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AN EXCLUSIVE [illegible]NE ON CIVIL AVIATI[illegible]DIA

60 1964-2024 YEARS OF SP'S

LEADING FROM THE FRONT

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PRIME MINISTER NARENDRA MODI ADDRESSES THE 2ND ASIA-PACIFIC MINISTERIAL CONFERENCE ON CIVIL AVIATION

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Prime Minister Modi at the 2nd Asia-Pacific Ministerial Conference on Civil Aviation with Salvatore Sciacchitano, President of the International Civil Aviation Organization (ICAO), marking 80 years of ICAO operations

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PUBLISHER AND EDITOR-IN-CHIEF
Jayant Baranwal

DEPUTY MANAGING EDITOR
Neetu Dhulia

PRINCIPAL CORRESPONDENT
Ayushee Chaudhary

CONTRIBUTORS
Group Captain Joseph Noronha (Retd)
S.R. Swarup, Vasuki Prasad
Shriniwas Mishra, Swaati Ketkar

CHAIRMAN & MANAGING DIRECTOR
Jayant Baranwal

PLANNING & BUSINESS DEVELOPMENT
Executive Vice President: Rohit Goel

GROUP DIRECTOR - SALES & MARKETING
Neetu Dhulia

DIRECTOR – SALES
Rajeev Chugh

MANAGER – HR & ADMIN
Bharti Sharma

DEPUTY MANAGER – CIRCULATION
Rimpy Nischal

GROUP RESEARCH ASSOCIATE
Survi Massey

GRAPHIC DESIGNERS
Sr. Designer: Vimlesh Kumar Yadav
Designer: Sonu S. Bisht

SP'S WEBSITES
Sr Web Developer: Shailendra Prakash Ashish
Web Developer: Ugrashen Vishwakarma

SUBSCRIPTION/CIRCULATION
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E-mail: subscribe@spguidepublications.com
subscribe@spsairbuz.com

FOR ADVERTISING DETAILS CONTACT
neetu@spguidepublications.com
rajeev.chugh@spguidepublications.com

SP GUIDE PUBLICATIONS PVT LTD
A-133 Arjun Nagar (Opposite Defence Colony),
New Delhi 110003, India.
Tel: +91 (11) 24644693, 24644763, 24658322
Fax: +91 (11) 24647093
E-mail: info@spguidepublications.com
www.spguidepublications.com

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New Delhi 110003, India.

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1964-2024 60 YEARS OF SP'S

The unprecedented growth in India's aviation sector is ushering in significant transformational changes. This evolution is being fueled by rationalisation of government policies and regulations, aimed at creating a more conducive environment for growth with a strong emphasis on the development of infrastructure and support systems and adopting eco-friendly practices to reduce its environmental impact.

In this issue of *SP's AirBuz*, we delve into the dynamic developments shaping the aviation sector, focusing on growth drivers, challenges, and the promising future of Indian aviation. One of the standout success stories is India's regional aviation sector, which has experienced impressive growth, largely propelled by the UDAN scheme. The scheme has been instrumental in the development and modernisation of regional airports, which, in turn, have catalysed economic growth by boosting trade, commerce, and tourism in previously underserved areas. Ayushee Chaudhary's report offers a comprehensive overview of the current regional aviation landscape. This issue also highlights that India's regional aviation market, with a fleet of 70 aircraft operated by IndiGo, Alliance Air, and Fly91, is now ATR's second-largest market globally, demonstrating the increasing importance of regional air mobility.

The edition also explores the Union Budget's focus on civil aviation, as highlighted by Swaati Ketkar. Despite a reduction in allocation for the sector in the 2024-25 budget, targeted spending on the right infrastructure projects and policy reforms promises to accelerate the industry's growth. Notably, the budget emphasised on MRO sector and drone technology. A separate report by Swaati, discusses the current state of the Indian MRO sector, its challenges, and the opportunities that lie ahead, along with the Ministry of Civil Aviation's commitment to boosting competitiveness, innovation, and efficiency within the industry. Another report in this issue, by Rohit Goel, is on India's renewed ambition to manufacture its own commercial aircraft. While the goal of domestic production is not new, the government's vision extends beyond meeting local demand and aims to position India as a global exporter of commercial aircraft.

As airlines strive to meet passengers' growing expectations for personalised, high-quality entertainment, the in-flight experience is being transformed. Rohit Goel's report on the latest trends and innovations in in-flight entertainment highlights the latest technological advancements, hinting at even more exciting developments in the near future that promise to make air travel more engaging and enjoyable for passengers. Further talking of trends, sustainability remains a central theme in aviation, with SAF often viewed as a solution to reducing the industry's carbon footprint. However, Joseph Noronha points out, the path to achieving net zero emissions by 2050 is both challenging and expensive. The journey will require urgent measures and industry-wide collaboration if the goal is to be realised.

This edition also includes a comprehensive show report by Ayushee Chaudhary on the Farnborough International Airshow 2024. Highlights from the airshow include pioneering advancements in hydrogen power, automated inspection systems, and next-generation technologies, all of which signal the industry's unwavering commitment to sustainability and innovation.

All this and more in this issue of *SP's AirBuz*. Welcome aboard and we wish you many happy landings!

Jayant Baranwal
Publisher & Editor-in-Chief

2ND ASIA-PACIFIC MINISTERIAL CONFERENCE ON CIVIL AVIATION

THE TWO-DAY 2ND ASIA-PACIFIC Ministerial Conference on Civil Aviation (APMC) concluded with Prime Minister Narendra Modi announcing unanimous passing of the Delhi Declaration.

The conference saw the participation of delegates from 29 Countries Ministers and Policy Makers, and 8 International Organisations including ICAO which celebrated its 80 years of operations as part of the conference. This high-level gathering brought together ministers, heads of civil aviation authorities, and key stakeholders to address the current challenges and unlock more opportunities in the region.

A significant milestone of the conference was the formal adoption of the Delhi Declaration, a comprehensive framework aimed at enhancing regional cooperation, addressing emerging challenges, and fostering sustainable growth within the civil aviation sector.

Prime Minister Modi shared the technological and infrastructural advancements made by India in the sector with the top civil aviation leaders of the Asia-pacific region. Prime Minister emphasized on making the sector more inclusive for women, he said, "In India, 15 per cent of the pilots are women which is more than the global average of 5 per cent and we have issued an advisory to further increase this number." Prime Minister also spoke about the transformation in the aviation sector in India in the last ten years and said from being aviation exclusive, India has become aviation inclusive. Highlighting the crucial role of the civil aviation sector, he said focus is on connecting people, culture and prosperity through the sector.

Earlier, Indian Minister for Civil Aviation Kinjarapu Rammohan Naidu inaugurated the Conference on September 11, 2024 in New Delhi. Addressing the conference, Rammohan Naidu outlined India's rapid advancements in aviation under the leadership of Prime Minister Narendra Modi and said, "India's airport infrastructure has expanded from 74 operational airports in 2014 to 157 in 2024, with plans to increase this number to 350-400 by 2047". He also added that the domestic air passengers have more than doubled in the past decade, with Indian airlines significantly expanding their fleets.

The Civil Aviation Minister also shared India's successful Regional Connectivity Model through the UDAN scheme, which has opened up 583 new regional routes and made air travel accessible to underserved and unserved regions. He reiterated India's commitment to making flying affordable for all citizens, with a vision of integrating helicopters, seaplanes, and widebody aircraft under the UDAN scheme.

Recalling India's efforts in fostering a robust drone innovation ecosystem with initiatives like the Drone Didi Yojna, which aims to train 15,000 women in operating drones for agricultural purposes. The minister shared that drones have been effectively used in sectors like healthcare, rural development, and disaster relief, further enhancing economic growth and job creation.

(Top) Prime Minister Narendra Modi addressing delegates at the 2nd Asia-Pacific Ministerial Conference on Civil Aviation
(Above) India's Civil Aviation Minister Kinjarapu Rammohan Naidu inaugurating the Conference

Rammohan Naidu also stressed on the government's focus on creating a conducive business environment in aviation, with policies supporting Maintenance, Repair, and Overhaul (MRO) services, aircraft leasing, and indigenous manufacturing. The Minister highlighted the introduction of new MRO Guidelines and the permitting of 100 per cent FDI through automatic route have been key steps towards making India a global aviation hub.

Recognising the global need for sustainable aviation, Rammohan Naidu called for increased adoption of Sustainable Aviation Fuels (SAF) and energy-efficient airport infrastructure. He highlighted India's goal to blend SAF with jet fuel for international flights and shared the success of carbon-neutral airports in Delhi, Mumbai, and Cochin.

The Minister emphasized India's leadership in promoting gender equality in aviation, with women constituting 15 per cent of the country's pilots, three times the global average. India's target is to increase women's participation in the aviation workforce to 25 per cent by 2025. Naidu concluded by calling for a collaborative effort among Asia-Pacific members to build a skilled aviation workforce, integrate advanced air mobility technologies, and ensure the sector's sustainability. He expressed optimism for the adoption of the Delhi Declaration, which will serve as a roadmap for elevating aviation in the Asia-Pacific region. SP

Full report in SP's Airbuz issue 5/2024

PHOTOGRAPHS: PIB, MoCA_GoI / X

SEAPLANE OPERATIONS GUIDELINES IN INDIA LAUNCHED

Minister for Civil Aviation, Kinjarapu Rammohan Naidu launched the Guidelines for Seaplane Operations in India in New Delhi. During his address at the event at the Indian Aviation Academy, Union Minister said that these guidelines not only integrate seaplane operations into India's aviation landscape for transportation but also create jobs and foster economic empowerment, making seaplanes a symbol of the country's growth, innovation, and commitment to inclusive development.

The Minister also launched the 5.4 version of the UDAN. Under UDAN 5.4, fresh bids would be invited for the routes which were cancelled for some reason or the other, to provide connectivity on unserved routes. The Minister also announced that the demonstration flights of the seaplane by manufacturer DeHavilland would be held shortly.

The guidelines would enable the seaplane operations under RCS to make use of the operations under a Non-Scheduled Operator Permit (NSOP). The extension of the Viability Gap Funding (VGF) under the RCS to seaplane operations would provide the initial fillip to the Operators. While seeking to promote seaplane operations, due care has been taken to ensure the safety and security of the operations.

GOVERNMENT PERMITS 100 PER CENT FDI FOR AIRCRAFT MRO

In a major boost to the domestic MRO industry and to the aviation sector, the Government has announced that a uniform rate of 5 per cent IGST will apply to imports of Parts components, testing equipment, tools and tool-kits of aircraft, irrespective of their HSN classification subject to specified conditions. This policy change is a crucial step towards enhancing the competitiveness of the Indian MRO sector, fostering innovation and efficiency and creating a robust and efficient aviation sector. The Government has taken several steps to facilitate setting up of aircraft Maintenance, Repair and Overhaul (MRO) services in India through various policy, regulatory and other incentives which include:

- As part of the announcements made in Union Budget 2024-25, the period for export of goods imported for repairs has been extended from six months to one year. Also, the time-limit for re-import of goods for repairs under warranty has been extended from three to five years.
- New MRO Guidelines announced on September 1, 2021 inter alia abolish royalties and build in transparency and certainty in land allotments for MROs in AAI airports.
- GST on MRO has been reduced from 18 per cent to 5 per cent with full Input Tax Credit from April 1, 2020.
- Transactions sub-contracted by foreign original equipment manufacturers (OEMs)/ MRO to domestic MRO are treated as 'exports' with zero-rated GST from April 1, 2020.
- Exempted Customs Duty on tools and tool kits.
- Simplified clearance processing of parts.
- 100 per cent Foreign Direct Investment permitted via automatic route for MRO.

VIRGIN AUSTRALIA ORDERS EIGHT EMBRAER E190-E2S

Virgin Australia has placed a firm order with Embraer for eight E190-E2 small narrowbody aircraft, as part of its fleet renewal plan. The order will see the E190-E2, the world's most fuel-efficient single-aisle aircraft with the lowest noise emissions, complement the airline's larger narrowbodies and replace its long-serving Fokker fleet. The order will be reflected in Embraer's Q3 backlog and deliveries are scheduled to begin in the second half of 2025.

Virgin Australia's E190-E2 fleet will be based in Perth and operated by Virgin Australia Regional Airlines (VARA). The aircraft has a flying range of around six hours and is powered by Pratt & Whitney's PW1900G engines.

The E190-E2's are certified to fly with blends of up to 50 per cent SAF and have demonstrated through test flights the engine's operability with 100 per cent SAF. Embraer's has firmly established its presence there with close to 50 aircraft currently operating in the country, making it one of the largest E-Jets fleets in the Asia-Pacific region.

ATR CELEBRATES 1700TH DELIVERY

ATR, the world's leading regional aircraft manufacturer announced the delivery of its 1,700th aircraft since the inception of the programme to longstanding customer Air Corsica. The delivery of this ATR 72-600 to the French airline completes the full transition of its fleet of ATR -500 series to the latest generation of turboprop aircraft, demonstrating its commitment to operational excellence, regional connectivity, and sustainability. It also underscores the robustness and enduring success of the ATR programme, solidifying its position as a cornerstone in the regional aviation landscape. Air Corsica was the first operator to take delivery of an ATR 72-600 equipped with the new PW127XT engine in November 2022. With this delivery, the airline now operates seven ATR 72-600 aircraft, powered by the latest PW127XT engines, enhancing the reliability, comfort, operating costs, and CO_2 emissions.

