA System Trial Operation Project. ■

# Japan Airlines first operator of A350 Virtual Procedure Trainer

Japan Airlines (JAL) is the first A350 operator globally to sign up with Airbus for the computer-based A350 Virtual Procedure Trainer (VPT). This state-of-the-art training tool offers a highly immersive and interactive environment for practising critical flight procedures and emergency scenarios.

JAL's adoption of the A350 VPT comes as the airline extends its partnership for the use of the Mobile Airbus Training experience suite (MATE) for systems training and practice. With this inte-

gration, JAL now benefits from the full spectrum of Airbus flight training solutions, leveraging the latest training concepts and technologies to enhance training efficiency and knowledge retention.

The airline's inaugural group of trainees on the A350 VPT comprises 12 pilots. This five-year initiative reflects JAL's unwavering commitment to upholding the highest standards of safety and operational excellence.

The Airbus-developed VPT provides realis-

tic virtual environments tailored to the airline's specific models, making it invaluable for enhancing pilot proficiency and preparedness. Its flexibility allows for training at any time and location, reducing disruptions and offering significant cost-efficiency by minimising training expenses and aircraft downtime.

Hiroshi Horikawa, Flight Training Vice President at JAL said, "Integrating the A350 VPT into our training curriculum will significantly elevate the quality of our flight crew training and enhance JAL's commitment to safety. We are excited about this new chapter in our collaboration with Airbus."

Airbus Head of Commercial Services for APAC, Balinda Zhang, added, "We are thrilled to support JAL with the implementation of the A350 VPT. Airbus is dedicated to providing exceptional support throughout the integration process to ensure a seamless transition. Our aim is to deliver a training solution that not only meets, but exceeds JAL's expectations, contributing to the airline's continued excellence in flight crew training."

This landmark agreement reaffirms Airbus' position as a leader in innovative aviation training solutions, and highlights JAL's commitment to pioneering advanced training technologies.

As of August 2024, JAL operates 15 A350-900s and five A350-1000s, with a backlog of 23 A350-900s and eight A350-1000s on order. ■



Airbus A350 VPT

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# Sensor-to-Shooter: Flies Like a UAS, Strikes Like a Missile

Israeli company Elbit Systems, high technology defence company, having a broad portfolio of airborne, land and naval systems and products for defence, homeland security and commercial applications is displaying a range of cutting-edge technologies, including the electronic warfare suit for helicopters, fixed wing and vehicles; helmet mounted display for helicopters; and armored fighting vehicles (AFV) protection suit etc.

Recently, Elbit Systems highlighted SkyStriker, a sensor-to-shooter system. Elbit said that the robust SkyStriker aims to shift the paradigm while unreliable and relatively cheap loitering munitions have become more and more in use in current battlefields. It said that seek-and-destroy missions have long been central to military strategy, aimed at quickly locating and neutralising enemy assets and threats. Traditionally, these operations involved advanced sensors and combat intelligence, with available and capable forces ready to engage. These missions require rapid engagement and accuracy, where speed and surprise are essential, often putting troops in high-risk situations, including the need to enter enemy territory, find the target, and neutralise it - if it is still there.

As the nature of warfare has changed, so too has the execution of these missions. Modern conflicts, marked by elusive enemies and intricate environments, have necessitated a shift in tactics. Today, the introduction of technologies, such as loitering munitions, has transformed the execution of sensor-to-shooter missions. These tools enable forces to survey the battlefield from above and strike at the optimal moment.

## A Cost-Effective Supplement

Elbit said that this transformation is particularly evident in recent conflicts, such as the Russian-Ukrainian War, where loitering munitions and drones are increasingly employed, providing a cost-effective complement to traditional methods. These systems significantly enhance the success rate of various military operations.

A senior executive from Elbit Systems' Aerospace division, with over 30 years of experience in special operations and intelligence, highlighted this shift: "Loitering munitions have become a

legitimate and proven tool on the battlefield. What was once viewed as a niche capability is now central to military operations around the world."

Elbit Systems' SkyStriker strives to redefine this paradigm, leveraging the vast potential of loitering munitions while offering a robust and reliable tool across multiple scenarios. Its ability to locate, acquire, and strike targets with pinpoint accuracy and adapt to rapidly changing battlefield conditions makes it an important asset for defence forces worldwide.