EMIRATES ORDERS FIVE MORE BOEING 777 FREIGHTERS

Boeing and Emirates SkyCargo today announced an order for five additional 777 Freighters as the operator again picks the world's most capable twin-engine freighter to meet growing cargo demand. The new purchase takes Emirates' order book to 245 Boeing widebody airplanes, including 10 777 Freighters. Emirates SkyCargo is the cargo division of Emirates, the world's largest international airline. Its investment in the 777 Freighter will boost main deck cargo capacity 30 per cent by 2026. In all, Emirates' freighter fleet will grow to 17 airplanes – including 777 Freighters, 777 converted freighters and 747 Freighters.

Minister for Finance Nirmala Sitharaman along with her Budget Team/senior officials arrived at the Parliament House to present the first Union Budget 2024-25 of Modi 3.0, in New Delhi on July 23, 2024.

GOVERNMENT TARGETS KEY AREAS

Although allocation for Civil Aviation was reduced in budget 2024-25, spending on the right places, right infrastructure projects and policies will help in the growth of the aviation sector in our country

BY **SWAATI KETKAR**

FINANCE MINISTER (FM) NIRMALA Sitharaman presented the Union Budget 2024-25, with the civil aviation ministry getting its share at ₹2,357.14 crore, a notch less than last year's funds allocation. Although this is viewed by some with scepticism, aviation stakeholders are of the opinion that this year, the budget is more focussed on certain key areas that needed more attention, funds and growth.

Sharad Agarwal, Chief Executive, AI Engineering Services, one of India's largest MROs pointed out the reduced allocation of funds to civil aviation sector. In 2023-24, the budgetary allocation was ₹2922.12 crores, whereas in the present budget, it is around ₹2357.14 crores. Dismissing this as an afterthought Agarwal feels that this budget is more task-oriented as far as aviation is concerned. He gives an example of how separate allocation is made for improving aviation infrastructure in Northeast.

The main focus of the budget with regards to civil aviation was – Drones and Maintenance, Repair and Overhaul (MRO) sector. Drones got a higher allocation eyeing the rising demand of indigenous drones and its applications while an uproar from the MRO sector led the government to rake up some of its key policies like implementing uniform IGST and revisiting the FDI in MRO. "The budget allocation by Finance Minister Nirmala Sitharaman is an important and promising step towards job creation for the youth, infrastructure development, and a skilled workforce," says Jaideep Mirchandani, CEO of SkyOne.

PHOTOGRAPH: PIB

Government has provided a boost to the MRO sector with policy rationalisation

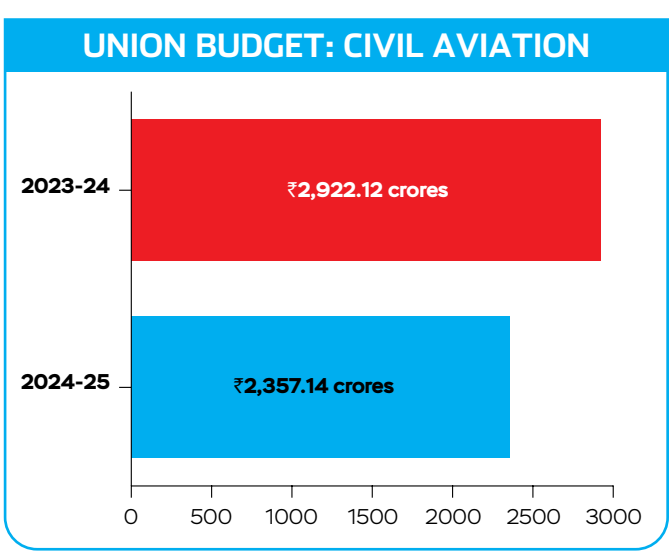
Industry experts feel that government's commitment to maintaining robust fiscal support for infrastructure over the next five years, with a capital expenditure allocation of ₹11.11 lakh crore at 3.4 per cent of GDP, highlights its dedication to fostering sustainable economic growth and enhancing our nation's foundational assets. "This substantial investment is poised to provide the much-needed boost to the aviation sector in India, driving growth and innovation," adds Mirchandani.

RCS-UDAN BUDGET SLASHED – FUNDS DIVERTED TO AIRPORT REVAMP. In what is looked upon as one positive aspect of budget allocation for different sectors within civil aviation was reduced budget for regional connectivity scheme and the balance funds to be allocated for airport revival and redevelopment. The budget for the regional air connectivity scheme has been slashed by 60 per cent to ₹502 crore after a record-high grant of ₹850 crore last time in the revised allocation for 2023-24. This amount will be used for the revival of 22 airports, mostly unused and underused airports in tier-2 and tier-3 cities. Since inception the RCS- UDAN scheme was looked upon with scepticism as airlines were shy of bidding on remote UDAN routes. The reason was obvious – lack of passengers leading to eventually termination of the route. Calling this move as a welcome step for taxpayer's money, Captain Peeyush Kumar, Chipsan Aviation Limited says that this is apparently bitter truth from CAG's report on the scheme was accepted. "It is unfortunate that sector is being advertised widely for purchase of planes or airport construction, has its budget reduced by 20 per cent (approximately) instead of a boost," Kumar adds.

Kumar further expresses his displeasure that on government's decision not to 'fuel-up' the UDAN sector as hyped. However, overall, the industry experts feel that by cutting costs on non-viable sector the FM's decision of allocating more funds for airports is the need of the hour.

NORTHEAST GETS ITS DUES! The scenic but neglected northeastern region got its due this budget season with a new scheme to improve air connectivity and aviation infrastructure. Girish Nair, Partner, KPMG India, hails government decision to focus on the development of neglected northeastern states. Calling it as a key highlight of the budget, he goes on to praise FM for the same.

BUDGET MADE DRONES 'HAPPY'. India is on the cusp of leading the Industrial Revolution 4.0 and on this backdrop, India has aimed to be a major hub for drones by 2030. This is expected to boost India's gross domestic product by 1 to 1.5 per cent and add over five lakh jobs. Since many years, the drone industry was asking for an expansion of the Production Linked Incentive (PLI) scheme which was rolled out by the government in 2021. Thankfully, their plea was heard and, in this budget, the PIL scheme for drones and components received an allocation



The main focus of the budget with regards to civil aviation was Drones and the Maintenance, Repair and Overhaul (MRO) sector

PHOTOGRAPH: AIESL

of ₹57 crore, as compared to ₹33 crore in 2023-24 revised estimate, a hike of ₹24 crores. This has made the drone community in the country very happy indeed and "This will give a much-needed thrust to the drone fraternity," Agarwal adds.

Gwalior Drone Mela. Drones is another area that is being provided a much-needed thrust.

MRO SECTOR ON GOVERNMENT'S RADAR. Another neglected sector of aviation came to limelight this Budget with Maintenance, Repair and Overhaul (MRO) segment also getting its due. In a major boost to the domestic MRO industry and to the aviation sector, the Government announced that a uniform rate of 5 per cent IGST will apply to imports of Parts components, testing equipment, tools and toolkits of aircraft, irrespective of their HSN classification subject to specified conditions. Industry experts are of the opinion that this policy change is a crucial step towards enhancing the competitiveness of the Indian MRO sector, fostering innovation and efficiency and creating a robust and efficient aviation sector.

HIGHLIGHTS OF GRANTS TO THE MRO SECTOR SO FAR.

- As part of the announcements made in Union Budget 2024-25, the period for export of goods imported for repairs has been extended from six months to one year. Also, the time-limit for re-import of goods for repairs under warranty has been extended from three to five years.

  Calling this as a welcome and long-awaited move Agarwal goes on to explain the obvious benefits for third-party MROs in India. "AIESL has EASA approved aero engine overhaul shop, where typical Turn-Around-Time (TAT) for an engine is three months. At times, due to unforeseen defects observed, there is a need to order further spares, which may have long lead time and the engines invariably gets delayed beyond six months. We also may face a situation, where an engine may have to wait for a slot for induction into the shop. Hence this proposed move is going to highly beneficial for the industry," Agarwal explains in detail.
- New MRO Guidelines announced on September 1, 2021 inter alia abolish royalties and build in transparency and certainty in land allotments for MROs in AAI airports.
- GST on MRO has been reduced from 18 per cent to five per cent with full Input Tax Credit from April 1, 2020.
- Transactions sub-contracted by foreign original equipment manufacturers (OEMs)/ MRO to domestic MRO are treated as 'exports' with zero-rated GST from April 1, 2020.
- Exempted Customs Duty on tools and tool kits.
- Simplified clearance processing of parts.

Some of the other allotments made in Budget for civil aviation sector are:

- For 2024-25, the allocations for the Directorate General of Civil Aviation (DGCA) and the Bureau of Civil Aviation Security (BCAS) have been reduced to ₹302.64 crore and ₹89 crore, respectively.
- An amount of ₹57.14 crore has been allocated for the Hotel Corporation of India Ltd to meet its statutory and other obligations under the ministry of civil aviation.
- An amount of ₹85 crore has been allocated this fiscal for providing medical benefits to retired employees of Air India, which was sold to Tata Group in 2022. In 2023-24, the amount stood at ₹51 crore.
- The government has set aside ₹502 crore for the scheme compared with the previous Budget Estimate (BE) of ₹1,244 crore, which was also the highest-ever allocation for the scheme since its launch in 2017.

All-in-all we saw that the budget is more focussed on developing key remote regions of India, while making India a drone-hub and MRO-hub. "As far as the infrastructure development is concerned, with an increase in targeted spending, we will gradually see more flights in regional cities; and it is in these cities where the next aviation boom will happen," Agarwal adds.

Thus, although civil aviation got less than its fair share, spending on right places, right infrastructure projects and policies will help our country scale up in its dream of becoming one of the fastest growing aviation markets in the world. SP

The northeastern region got its due in this budget with a new scheme to improve air connectivity and aviation infrastructure

PHOTOGRAPH: OfficeofSSC / X

Ground breaking of the Air India MRO at Bengaluru. Air India has roped in SIAEC, the engineering arm of Singapore Airlines for developing base maintenance facility at its new MRO in Bengaluru.

A JOURNEY TOWARDS SELF-RELIANCE

The Indian MRO industry is rapidly evolving into a global hub, fuelled by government initiatives, foreign investments, and growing domestic capabilities, positioning it for significant growth and self-reliance in the coming years

BY **SWAATI KETKAR**

A DECADE BACK THE AEROSPACE maintenance, repair and overhaul (MRO) industry in India was a no-show. With just 3-4 major independent MROs struggling to make ends meet with basic airframe and line maintenance, there was nothing to talk or look forward to in Indian MRO circles. Fast-tract to today, when the Indian MRO industry is one of the fastest growing sectors of the world. Within a span of a little over a decade, the Indian MRO industry has grown by leaps and bounds and continues to grow at a super-fast speed. How did this transition happen? Why is the world suddenly started taking interest in investing in India's MRO infrastructure and capabilities? Let us find out.

"The MRO industry in the country is expected to go up to $4 billion in seven years from the present $2 billion. Thus by 2030 India will develop a strong ecosystem for MRO services, driving innovation, and ensuring sustainable growth," just as India's Minister of Civil Aviation Rammohan Naidu said these words during question hour in Lok Sabha recently, the entire world's focus increased on India's MRO sector with just one question – How?

The government had the answer ready. India's minister of civil aviation is leaving no-stone unturned to encourage the airline MROs, independent MROs as well as oversees MROs and OEMs to come and invest in India. In fact, experts believe that MRO is the current pet project of MoCA and he fully intends to take it

PHOTOGRAPH: Air India

Indian airlines are increasingly developing in-house MRO capabilities, with Air India and IndiGo leading the way by building widebody hangars and using indigenous non-critical parts

through. As a testimony to this, he rapidly changed some of the regulations stuck in red-tape like introduction of a uniform five per cent IGST rate on MRO items, introduction of 100 per cent FDI in MRO sector etc to name a few. The MRO fraternity in India welcomed this move with open arms. But is this enough to develop a sound $4 billion MRO ecosystem that India aspires? Definitely not! But its still a small and significant step towards achieving this goal.

THE ENTRY OF FOREIGN MROS IN INDIA. Dassault Aviation is currently in the process of land acquisition near the upcoming Noida International Airport to establish a facility for the maintenance and overhaul of Rafale and Mirage 2000 fighter aircraft. This will allow India's armed services to maintain their Rafale and Mirage 2000 fleets in-country. Dassault is already sourcing multiple titanium parts from various local companies in India with plans to add more local vendors to its supply chain. This will strengthen the overall aerospace manufacturing and MRO ecosystem in the country while realising the government's Atmanirbhar Bharat initiative.

Belagavi-based aerospace manufacturing provider Aequs Aerospace recently signed memorandum of understanding with Magellan Aerospace to develop a business plan for engine MRO in India. The plant will be based in the Belagavi aerospace cluster (BAC) with plans of a full-fledged engine MRO complete with an engine testbed and ability to rebuild an entire engine along with component repairs.

With 2,200 LEAP engines on order in the region, Safran is building one of its largest MRO facilities in the world in Hyderabad. Construction of this €150 million plant started late last year with the objective of being fully operational by 2025. The MRO shop will be the first of its kind opened by an OEM in India, putting India on the global MRO map. The MRO ecosystem is a major step toward achieving self-reliance in airline operations and developing the associated skills and training infrastructure. Safran further plans to develop synergies with the local aerospace ecosystem. Some of the other investments by Safran include setting up a helicopter engine MRO facility with HAL in Goa and establishing a LEAP engine MRO plant to support Indian airlines in Hyderabad, both by 2025. Safran is also working closely with HAL to co-design the next-gen turboshaft engine for HAL's medium-lift helicopter.

Currently in India only AI Engineering Services (AIESL), the erstwhile engineering arm of Air India prior to privatisation has a complete engine MRO set up with capabilities for a complete engine overhaul. But eyeing the huge aircraft orders and rising demand, the need for more engine MROs was evident and the world saw a huge gap in the space. Now entry of players like Aequs Aerospace and Safran in India's aircraft engine MRO market will pave way for more OEMs like Pratt & Whitney and Rolls-Royce to establish their own engine MRO shops along with various third-party MROs to establish JVs with their local counterparts in India.

Recent media reports also said that StandardAero was looking at potential partners in India to establish a JV and that the

PHOTOGRAPH: AIESL

Air Works operates 5 hangars at three strategically located, state-of-the-art Base maintenance facilities

company will take a decision based on the engine workload at Safran's Hyderabad facility.

Israel Aerospace Industries also in talks with two Indian partners, one of them is reportedly Hindustan Aeronautics Limited (HAL) for setting up a widebody passenger-to-freighter conversion centre in the country along with long-term MRO plans.

Air India has roped in SIA Engineering Company Ltd (SIAEC), the engineering arm of Singapore Airlines for developing the base maintenance facility at its new MRO in Bengaluru. As per the plan, SIAEC will plan, construct, develop and operationalise the Bengaluru facilities. Such a JV-model is extremely lucrative as it will provide the airline – 'Air India' with capabilities, training, etc while working with SIAEC, while the MRO will gain a ready-made entry in India's MRO market.

Epsilon Aerospace the aircraft interiors specialist signed a memorandum of understanding with Netherlands-based structural metal and composite component repair provider 4Repair to establish a facility focusing on MRO services for composite parts. Both the companies are currently exploring different locations across India to establish the facility.

CHANGING MRO TRENDS. Until recently most of the airlines in India used to send their aircraft abroad for maintenance work leading to the airlines spending exorbitant but necessary funds on the maintenance work. This picture is also witnessing a drastic change as airlines in India are either developing their own capabilities to take care of MRO work of their own fleet or sending their aircraft to local- third party independent MROs. On a positive note, almost 99 per cent of the airframe maintenance, line maintenance work is carried out within India for domestic carriers.

But certain airlines like Air India are going a step ahead and setting a benchmark in establishing its own in-house maintenance capabilities. The recent ground-breaking of MRO facility at Bengaluru airport is a testament of this process. The airline has already developed its in-house line maintenance capabilities for a variety of aircraft right up to the DGCA approval for the latest widebody A350 aircraft. Apart from the huge 350 acres MRO facility in the Kempegowda cluster in Bengaluru, Air India has also refurbished its widebody hangar in Mumbai and is about to open two huge widebody hangars in Delhi. Thus, the airline is already begun its preparation for the widebody aircraft influx.

Other airlines like IndiGo are focussing on various non-critical elements in the aircraft like paper, soap dispenser, the stickers, etc some of the basic items found in the galley. A couple of years back, IndiGo had approached DGCA for approvals of non-critical items in the aircraft. The airline found that the regulator was extremely welcoming in their approach and even encouraged the airline to go in for the manufacture and use of as many non-critical components as possible. Fast-forward to today, IndiGo uses in-house papers, stickers etc, instead of importing these items thus mitigating costs. This initiative by IndiGo's initiative to seek approvals for using indigenous non-critical parts reflects a shift in maintenance practices.

UPCOMING MRO FACILITIES IN INDIA. Apart from the Air India Bengaluru MRO facility, another huge aerospace and MRO cluster is under development at Noida International Airport. Noida International Airport will have both an MRO facility (40-acres) within the airport and a larger facility (MRO-hub) on 1,365 acres of land adjacent to it. The process of land acquisition is currently underway. Once the land acquisition is complete the government will hand over the land to NIAL for further development.

The Noida International Airport (NIAL) have fast-tracked the process of developing an MRO facility at the airport and has issued a global tender for hiring a company to develop the 40-acre airport MRO facility. The work on this MRO facility is expected to start in the next two to three months. This facility will be part of the aviation hub and will be developed on the premises of the airport in the ongoing phase.

PHOTOGRAPH: Air Works

GMR Aero Technic provides third party Airframe Maintenance, Repair & Overhaul (MRO) facility at RGIA, Hyderabad.

In order to encourage oversees investment, the government of Uttar Pradesh has also introduced a new MRO policy offering capital investment subsidies ranging from five per cent to 12 per cent for companies that submit their application by December 31, 2024. The new MRO policy developed by the state to attract investors will include a capital investment subsidy of:

- five per cent for investments up to ₹500 crores
- eight per cent for investments over ₹500 crores but less than ₹1,000 crores
- 12 per cent for investments exceeding ₹1,000 crores, subject to a maximum of ₹200 crores.

Other upcoming MRO facilities are those at Belagavi airport in Karnataka, Bhopal airport, Bhogapuram airport and Tirupati airport.

The Bhogapuram MRO facility will be spread over 25 acres, featuring aprons, aircraft washing areas, airside and landside circulation, hangars, engine run-up bays, and support facilities. The MRO facility will be constructed on the western side in phase one, with plans for future development phases to include expansion to the northeast corner.

The TDP proposed the MRO during its tenure of power from 2014-2019. Of the total 2,700 acres earmarked for the Bhogapuram airport project, 500 acres were allocated for the MRO facility. However, the YSRCP government, after coming to power in 2019, shelved the proposal and kept aside these 500 acres for other purposes, causing delays in the MRO project development.

The groundbreaking ceremony for Bhopal airport's MRO facility took place in October 2022. Two MRO facilities will be constructed at Bhopal airport over an area of 5,600 square metres at an investment of ₹300 million. This project is based on the design-build-operate-maintain-transfer (DBOMT) model. The work on the Bhopal MRO project is currently underway although slightly delayed. The facility that was due to be operational by 2024, is now expected to open for commercial operations over the next couple of years.

Meanwhile, the work on the MRO facility to be developed on Tirupati airport gained momentum in 2023 with the site-visit by a Canadian company about a year back in August 2023. The overseas OEM seemed interested the viability of MRO project at Tirupati airport and conducted a feasibility study for the same. The concept of an MRO centre at Tirupati International Airport has been in the works for some time, with discussions done between local authorities and the civil aviation ministry. Canadian aviation would submit their proposals to the central government. Meanwhile, the Airports Authority of India (AAI) floated a tender for leasing of land for the MRO facility on Design, Build, Operate, Maintain and Transfer (DBOMT) basis at site-2 of Tirupati airport.

Land at Belagavi airport was awarded by AAI to Aviation Connectivity and Infrastructure Developers Private Limited in November 2022. In 2022, in order to capitalise on the enormous potential of the MRO sector, the civil aviation ministry identified sites for implementation of MRO at eight airports across the country including Chandigarh, Delhi, Begumpet, Juhu in Mumbai, Bhopal, Chennai, Kolkata and Tirupati.

CIVIL-DEFENCE CONVERGENCE. According to experts, India has huge Defence MRO capabilities, but most of them cannot be used by the civil sector due to certain regulations and restrictions. There is an invisible wall between the civil and defence MROs in India with little sharing of expertise, technology, or manpower leading to unnecessary duplication of infrastructure and capabilities. While on the other hand, India's civil aircraft are being sent aboard for the lack of enough capability and capacity in the civil MRO sector. This sowed the seeds and was the basic central idea behind the civil-defence convergence in MRO space.

PHOTOGRAPH: GMR Aero Technic

Aequs Aerospace has plans of a full-fledged engine MRO complete with an engine testbed

Recognising the need for integration, the Government announced plans in 2020 to promote Civil-Defence convergence to seek enhanced coordination and integration, driven by the vision of self-reliance. However not much has achieved since then, and the major hindrance to this is the regulatory authorities. The defence MRO in India comes under DGAQA - Directorate General of Aeronautical Quality Assurance, under the Department of Defence Production while the civil MRO comes under DGCA - Directorate general of Civil Aviation. The terms and conditions of these two independent bodies, their regulatory framework etc is proving to be major challenge in the convergence of Civil and Defence MRO capabilities in India. Realising this, the government and stakeholders of both civil and defence MRO circles have come together to establish one uniform regulatory body for both MRO sectors. This will prove to be a turning point in the civil-defence convergence plan of Indian MRO ecosystem. Advantages:

- enhance customer satisfaction at lowest cost and less time
- revenue and employment generation
- save fuel and logistic costs, and conserve foreign exchange for airlines
- share and exchange the resources, technology, manpower and tools etc
- optimum utilisation of resource on exchange basis for both civil and defence
- maximum utilisation of infrastructure and other support system.

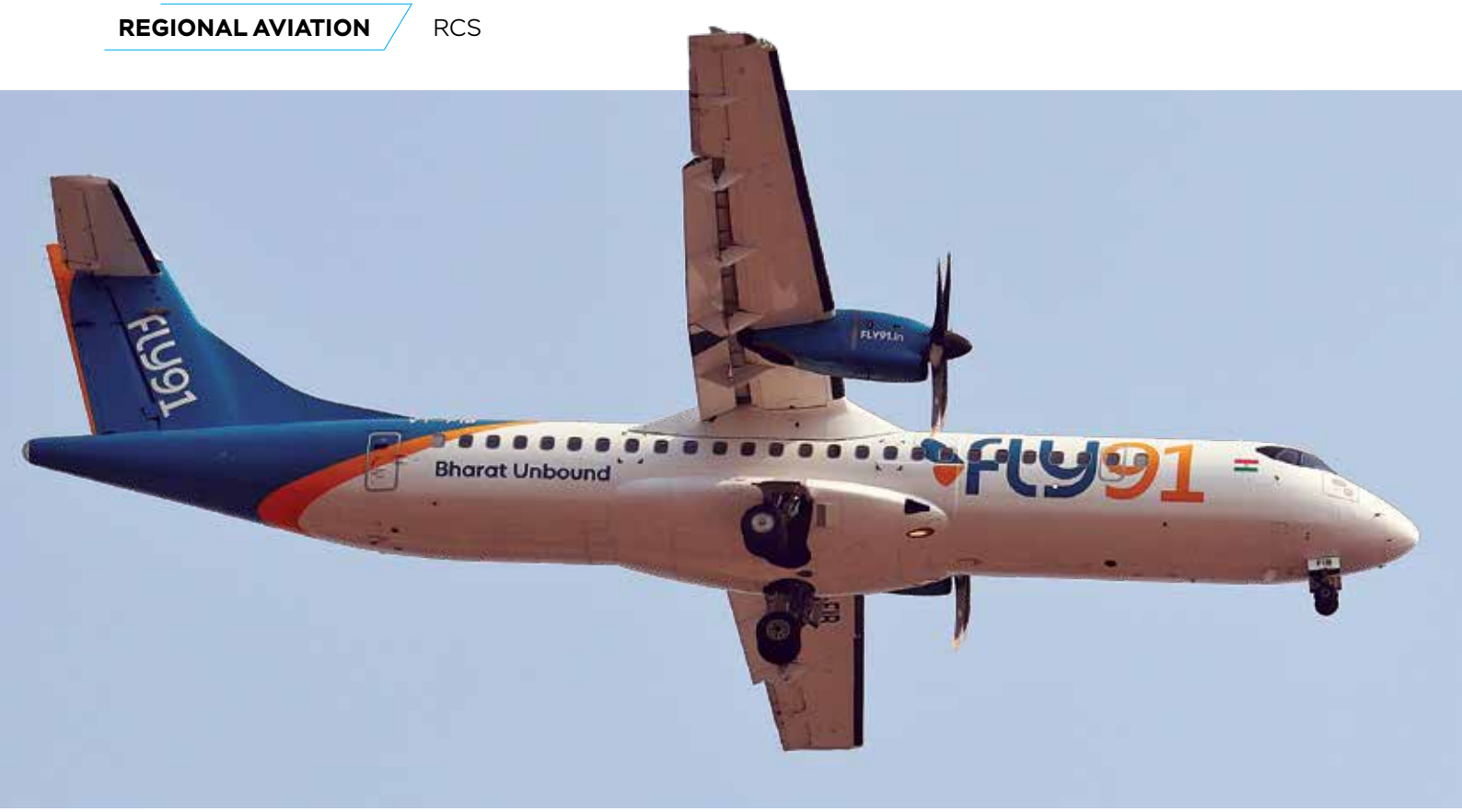
OTHER CHALLENGES. In spite of growing passenger traffic and considerable fleet size, the Indian MRO sector continues to face certain bottlenecks. One of the major factors for this is the OEM dominance in the aftermarket and their ability to grab and capture a huge chunk of the market due to their control over Intellectual Property (IP). Thus, the OEMs control training manuals, data design, critical component repairs, engine overhaul, basically every repair that is cost-inductive for the airlines, leaving little or no-scope for the airline MROs or independent MROs to grow and develop their capabilities.