SkyStriker

## Locating, Acquiring, Striking or Assessing

SkyStriker is a fully autonomous loitering munition (LM) that can locate, acquire, and strike operator-designated targets with a 5 or 10 kg adapted warhead installed inside the fuselage, enabling high-precision performance. With the capability to dive towards targets at speeds exceeding 300 knots, the SkyStriker is challenging to detect and intercept. This makes it a formidable weapon on the modern battlefield, where stealth and precision are paramount.

Its versatility underscores the broader trend of integrating advanced technologies into military strategy. However, not all loitering munitions offer the same level of performance. Many systems used in recent global conflicts are low-cost and lack operational reliability, falling short at times in delivering the precision and effectiveness required in high-stakes situations.

## SkyStriker stands apart

Unlike other alternatives, it features advanced electro-optical systems and the versatility to perform multiple roles on the battlefield. Whether gathering intelligence, delivering powerful strikes,

or providing post-strike assessments (BDA) while finalising the strike if needed.

Moreover, its quiet electric engine and ability to operate in GPS-denied environments enables stealthy operations, while flexible launch methods - whether from a catapult system or a canister - provide adaptability in diverse combat scenarios and end-users.

## Minimising Collateral Damage

The SkyStriker also has the rare ability to abort missions if necessary. If the situation on the target seems to be changed - such as the sudden appearance of non-involved civilians - the operator can command the munition to return to loitering mode before hitting the target, ready to re-engage when conditions are right. Additionally, it can be safely recovered and reused thanks to an attached parachute, allowing it to provide a full training experience and further enhancing its cost-effectiveness.

## Battle Proven and Reliable

A key issue that loitering munitions have addressed is the ability to carry out precision attacks without the high costs associated with expensive ammunition like guided missiles and rockets.

The SkyStriker has already been operationally proven across various combat zones, demonstrating its capabilities in real-world scenarios with different customers.

"When you decide to invest in military capability, one of the main things you want is reliability," he emphasises. "Our solution delivers on that front. Sometimes it may cost a bit more, but we believe its potential far surpasses other tools, making it almost incomparable."

"Failing to adopt and train with these systems means risking obsolescence in modern warfare," the official concludes. "The urgency to adapt, equip, and embrace new technologies has never been greater, and the SkyStriker is leading this technological revolution."

As European and global militaries increasingly recognise the importance of integrating loitering munitions into their strategies, tools like the SkyStriker is set to play a central role. ■

# Commercial Aircraft Service Market to double in APAC

The commercial aircraft services market in the Asia-Pacific region will more than double in value to US\$129 billion from US\$52 billion by 2043 according to the latest Global Services Forecast by Airbus. This is driven by a demand for some 19,500 new aircraft for the region, supported by a compound annual growth rate (CAGR) of 4.81% in passenger air traffic in the region.

Driven by the rise in annual air traffic, fleet growth and the requirement for more digitally-enabled and connected aircraft, the growth in demand for services will be reflected in solutions

implemented across all phases of the aircraft from delivery to end-of-life, including fleet maintenance, aircraft modernisation and training.

Among the various segments of the services business in Asia and the Pacific, the Maintenance market will more than double from US\$43 billion to US\$109 billion (+5.0% CAGR). The Enhancements and Modernisation sector is projected to grow similarly, from US\$5.1 billion to US\$13 billion (+5.1% CAGR), while Training and Operations is expected to rise from US\$4.1 billion in 2024 to US\$7.6 billion in 2043 (+3.3% CAGR).

Airbus anticipates a need for 999,000 new

skilled professionals in the region (nearly 45% of global manpower) over the next 20 years, comprising 268,000 new pilots, 298,000 new technicians and 433,000 new cabin crew members.

"The Asia-Pacific region will see the largest volume of growth and activity in terms of aftermarket services, with many opportunities for additional efficiency, simplification and responsible operations. Airbus will continue to play an important role in supporting airlines and the aviation industry at large in responding to those opportunities," said Cristina Aguilar Grieder, Airbus Senior Vice President Customer Services. ■



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