Here's where the critical role of airlines comes in. With the humongous aircraft orders placed by Indian airlines, India is now in the position of power and authority to negotiate its terms with the OEMs as well as the lessors based on cost-effectiveness as well as capability development and technology transfer. Thus, airlines can play a huge role in developing the MRO in the country. The airlines need to urge and insist the OEMs to establish 70-80 per cent the MRO facility within the country for their upcoming fleet. Accordingly, efforts should be made to include the provisions in the aircraft contract. Technology transfer for repair/MRO of key components should also be sought from the OEMs. These OEMs also need to come forward to establish their authorised repair centres in India in collaboration with existing local-MRO players so that facilities can be established at a faster pace.

Thus, airlines need place its terms before the OEMs with regards to MRO capabilities, training as well as technology transfer to make India self-reliant in terms of developing an overall MRO ecosystem in the country.

THE FUTURE. Looking at the above new MRO facilities, new capabilities being developed by the airline as well as independent MROs in the country and the way forward to overcome the obstacles and bottlenecks Indian MRO is on a path towards self-reliance and progress. Looking at the above, on an optimistic note, Mumbai-based analytics group CRISIL Ratings have forecasted that India's annual MRO revenue could grow more than threefold to $55-60 billion by 2050 from roughly $18 billion by fiscal 2028. The Ministry of Civil Aviation is confident that changes in the policy structure and providing unconditional support to MRO players in the country will significantly enhance the competitiveness of the Indian MRO sector, fostering innovation and efficiency, and creating a robust and efficient aviation sector. SP

PHOTOGRAPH: Aequs Aerospace



India's Regional Connectivity Scheme (UDAN) has become a cornerstone of the country's aviation landscape, improving accessibility and promoting economic growth, tourism, and regional connectivity

REGIONAL CONNECTIVITY

DRIVING GROWTH AND DEVELOPMENT

The UDAN scheme has been a game-changer for India's aviation industry, democratising air travel, stimulating economic development, and fostering regional connectivity becoming a cornerstone of India's aviation strategy

BY **AYUSHEE CHAUDHARY**

INDIA'S REGIONAL AVIATION MARKET is on the cusp of a significant transformation, experiencing rapid growth fueled by the government's push for improved connectivity and the rising demand for air travel in smaller cities. With new airlines entering the fray and established carriers expanding their regional networks, the sector is set to play a crucial role in enhancing accessibility and driving economic development across the country. This expansion underscores the importance of regional air travel in bridging the gap between major hubs and remote areas, contributing to the overall growth of India's aviation industry and the country's economy.

India's regional aviation sector is expecting shifts in the nation's aviation trajectory with new additions of Alhind Airline following Air Kerala from the same region. Kerala-based travel services operator, Alhind Group, recently received initial approval from India's Civil Aviation Ministry to launch its own airline, Alhind Air. Aiming to begin operations by the end of this year, the group is now focused on obtaining the crucial

PHOTOGRAPH: ATR

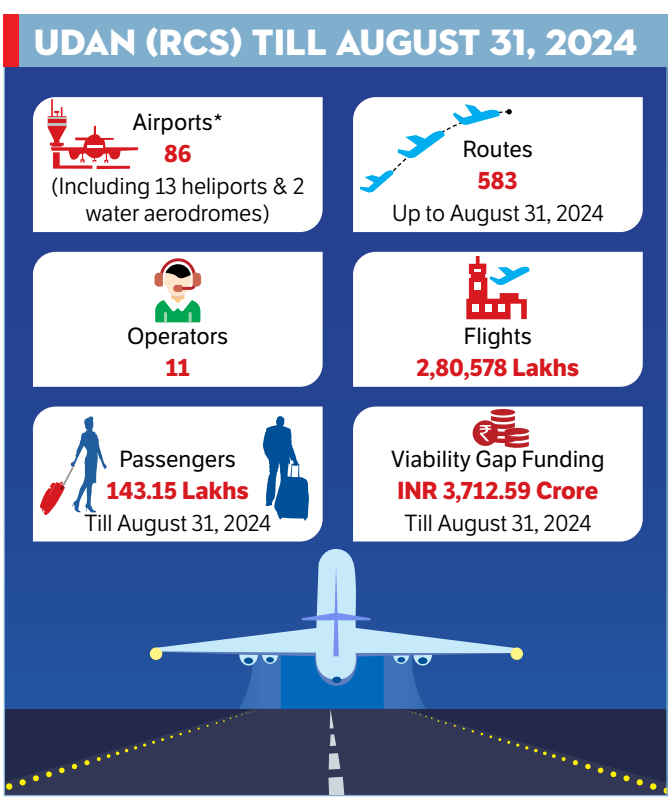
UDAN's impact is evident in the operationalization of over 70 airports, fostering local tourism and economic growth in previously underserved regions

Air Operator Certificate (AOC) from the Directorate General of Civil Aviation (DGCA) to finalise its entry into the aviation sector. This move signifies Alhind Group's strategic expansion into the competitive aviation market, driven by the growing demand for air travel in the region. Alhind Air plans to initially operate regional routes in southern India, connecting Cochin with Bengaluru, Thiruvananthapuram, and Chennai using a fleet of three ATR-72 aircraft, known for their efficiency on short-haul flights. The airline has ambitious plans to expand its operations nationwide, eventually incorporating Airbus A320 aircraft to serve longer domestic routes and, within two years, launching international flights after increasing its fleet size to over 20 planes.

The airline's establishment is backed by the well-established Alhind Tours & Travels Pvt Ltd, part of the Alhind Group, a major player in the travel and tourism industry both in India and internationally. With over 130 offices worldwide, a reported turnover exceeding ₹20,000 crore, and a broad range of services including air ticketing, holiday packages, and visa facilitation, the group has carved out a significant presence in the industry. Alhind Group's entry into the airline industry is largely motivated by the high demand for air travel between Kerala and Gulf countries, a market Alhind Group is well-positioned to serve, given its extensive experience and robust presence in the region. The company is set to invest between ₹200 crore to ₹500 crore in this new venture, underscoring its commitment to becoming a significant player in India's domestic aviation sector.

The new regional airline Air Kerala is ready to make an entry with an aim to mark a milestone in Kerala's aviation history. The venture, backed by Dubai-based Malayali entrepreneurs Afi Ahmed and Ayub Kallada, received its no-objection certificate (NOC) from the Ministry of Civil Aviation (MoCA) in July, paving the way for its official launch in 2025. As the first regional airline originating from Kerala at the time, Air Kerala's entry signified not just a business opportunity but a strategic move to address the unique travel needs of the state and its large expatriate community.

Air Kerala, owned by Zett Fly Aviation Private Limited, plans to base its operations in Kochi, leveraging the city's exist-



Source: Ministry of Civil Aviation

PHOTOGRAPH: Air Kerala

Despite its success, the UDAN scheme faces challenges, including the sustainability of subsidies, the need for continued infrastructure investment, and environmental concerns related to increased air traffic

ing robust air traffic infrastructure. The airline's initial fleet will also consist of three ATR 72-600 aircraft, focusing on domestic routes that connect Tier II and Tier III cities with major metros in South India. These aircraft are particularly well-suited for regional operations due to their efficiency on shorter routes and lower operating costs. The company's ambitious roadmap includes expanding its fleet to 20 aircraft and exploring international routes, with Dubai as a prime target, owing to the significant Malayali population residing in the Gulf region. The airline aims to make air travel more affordable and accessible, particularly during peak travel seasons when demand surges, and ticket prices can become prohibitive. Kerala, with its four major airports—Kannur, Kochi, Kozhikode, and Thiruvananthapuram—already has a well-established aviation network. However, Air Kerala's strategic focus on serving both domestic and international markets uniquely positions it to tap into the high demand for connectivity, especially between Kerala and the Gulf.

GROWING REGIONAL CONNECTIVITY. These new airlines are making an entry into a rapidly evolving aviation landscape. These airlines' strategic focus on serving both domestic and international markets, combined with the broader expansion of regional airlines in India, underscores the growing importance of regional aviation in the country's economic and social development.

India's regional aviation market is undergoing rapid growth, driven by government initiatives to improve connectivity and rising demand for air travel in smaller cities

The entry of Air Kerala and Alhind Air are a latest in a series of developments that highlight the growing importance of regional aviation in India. Earlier this year, FLY91, another regional airline, began its commercial operations, marking a significant expansion in the country's regional connectivity. Similarly, Star Air, another regional airline, is focusing on expanding its network by adding more routes and aircraft. FlyBig, too, continues to increase its route network, further strengthening India's regional connectivity. A major player in this space is Alliance Air, a state-owned carrier and a key operator under the government's UDAN (Ude Desh ka Aam Naagrik) scheme. Earlier this year, the Union civil aviation ministry awarded 28 non-operational routes to Alliance Air under the UDAN 5.3 short-bidding round.

The expansion of regional aviation in India, driven by the UDAN scheme, is more than just a boost to the aviation sector. It represents a significant opportunity for socio-economic development across the country. Improved access to air travel facilitates trade, investment, and the movement of people and goods, driving infrastructure development, tourism promotion, and the establishment of new markets. By connecting more routes and adding supportive infrastructure like airports has significantly increased tourist footfall and made it easier for businesses to operate in remote regions, further boosting local economies, and fostering local entrepreneurship and investment.

Moreover, the focus on regional connectivity aligns with the government's broader goals of promoting local industries and encouraging balanced regional development. The ease of transportation and increased accessibility have the potential to enhance local tourism, expand economic opportunities, and contribute to the overall growth of the national economy.

Continued on page 17...

PHOTOGRAPH: Alhind Group

ATR – CHAMPIONING REGIONAL AIR MOBILITY IN INDIA

With a fleet of 70 aircraft operated by IndiGo, Alliance Air, and Fly91, India is ATR's second-largest market globally, showcasing the growing significance of regional air mobility in the country

BY **SP'S NEWS NETWORK**

With a fleet of 70 aircraft, India is ATR's second largest market globally

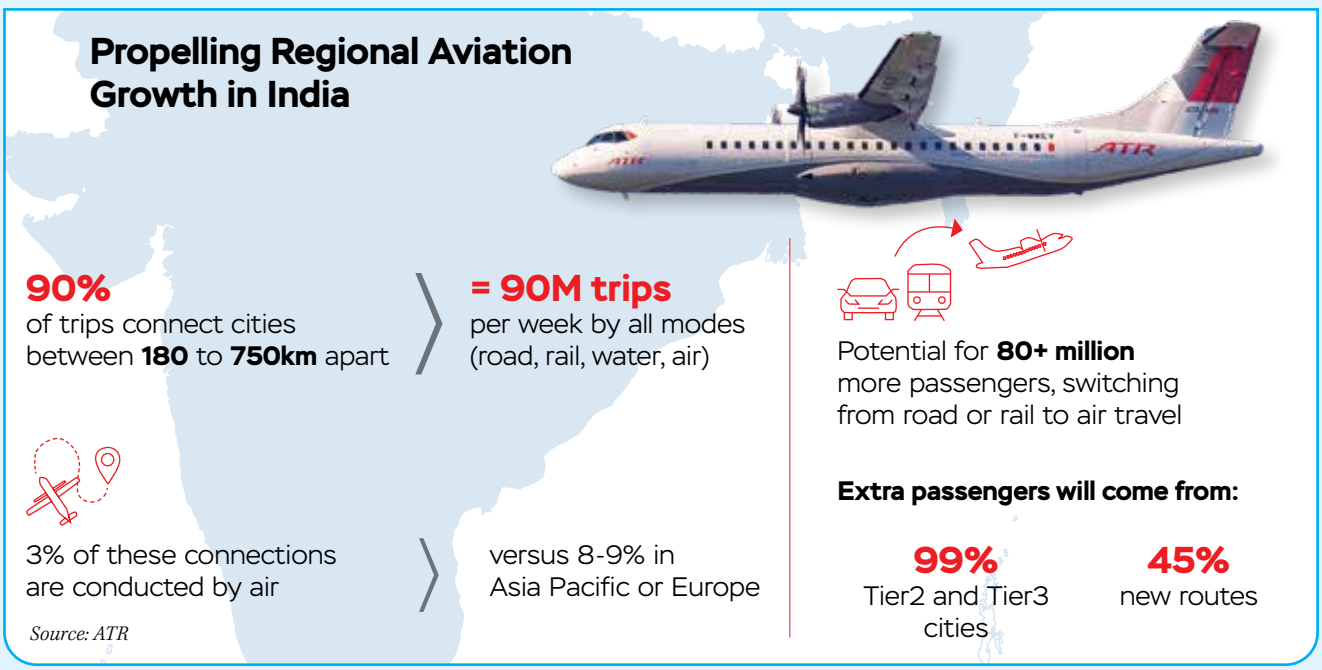
PHOTOGRAPH: ATR

IN A REMARKABLE EVENT held in New Delhi, organised by the Federation of Indian Chambers of Commerce and Industry (FICCI) and the Indian Ministry of Civil Aviation, experts and key decision makers from the Indian aerospace industry came together to share a round-table discussion on how to best unlock the country's immense regional aviation potential.

With senior figures of the Ministry of Civil Aviation in attendance, ATR's SVP Commercial Alexis Vidal had the opportunity to highlight the essential role of regional aviation to meet the Indian communities' travel needs and advocated for increased point-to-point links between secondary and tertiary cities, to support the Indian government's UDAN initiative.

KEY MESSAGES INCLUDED:

- **Importance of the regional market segment:** 90 per cent of intercity trips by all modes (90 million trips per week) are within the 100-400NM range, highlighting the crucial nature of this segment to Indian travel needs.
- **Air Travel Potential:** Presently, only three per cent of trips within the 100-400NM range are conducted by air, indicating significant room for growth in air travel penetration.
- **Catching up with existing demand:** Levels of already existing regional intercity travel going by ground, indicate that there is an untapped potential of 80 million additional air passengers per year, which could be served by increasing flight frequencies on existing routes and creating new air connections.



- **Expanding Airport Accessibility:** With 40 per cent of intercity trips originating from areas lacking active airports, there is a notable opportunity for the expansion of air infrastructure.

Many Indian passengers are first-time travellers, who choose air transport over slower or less comfortable options such as trains or buses, which also makes them very price sensitive. In such a low-fare environment, with a pressing need to join secondary population centres, and a burgeoning middle-class asking for affordable connectivity, ATR aircraft provide an excellent business case, offering the lowest cost per trip and unmatched fuel efficiency compared to similar-size regional jets.

As India stands as the world's fastest growing aviation market, it is also ATR's second largest market globally, boasting a fleet of 70 aircraft, operated by Indigo, Alliance Air and Fly91.

ATR's sole sponsorship of the event on behalf of the Indian Government and FICCI underscores a shared commitment to bolstering regional connectivity in India, setting the stage for a future where air travel becomes a primary, responsible and affordable mode of intercity transportation, fostering economic growth and societal development nationwide. SP

...continued from page 15

DEMOCRATISING AIR TRAVEL. In a transformative initiative aimed at democratising air travel and enhancing regional connectivity, the Indian government launched the Regional Connectivity Scheme (RCS) in 2017. Popularly known as UDAN (Ude Desh ka Aam Naagrik), this programme seeks to make air travel affordable and accessible to the common citizen while linking underserved and unserved airports across the country. Over these last couple of years, UDAN has become a cornerstone of India's aviation landscape, driving economic growth, promoting tourism, and significantly boosting regional connectivity.

The UDAN scheme was designed with the primary objective of bridging the gap between metropolitan cities and tier-2 and tier-3 towns. By operationalising flights on these routes, the government aims to bring smaller cities closer to major economic centers, facilitating the movement of people, goods, and services, and fostering trade and investment opportunities.

UDAN is a demand-driven scheme, wherein airline operators assess the feasibility of operation on a particular route and submit bids under the scheme from time to time. An airport which is included in the awarded routes of UDAN and requires upgradation/development for commencement of UDAN operations, is developed under the 'Revival of unserved and underserved airports' scheme. Under the scheme, the airfare for a one-hour journey by a fixed-wing aircraft or a half-hour journey by helicopter over approximately 500 kilometers is capped at ₹2,500, which is significantly lower.

To operationalise routes under UDAN, aviation companies bid for air routes, with the contract being awarded to the company that requests the lowest subsidy. The airline is then required to reserve a portion of the seats—either half of them, a minimum of nine seats, or a maximum of 40 seats—at the capped fare.

On the basis of five rounds of biddings, 76 airports, including two water aerodromes and nine Helipads in different regions of the country, had been developed and operationalised by RCS flights at the beginning of this year. The RCS scheme also mandates Regional Connectivity Fund allocation to regions in a manner that promotes balanced growth / regional connectivity in different parts of the country.

The recently launched Seaplane guidelines would enable the operations under RCS to make use of the operations under a Non-Scheduled Operator Permit (NSOP).

As of July 8, 2024, a total of 579 routes have been operationalised under the scheme across various phases. The routes include more than 53 tourism routes and over 48 helicopter routes connecting hilly regions of the nation. According to the data shared by the Ministry, more than 133.86 lakh passengers have benefited from the UDAN flights and over 2.56 lakh flights have operated under the scheme. The UDAN scheme has also encouraged procurement of different types of aircraft in the country. Presently, 3 seater Tecnam, 9 seater Cessna 208B, 19 seater Twin Otter, 50 seater Embraer 145, 42/72/78 seater ATR and Q-400 as well as bigger aircraft like 189 seater Airbus 320/321 and B737 are in operation for UDAN flights. This surge in demand has driven a substantial increase in the requirement for new aircraft, ranging from helicopters and seaplanes to larger jets. 13 Airlines have commenced operations under UDAN, including Air Taxi, IndiaOne, Star Air, FlyBig and Fly91. While many of these new airlines are looking at an upward trajectory, some airlines have also shut down due to high maintenance costs, lack of infrastructure like MRO facilities and skilled workforce like trained pilots, etc. Nevertheless, the scheme has played a pivotal role in promoting tourism by connecting key destinations such as Khajuraho, Deoghar, Amritsar, and Kishangarh (Ajmer), thereby stimulating local economic growth and supporting the hospitality industry.

The success of UDAN is evident in the development and modernisation of regional airports. The scheme has operationalised over 75 airports. Cities like Agra, Bikaner, and Kanpur, previously underserved, now enjoy enhanced air connectivity, which has fostered local tourism and economic growth. For example, Jharsuguda Airport in Odisha, developed under UDAN, has become a gateway for the region's industrial belt, significantly boosting local economic activity.

Enhanced connectivity through UDAN has opened up previously inaccessible destinations, particularly in regions like the Northeast. This has led to a surge in tourism, contributing to local economies and creating jobs. For instance, Himachal Pradesh saw a 20 per cent increase in tourist arrivals following the introduction of UDAN flights to Shimla and Kullu, significantly benefiting the state's economy. By making air travel more affordable, the scheme has democratised aviation, allowing more people from diverse socio-economic backgrounds to fly, further driving inclusive growth.

FUTURE PROSPECTS AND CHALLENGES. Despite its successes, UDAN faces several challenges. The sustainability of subsidies is a significant concern, as is the need for continued investment in airport infrastructure, particularly in remote areas. Operational challenges such as inadequate infrastructure and skilled manpower at smaller airports also pose difficulties for airlines. Additionally, increased air traffic raises environmental concerns, highlighting the need for sustainable aviation practices. While UDAN has provided airlines with opportunities to expand their networks and tap into new markets, it also presents challenges, particularly in operating less profitable routes. The scheme's Viability Gap Funding (VGF) mechanism helps airlines maintain operational viability on these routes by subsidising a portion of the airfares. As of August 2, 2024, Rs.3,587 crores have been disbursed to the Selected Airline Operators towards VGF as per the provisions of the Scheme. However, the long-term sustainability of these routes will depend on airlines gradually reducing reliance on subsidies as market demand increases. Looking ahead, the future of regional aviation under UDAN is promising. The government aims to phase out subsidies as routes become self-sustaining and continues to enhance infrastructure and operational capabilities at regional airports. With continued investment and innovation, regional airlines are poised to play an even greater role in India's economic growth. This enhanced connectivity is driving economic growth by boosting trade, commerce, and tourism in previously underserved regions. The development and modernisation of regional airports are creating jobs and stimulating local economies, positioning regional aviation as a key driver of India's overall economic development. SP

PHOTOGRAPH: vijayrupanibjp / X

The long-term trend is expected to be a reduction in SAF production costs enabled by economies of scale and technological advancements, provided demand is assured

WANTED: ACTION ON SAF!

With SAF being constantly pushed as a panacea, a reality check is essential. The journey to achieve net zero by 2050 will in truth be long, arduous and terribly expensive. Success is by no means assured without urgent measures.

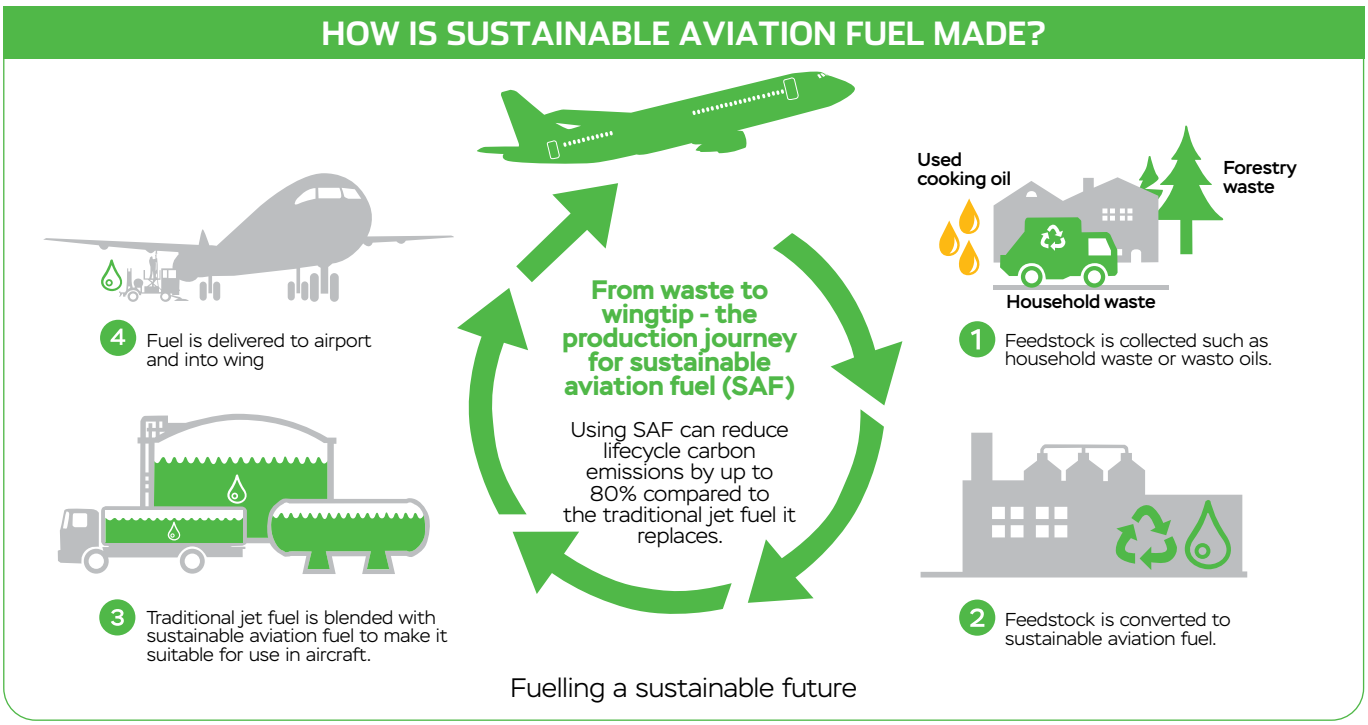
BY **JOSEPH NORONHA**

AIRLINE STRATEGY IS NOW increasingly influenced by environmental sustainability. Both the International Civil Aviation Organization (ICAO) and the International Air Transport Association (IATA) have set impressive climate goals. In October 2022, ICAO member states agreed to a long-term aspirational goal (LTAG) of net zero emissions from aviation by 2050. This followed the aviation industry's commitment to the same net zero objective, adopted by IATA in 2021. Net zero means the amount of greenhouse gases (GHG) removed from the atmosphere is equal to that emitted by that activity.

The quest for sustainability is driven by growing fears of irreversible climate change. In February 2024, for the first time, global warming exceeded 1.5 degrees C through a full year. "Why lose sleep over this?" climate sceptics demand, adding that ups and downs in the global temperature trend have been recorded throughout history. But an overwhelming majority of scientists believe that 1.5 degrees is a climate change "red line" and overshooting it even for a few years may trigger tipping points that cannot be uncrossed – such as the melting of permafrost that would, in turn, release huge amounts of trapped CO_2 and intensify global warming. If proof were needed, the planet experienced record floods, droughts, heatwaves and wildfires in 2024. Another half degree temperature rise could greatly intensify these effects.

Where does aviation stand? Although flying is very carbon intensive it contributes just 2.5 per cent of global emissions. But thanks to non-CO_2 emissions, soot and contrails, aviation's total

PHOTOGRAPH: Airbus



Source: Air bp

contribution to global warming is more than twice that figure. While engine manufacturers constantly strive to increase fuel efficiency, the gains are dwarfed by soaring demand for aviation services. Convinced of the need to act, the aviation industry has adopted a multi-pronged approach that banks mainly on sustainable aviation fuel (SAF). In fact, in IATA's thinking, as much as 65 per cent of carbon mitigation required to achieve net zero by 2050 will come from SAF.

Yet, many major questions remain unanswered. Is the aviation industry's commitment to sustainability strong and lasting? Can it afford the cost? Will it bear the pain? Even with the best of intentions, can SAF production be steeply ramped up in time to attain the 2050 net zero goal? Unfortunately, action so far – as opposed to mere aspiration – does not offer much hope. So what needs to be done?

SAF is a synthetic replacement for regular jet fuel, made from renewable sources like waste cooking oils, vegetable fats and agricultural waste, as well as captured CO_2. While fossil fuel releases carbon that has been stored in the earth for millions of years, the carbon generated by SAF has only recently been removed, either by plants or by chemical processes. Therefore, SAF does not add to the overall amount of CO_2 in the atmosphere. Apart from this direct CO_2 benefit, SAF reduces the particulates and smoke that emerge from the engine and enhance contrails. Contrails are increasingly seen as deadly by climate scientists.

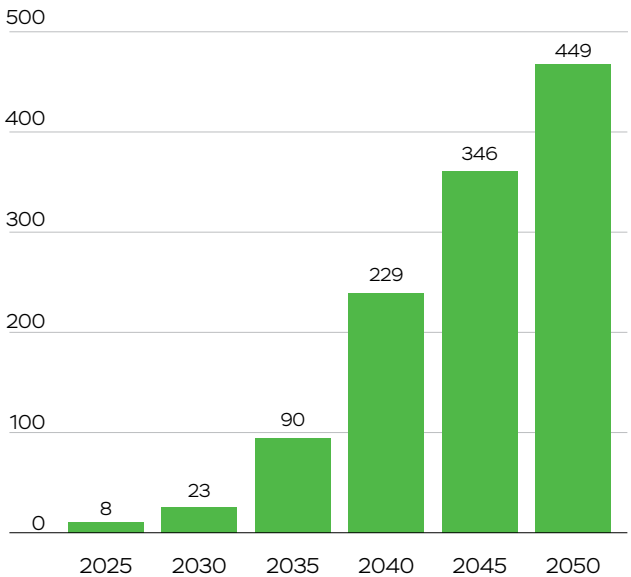
SAF is a "drop-in" fuel meaning that since its chemical composition is very similar to normal fossil fuel the two can be used interchangeably. Although current regulations only permit up to 50 per cent of SAF in jet fuel blends, efforts are on to clear even 100 per cent SAF. However, the process is slow. Both Airbus and Boeing have pledged to make their aircraft fully compatible with 100 per cent SAF by 2030.

Advocates of SAF claim that it can reduce emissions by up to 80 per cent across the lifecycle of the fuel, with a 100 per cent reduction possible in future. However, some recent studies have concluded that the emissions created in flight are considerable and that the benefits of SAF may be rather less than estimated. There are also concerns about secondary environmental impacts, including SAF feedstocks being grown as cash crops and usurping land used for food production. A 2023 report by the UK-based Royal Society said biofuels do reduce emissions, but that many estimates do not account for "land use changes". Accounting for those changes "significantly" impacts estimated carbon output, and "few hit the renewable energy directive target".

HOW IS SAF PRODUCED? SAFs can be produced from a variety of feedstocks and through several different technologies. As of July 2023, 11 conversion processes for SAF production had been approved and seven other processes were under evaluation.

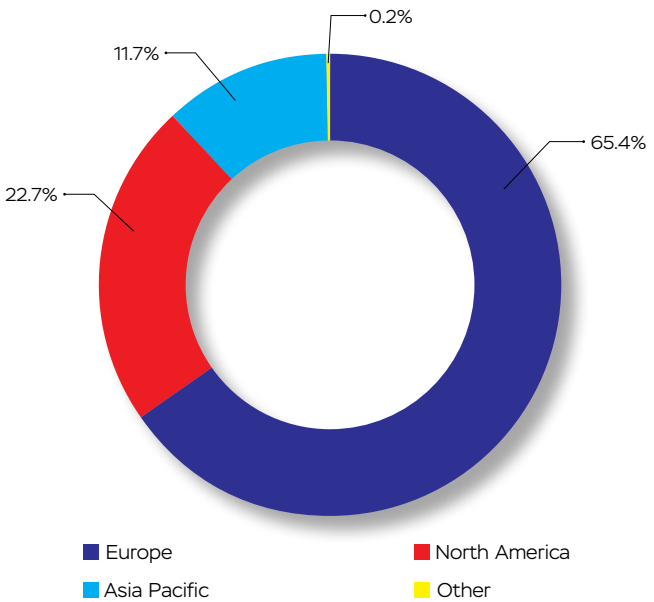
- **First Generation SAFs:** These are the cheapest, simplest to produce and hence most commonly available types. They come mainly from fats, oils and greases (FOGs). However, limited availability of feedstocks prevents significant scaling up of production.
- **Second Generation SAFs:** These are obtained from abundant biomass sources like algae, crop residues, animal waste, forestry residues and sludge as well as from municipal solid waste. But production requires advanced technologies and complex processes that are expensive and energy-intensive.
- **E-Fuels:** Also known as electrofuels, these are prepared from renewable energy and captured CO_2. They are made using a "power to liquid" (PtL) process that produces liquid hydrocarbons synthetically. Although very expensive, they could potentially produce unlimited supplies of SAF. To be truly

EXPECTED SAF REQUIRED FOR NET ZERO BY 2050 (BILLION LITRES)



Source: IATA

SAF USE BY REGION



Source: CAPA Centre for Aviation

sustainable they need large quantities of renewable electricity, as well as a substantial increase in carbon capture and storage capacity.

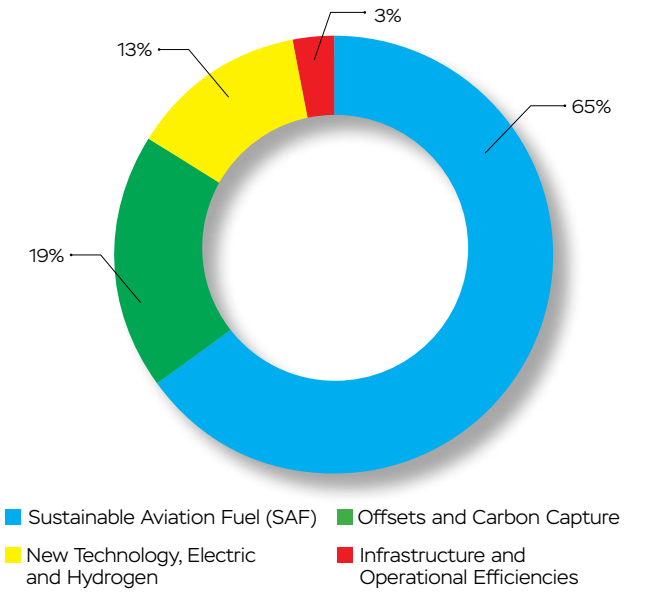
CHIEF CHALLENGES. According to the Geneva-based Air Transport Action Group (ATAG) over 7,75,000 commercial flights have been operated using SAF since 2011. Worldwide, 69 airports are currently regularly supplied with SAF. And 50 airlines have committed to 2030 SAF goals ranging from 5-30 per cent of their total fuel usage, with most committing to 10 per cent. It all looks rosy. However, formidable challenges lie ahead.

- **Price:** The main issue is producing SAF at scale, across the globe, at an affordable price. This seems a distant dream because SAF currently costs between three and five times as much as regular jet fuel.
- **Production:** According to IATA, around 600 million litres of SAF were produced in 2023. Production is expected to more than triple in 2024, to around 1.9 billion litres. Even this will constitute just 0.53 per cent of the total jet fuel consumed during the year. An ICAO sponsored goal of five per cent CO_2 emissions reduction by 2030 would need around 27 per cent of global renewable fuel production capacity to be devoted to SAF. However, SAF currently accounts for just three per cent of such production. Another daunting figure – in order to reach the 449 billion litres annual SAF production capacity that the 2050 net zero goal is overwhelmingly dependent on, the CAGR needs to be 23.39 per cent.
- **Patchy Usage:** Every drop of SAF is purchased but the users are mostly full-service and network airlines. According to the CAPA - Centre for Aviation, the ubiquitous LCCs are less likely to adopt SAF enthusiastically since fuel typically accounts for a large proportion of their operating costs. Due to limited renewable fuel availability, airlines will also need to purchase much more expensive types like e-fuels. European airlines are mainly driving SAF adoption, accounting for around two thirds of globally reported SAF use. North America, although the world's largest aviation market, is way behind. More worryingly, SAF usage is still low in the fast-growing Asia Pacific region and practically non-existent in the rest of the world.
- **Political Pressures:** A second Donald Trump presidency would quite likely be a nightmare for Earth's climate. It may be recalled that in his first term, Trump pulled the US out of the 2015 Paris climate agreement, rolled back environmental regulations, unleashed large-scale oil and gas drilling and much more. Recent reports quote his advisors as believing he did not go far enough. They are openly planning an "all-out war on climate science and policies". Where would that leave the Biden administration's "SAF Grand Challenge" goal of producing sufficient SAF to meet 100 per cent of US demand by 2050? In July 2024, even the European Commission, otherwise a staunch proponent of strong action to mitigate global warming, succumbed to pressure from legacy airlines and excluded long-haul flights from the scope of its non-CO_2 aviation emissions monitoring scheme that commences in January 2025. This means that 67 per cent of European aviation's contrail climate impact will be ignored for at least another two years.

SEEKING SOLUTIONS. Accelerating production and reducing the cost of SAF is imperative and will best be achieved by a combination of urgent measures. Some of these are:

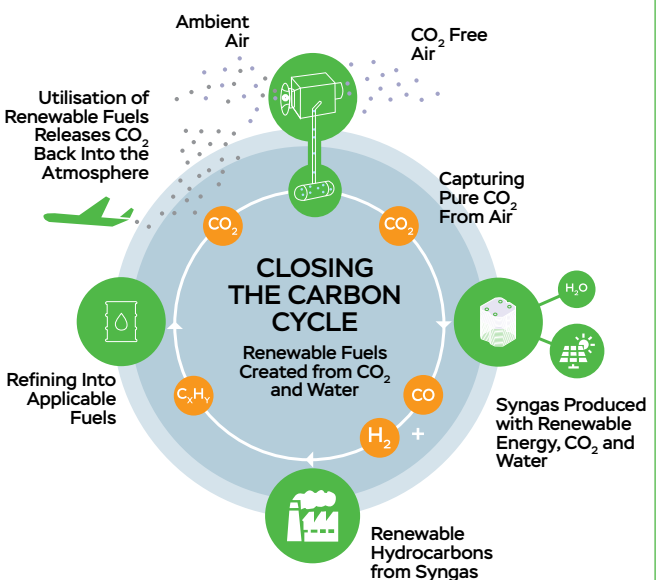
- **Diversifying Feedstocks:** The global supply of hydrogenated fatty acids (HEFA) like used cooking oils and animal fats could soon run out. Focussing on other certified pathways and feedstocks will "greatly expand the potential for SAF production," according to IATA.

CONTRIBUTION TO ACHIEVING NET ZERO CARBON IN 2050



Source: IATA

POWER TO LIQUID (PTL) SAF PROCESS



Source: Zenid

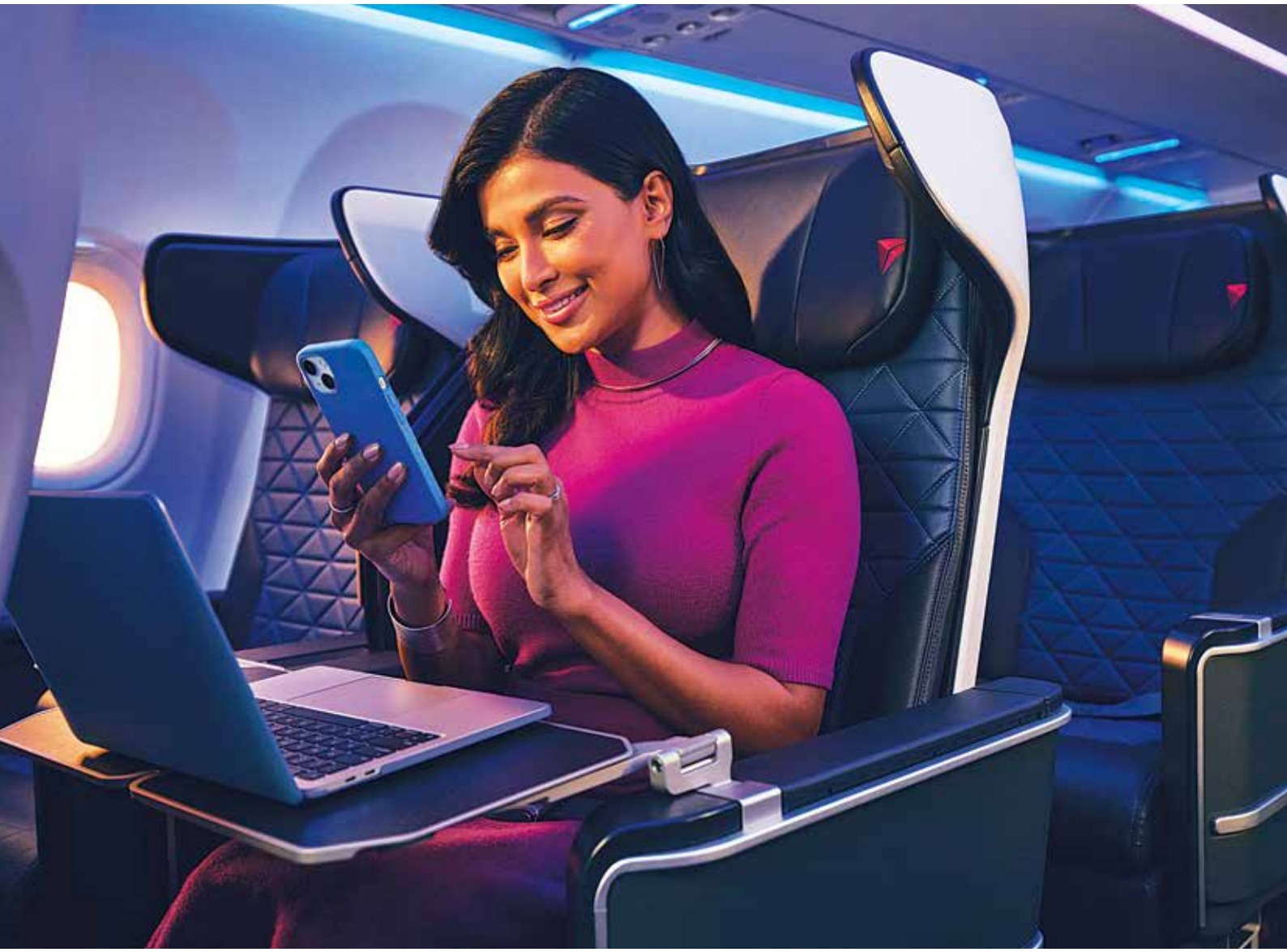
- **Exploiting Existing Refineries:** Crude oil refineries should be mandated to co-process a small but increasing percentage of approved renewable feedstocks too. This could quickly scale up SAF production.
- **Increasing Aviation's Share:** As mentioned earlier, SAF constitutes just three per cent of renewable fuel. Other sectors that grab the lion's share – like transportation – should be incentivised to go electric, leaving more of the pie for aviation. The switch from diesel to SAF requires only minimal modification of existing renewable fuel facilities.
- **Boosting Investment:** An investment of over $1 trillion may be required to create enough SAF production capacity for 2050. Government support is crucial. The big energy companies should also be compelled to invest some of their huge profits in SAF.
- **SAF Mandates and Subsidies:** The long-term trend is expected to be a reduction in SAF production costs enabled by economies of scale and technological advancements, provided demand is assured. Governments can help with strict mandates and generous incentives to use SAF. The EU, for instance, has introduced regulations that include mandates to use SAF starting at two per cent from 2025 and increasing to six per cent by 2030. The US offers subsidies to bring down the price of sustainable fuels. India has set a target to blend one per cent SAF with jet fuel in 2027 and two per cent in 2028. However, these will apply only to international flights initially.
- **Pursuing Contrail Mitigation:** Recent research suggests that contrails could have a greater climate impact than CO_2 emissions and that reducing the amount of soot emitted can reduce contrail persistence. Contrail management therefore could potentially deliver quick environmental gains for the industry, giving it more time to switch to SAF. The most heartening finding is that SAF results in less persistent contrails.

ACTIONS SPEAK LOUDER THAN WORDS!. Matt Finch, UK head of campaign group Transport & Environment says, "There are good SAFs, and there are bad SAFs, but the brutal truth is that right now there is not much of either. Conversely, right now there are thousands of new planes on order from airlines, and all of them will burn fossil fuels for at least 20 years. Actions speak louder than words, and it's clear that the aviation sector has no plans to wean itself off its addiction to pollution."

Finch's opinion may seem unduly harsh since the aviation industry is indeed sincere in its desire to attain environmental sustainability. Yet, it is undeniable that traffic growth will far outstrip efficiency improvements for the foreseeable future, thus increasing carbon emissions. IATA's strategy therefore rests heavily on SAF. Too heavily perhaps? Just a couple of high-profile accidents even partly attributable to the use of SAF could prove a severe setback.

The cost of SAF will surely fall with higher production levels and economies of scale. However, it is unlikely that it can ever match regular fuel costs. But if not SAF, what? In the near term, there is a woeful lack of alternatives. Battery-powered planes are suitable only for short flights of small aircraft. Hydrogen will probably take decades to overcome technological and infrastructural barriers, problems of scalability, and even environmental concerns.

Yet, with SAF being constantly pushed as a panacea, a reality check is essential. The journey to achieve net zero by 2050 will in truth be long, arduous and terribly expensive. Success is by no means assured without urgent measures. Will the aviation industry shoulder its responsibility to curb emissions, no matter what the cost, even reducing flying if necessary? If not, will planet Earth ever forgive us? SP



Airlines now offer passengers in-flight connectivity services through high-speed broadband for them to browse the internet using their own tablets, smartphones and laptops.

PHOTOGRAPH: Delta Air Lines

INFLIGHT ENTERTAINMENT — LATEST TRENDS & INNOVATIONS

Airlines across the board are introducing cutting-edge and innovative inflight entertainment solutions that transform the passenger's inflight experience into something far more engaging and personalised than ever imagined

BY **ROHIT GOEL**

IN TODAY'S HYPER-CONNECTED WORLD, the expectations for inflight entertainment (IFE) have soared to unprecedented heights. As passengers increasingly demand personalised, high-quality entertainment experiences, airlines are responding with a host of innovative solutions designed to transform the in-flight experience. From live streaming to virtual reality, the IFE landscape is rapidly evolving, driven by technological advancements and a keen understanding of passenger needs.

This article offers a comprehensive overview of the latest trends and innovations in inflight entertainment, providing insights into how airlines are leveraging technology to enhance the passenger experience. The emphasis on personalisation, connectivity, and sustainability reflects the broader trends shaping the aviation industry, making it a valuable read for professionals in the field.

THE EVOLUTION OF INFLIGHT ENTERTAINMENT. Traditionally, inflight entertainment was limited to a few preselected movies and music tracks. However, with the advent of digital technology and high-speed internet, the options available to passengers have expanded dramatically. Modern IFE systems now offer an extensive library of content, from the latest blockbusters to niche indie films, alongside a wide array of music, games, and even live television.

The shift from seatback screens to personal devices has been a significant trend, as airlines embrace the bring-your-own-device (BYOD) model. This approach not only reduces costs associated with maintaining seatback hardware but also allows passengers to enjoy a more personalised experience. Many airlines now offer apps that can be downloaded pre-flight, enabling passengers to access content directly from their smartphones, tablets, or laptops.

STREAMING AND CONNECTIVITY. High-speed Wi-Fi has become a critical component of inflight entertainment. Gone are the days when passengers had to disconnect from the world once they boarded a plane. Today, many airlines offer robust Wi-Fi services that allow passengers to stream content, browse the web, and stay connected with friends and family in real time.

American Airlines, for instance, has partnered with Viasat to provide fast, reliable Wi-Fi across most of its domestic fleet. This service allows passengers to stream Netflix, Hulu, and other platforms directly to their devices. Similarly, Delta Air Lines has introduced free messaging on platforms like iMessage, WhatsApp, and Facebook Messenger, keeping passengers connected even while in the air.

Moreover, airlines like Emirates have gone a step further by offering live TV channels, allowing passengers to watch news, sports, and other programming as it happens. This service is particularly popular among sports enthusiasts who don't want to miss a moment of live action while traveling.

High-speed Wi-Fi has become a critical component of inflight entertainment, enabling passengers to stream content, browse the web, and stay connected in real-time

Virtual Reality technology has the potential to create a truly immersive and personalized inflight entertainment experience

PERSONALISED CONTENT AND DATA-DRIVEN EXPERIENCES. Personalisation is at the heart of the latest trends in IFE. Airlines are increasingly leveraging data analytics to understand passenger preferences and tailor content accordingly. This includes everything from recommending movies based on previous viewing habits to offering targeted advertisements.

Singapore Airlines, for example, has introduced a "KrisWorld" system that allows passengers to create personalised playlists and even resume watching a movie from where they left off on a previous flight. The system is designed to remember passengers' preferences, making the IFE experience more seamless and enjoyable.

Another notable innovation is Lufthansa's "BoardConnect" system, which offers a wide range of on-demand content that can be streamed to personal devices. The system also provides real-time information about the flight, including weather updates, connecting gate information, and destination guides, all tailored to the passenger's preferences and travel itinerary.

IMMERSIVE EXPERIENCES: VIRTUAL REALITY AND BEYOND. As virtual reality (VR) technology becomes more sophisticated, it is gradually making its way into the inflight entertainment space. VR offers passengers a fully immersive experience, transporting them to different worlds without leaving their seats. This technology is particularly appealing for long-haul flights, where passengers are looking for ways to pass the time.

Qatar Airways has been at the forefront of this trend, offering VR headsets in its first-class cabins. Passengers can choose from a variety of VR experiences, including 3D movies, interactive games, and virtual tours of the airline's lounges and destinations. Similarly, Alaska Airlines has experimented with VR headsets, providing passengers with a selection of 360-degree videos that range from nature documentaries to interactive games.

While VR is still in its early stages in the IFE market, it has the potential to become a significant differentiator for airlines looking to offer a premium experience. The challenge lies in ensuring that the technology is accessible and comfortable for all passengers, as VR can sometimes cause motion sickness or discomfort during turbulence.

PHOTOGRAPH: Alaska Airlines

Smart Seat Display Unit has a high resolution capacitive touch screen, supporting touch gestures and an ability to play all formats of audio/video

GAMING AND INTERACTIVE CONTENT. In addition to movies and music, gaming has emerged as a popular form of inflight entertainment, especially among younger passengers. Airlines are increasingly offering a selection of games that can be played on seatback screens or personal devices, ranging from casual puzzles to more complex strategy games.

Cathay Pacific, for example, has partnered with gaming companies to offer a variety of interactive games, including multiplayer options that allow passengers to compete against each other. The airline's IFE system also includes educational games for children, making it easier for parents to keep their kids entertained during long flights.

Moreover, some airlines are exploring the potential of cloud gaming, which allows passengers to stream high-quality games without the need for powerful onboard hardware. This could open up a new realm of possibilities for inflight entertainment, providing passengers with access to the latest games without compromising on quality or performance.

THE ROLE OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING. Artificial intelligence (AI) and machine learning are playing an increasingly important role in the development of inflight entertainment systems. These technologies enable airlines to offer more personalised content, predict passenger preferences, and optimise the overall IFE experience.

Virtual reality (VR) is gradually making its way into inflight entertainment, offering passengers fully immersive experiences that are especially appealing on long-haul flights

PHOTOGRAPH: Cathay Pacific Airways

AI-powered chatbots, for example, are being used by airlines to assist passengers with IFE-related queries, such as finding a specific movie or navigating the content library. These chatbots can provide instant, personalised recommendations based on the passenger's previous interactions, making it easier to discover new content.

Furthermore, machine learning algorithms are being used to analyse passenger data and identify trends in content consumption. This allows airlines to continuously refine their IFE offerings, ensuring that they remain relevant and appealing to a diverse range of passengers.

INNOVATIVE SEAT DESIGN AND COMFORT. In addition to providing a wide range of entertainment options, airlines are increasingly focusing on enhancing the overall comfort and experience of flying. This includes investing in innovative seat design and providing amenities that enhance passenger well-being. For example, many airlines are now offering more spacious and comfortable seats, with features such as adjustable headrests and lumbar support. This not only improves passenger comfort but also contributes to a more enjoyable overall travel experience. By providing comfortable and ergonomic seats, airlines can help to reduce the discomfort and fatigue that passengers often experience during long flights. Additionally, many airlines provide amenities such as noise-cancelling headphones and blankets to help passengers relax and enjoy their journey.

SUSTAINABILITY AND THE FUTURE OF INFLIGHT ENTERTAINMENT. As the aviation industry grapples with the challenges of sustainability, airlines are also exploring ways to make inflight entertainment more eco-friendly. This includes reducing the weight of IFE systems to lower fuel consumption and exploring the use of energy-efficient technologies.

For instance, some airlines are moving towards wireless streaming solutions that eliminate the need for heavy seatback screens. Instead, passengers can access content on their devices, reducing the overall weight of the aircraft and, consequently, its carbon footprint.

The future of inflight entertainment is likely to be shaped by a combination of technological innovation and a focus on sustainability. As airlines continue to invest in new IFE systems, the emphasis will be on creating experiences that are not only entertaining but also aligned with the industry's broader environmental goals.

CONCLUSION. As airlines continue to explore new ways to enhance the passenger experience, the future of inflight entertainment promises to be more exciting and dynamic than ever before. Driven by advances in technology and changing passenger expectations, the world of inflight entertainment is undergoing a transformation. From personalised content and high-speed connectivity to immersive experiences and AI-driven solutions, the innovations in this space are redefining what it means to be entertained at 35,000 feet.

As technology continues to advance, we can expect to see even more innovative and exciting developments in inflight entertainment. Airlines are striving to create a seamless and enjoyable travel experience for their passengers, and IFE plays a crucial role in achieving that goal. Whether you're a frequent flyer or an occasional traveller, the next time you board a plane, you're likely to find that the skies have never been more entertaining. SP

FIA2024 reaffirmed its role as a premier platform for showcasing the latest aerospace innovations and cutting edge aircraft that captured the attention of enthusiasts and industry professionals alike

CUTTING-EDGE TECHNOLOGIES HIGHLIGHT INDUSTRY'S FUTURE

Over seven decades of FIA, the airshow still remains significant, underscoring the industry's collective drive towards sustainability, AI-based solutions, advanced air mobility, strategic partnerships, significant orders and groundbreaking technologies

BY **AYUSHEE CHAUDHARY**

SINCE ITS INCEPTION, THE Farnborough International Airshow has been a launchpad for groundbreaking milestones in the aerospace industry. Celebrating its 75th anniversary on September 7, 2023, the event remains a vital hub for innovation and collaboration. The 2024 Farnborough Airshow, held from July 22-26 in Hampshire, UK, emphasised six key themes: Space, Defence, Sustainability, Innovation, Future Flight, and Workforce. This year's show highlighted advancements in sustainable aviation, AI-driven solutions, advanced air mobility, and cutting-edge technologies, reinforcing the industry's forward-thinking agenda. The event underscored a future of greater global connectivity, reduced environmental impact, and pioneering advancements in aviation.

Farnborough International Airshow 2024 attracted over 1,00,000 visitors and 1,500 exhibitors from more than 60 countries, marking a 33 per cent increase in attendance and a 57 per cent rise in delegation participation compared to previous years. With over 390 civil, military, and space delegations in attendance, the show solidified its global importance. The event saw commercial aircraft and engine orders worth around $105.8 billion

PHOTOGRAPH: Airbus

Embraer E195-E2 & E175 presented updates to its E-Jets commercial jets

from key players like Airbus, Boeing, and Embraer, injecting an estimated £13 billion into the UK economy. The UK's new Prime Minister, Sir Keir Starmer, officially opened FIA2024, further elevating its global profile. A new highlight for 2024 was the UK Government Hub, providing a platform for political, industry, and international stakeholders to demonstrate the government's support for the aerospace sector.

The 2024 Farnborough International Airshow reaffirmed its role as a premier platform for showcasing the latest aerospace innovations and fostering strategic partnerships. From cutting-edge aircraft to innovative commercial jets, the event featured a variety of impressive displays that captured the attention of enthusiasts and industry professionals alike.

CIVIL/COMMERCIAL. **Embraer's E195-E2** airliner graced the skies above Farnborough, powered by two Pratt & Whitney PW1900G Geared Turbofans, each delivering up to 23,000 pounds of thrust. The aircraft offers multiple seating configurations, accommodating up to 146 passengers in a single-class layout with 28 inches of seat pitch. With a maximum range of 2,600 nautical miles and a cruising speed of Mach 0.82, the E195-E2 demonstrated its capability to serve various routes efficiently. Making its public debut, Embraer's **E190F** freighter, a converted passenger jet, headlined the company's activities at Farnborough. The E190F addresses the evolving demands of e-commerce and modern trade with its fast delivery capabilities and decentralised operations.

The Farnborough International Airshow 2024 attracted over 1,00,000 visitors and 1,500 exhibitors from more than 60 countries, marking significant increases in attendance and delegation participation compared to previous years

Airbus's A321XLR, equipped with CFM International LEAP-1A engines, made a significant impression at the show. Having received type certification from the European Union Aviation Safety Agency (EASA), the A321XLR is set to enter service by the end of the summer. The aircraft has already garnered over 500 orders, reflecting its anticipated impact on long-range narrow-body travel. **Air India** also made a notable impression by showcasing its latest Airbus A350.

The **ATR 72-600,** a turboprop regional airliner developed through a joint venture between Airbus and Leonardo, demonstrated its efficiency and reliability. Powered by Pratt & Whitney Canada PW127 turboprops, the aircraft offers a typical seating capacity of 72 passengers, making it a vital asset for regional airlines.

The **Diamond Aircraft DART-750,** an all-composite aerobatic basic trainer, showcased its capabilities powered by the Pratt & Whitney Canada PT6A turboprop. With advanced avionics and an all-composite airframe, the DART-750 offers a state-of-the-art training platform for future pilots.

Although **Boeing's** commercial airliners were absent from the static and flying displays, the company showcased a cross-section mockup of its new 777X cabin. This display offered visi-

PHOTOGRAPH: Embraer

tors a preview of the advanced comfort and technology that passengers can expect in the future.

DEFINING DEALS. This year's event highlighted significant announcements focused on sustainability and technology, resulting in 286 aircraft order commitments, including 124 firm orders. The collaborations and projects unveiled, such as Airbus' partnership with ACI World on environmental goals, Boeing's X-66 flight demonstrator, and Lilium's eVTOL air taxi network, reflect the industry's dedication to reducing carbon emissions and advancing operational efficiency. The show also featured breakthroughs in hybrid-electric propulsion, AI-driven maintenance, and next-generation turbofan engines, underscoring the sector's commitment to a more sustainable and technologically advanced future.

Airbus. Preliminary deals for 95 aircraft with Saudi budget carrier Flynas and Latin American holding company Abra. Flynas signed for 75 A320neos and 15 A330-900s, while Abra committed to five A350-900s. Additionally, Virgin Atlantic ordered seven more A330neos, VietJet firmed its order for 20 A330neos, Drukair signed for three A320neos and two A321XLRs. Libyan airline Berniq Airways placed a firm order with Airbus for six A320neo family aircraft, aimed at enhancing its regional and international route network. Meanwhile, Japan Airlines (JAL) confirmed its commitment to Airbus with orders for 20 A350-900s and 11 A321neos. JAL's total order for A350s now stands at 52, with 18 already in service. Airbus also celebrated a significant milestone with Cebu Pacific's purchase of up to 152 A321neo aircraft, marking the largest aircraft order in Philippine aviation history.

Boeing. Korean Air committed to up to 50 widebodies, including 777-9s and 787-10s. National Air Cargo signed for four 777Fs with deliveries scheduled between late 2025 and early 2026, Luxair ordered two firm and two option 737 MAX 10s and Qatar Airways ordered 20 Boeing 777-9s. Macquarie AirFinance purchased 20 Boeing 737-8s, doubling the lessor's existing 737-8 order book, which it initially acquired from Alafco Aviation Lease and Finance in 2023. Qatar Airways solidified its commitment to Boeing by confirming an additional order of 20 Boeing 777-9 aircraft, expanding its 777X order book to a total of 94 airplanes. The Doha-based airline now has on order 60 of the 777-9 passenger models and 34 of the smaller 777-8 freighters, making Qatar Airways the launch customer for the 777-8F. Additionally, Qatar Airways has placed orders for 12 Boeing 787 Dreamliners and 25 737 MAX jets, further reinforcing its expansive fleet strategy. Additionally, Boeing also secured a strategic partnership with Lufthansa Technik for 787 cabin modifications.

Embraer has signed a pair of contracts with Brazil's Department of Airspace Control (DECEA) aimed at modernising the country's air traffic control centers and upgrading strategic solutions for the management of national airspace flow. The two new contracts, worth $17 million, will be implemented by Embraer's Atech subsidiary, which specialises in systems engineering, decision support, and situational awareness technologies.

(Left) VoltAero expands its market scope to Southeast Asia with Global Sky's pre-order for 15 cassio electric-hybrid aircraft; (Right) Wisk Aero and Skyports expand partnership for Wisk's autonomous generation 6 aircraft entry in Australia.

Turkey's Freebird Airlines selected **Collins Aerospace,** a subsidiary of RTX, to provide a software solution for improving operations across its A320 fleet. Freebird Airlines will implement Ascentia, Collins Aerospace's cloud-based data management and analytics platform, to gain a comprehensive view of aircraft maintenance. This solution will enable the airline to predict and reduce aircraft-on-ground events, ultimately lowering maintenance costs and enhancing the passenger experience.

Jekta Switzerland and **Hong Kong's Seaplane Asia** have signed an agreement to add 14 PHA-ZE 100 amphibious aircraft to the Southeast Asian operator's fleet. This deal highlights the growing demand for versatile and sustainable aircraft in the region.

Taiwanese airline **EVA Air** has placed an order for **GEnx engines** to power an additional four Boeing 787-10 aircraft. EVA

Significant aircraft order commitments at the event included $105.8 billion worth of commercial aircraft and engine orders from major players like Airbus, Boeing, and Embraer

PHOTOGRAPHS: VoltAero, Wisk Aero

Air currently operates 15 GEnx-powered Boeing 787s. The GEnx-1B engine, powering two-thirds of all 787 aircraft in service, has amassed over 56 million flight hours since its introduction in 2011 and stands as GE Aerospace's fastest-selling, high-thrust engine.

Long-time ATR customer **Air Tahiti** has signed a new purchase agreement for four **ATR 72-600** aircraft. Scheduled for delivery between 2025 and 2028, these twin turboprops will support the airline's planned expansion in flight frequency and capacity. Air Tahiti, which has been using ATR aircraft for nearly 40 years, currently operates a fleet of 11 aircraft, including nine ATR 72-600s and two ATR 42-600s.

De Havilland Canada (DHC) has signed an agreement with Colombia's Servicio Aéreo a Territorios Nacionales **(Satena)** for the purchase of eight DHC-6 Twin Otter aircraft. This sale will enhance Colombia's air connectivity by improving access to remote areas. Majority-owned by the government of Colombia, Satena plays a vital role in providing essential air services to less connected regions.

ADVANCED AIR MOBILITY. The Farnborough Airshow in June 2024 showcased a range of cutting-edge innovations in advanced air mobility, highlighting the future of urban and regional transportation.

Joby Aviation presented its electric vertical takeoff and landing (eVTOL) air taxi, featuring six tilting rotors. With over 33,000 test miles and more than 100 piloted flights completed, Joby's air taxi offers a glimpse into the future of urban air mobility.

Supernal debuted its four-passenger S-A2 eVTOL aircraft, a new mode of urban transportation designed to alleviate traffic congestion. The company is progressing towards a full-scale prototype, with the first flight scheduled for 2025.

VoltAero exhibited the Cassio 330, a hybrid-electric aircraft aimed at sustainable regional air transportation. This aircraft represents a significant step towards greener aviation solutions.

Hexagon unveiled the PRESTO XL, a state-of-the-art automated quality inspection system. This new addition to Hexagon's modular series supports increased aerospace production by inspecting major aerostructure components such as fuselage panels and wing ribs. The fully automated PRESTO XL system can be deployed globally within 16 weeks.

Magnet Schultz showcased its EN9100-certified hydrogen power solenoid valve, designed for hydrogen gas flow control in aerospace applications. This innovation adheres to ISO 9001 standards and marks a significant advancement in hydrogen power technology.

(Left) Joby Aviation's eVTOL air taxi made its first European appearance;
(Right) Supernal debuts S-A2 eVTOL at FIA2024.

The event showcased innovations in advanced air mobility, including electric vertical takeoff and landing (eVTOL) aircraft and hybrid-electric aircraft, underscoring a transformative shift towards greener aviation solutions

GKN Aerospace revealed its H2FlyGHT initiative, an ambitious project to develop a 2-megawatt cryogenic hydrogen-electric propulsion system. This cutting-edge system aims to set new standards for larger, sustainable aircraft. Additionally, GKN will use Vaeridion's all-electric nine-passenger regional airliner as a testbed for new electrical wiring interconnection systems (EWIS) technology, with the aim of achieving type certification before 2030.

Electra introduced its hybrid-electric eSTOL aircraft, featuring Honeywell Aerospace's flight control computers and electromechanical actuation systems. Designed for short takeoff and landing in under 150 feet, Electra's aircraft is suited for unconventional locations and includes blown lift technology with distributed electric propulsion.

Global Sky has committed to purchasing 15 Cassio hybrid-electric aircraft from VoltAero, becoming the launch customer for this innovative vehicle. The aircraft will support regional air services, freight deliveries, and emergency medical support, offering a range of around 82 nautical miles in all-electric mode.

PHOTOGRAPHS: FIAFarnborough / X, Supernal

Luxaviation Group's Sigma Air Mobility has partnered with VoltAero to introduce a family of hybrid-electric aircraft, including the five-seat Cassio 330, the six-seat Cassio 480, and the larger Cassio 600, which can accommodate 10 to 12 passengers. The Cassio 330 is expected to begin flight testing in 2025, with EASA type certification anticipated by 2026.

Honeywell and Odys Aviation signed a memorandum of understanding to co-develop ground control stations for Odys' hybrid-electric VTOL aircraft, Laila. Designed for cargo delivery and inspections over distances up to 230 miles, these ground control stations will enable remote management of multiple vehicles.

Wilbur Air, an Australian startup, has partnered with Crisalion Mobility to operate 100 Integrity eVTOL aircraft, connecting Australian cities through a network of planned vertiports. The Integrity eVTOL, featuring Crisalion's patented FlyFree propulsion system, aims for certification and service entry by 2030.

Lilium, in collaboration with SEA Milan Airports and Skyports Infrastructure, is working to establish a network of eVTOL air taxi services in Milan. The initial route will connect Malpensa Airport with the city center. Lilium has also secured a binding sales agreement with Saudi Arabian airline Saudia for 50 six-passenger eVTOL aircraft, with options for an additional 50 units.

Eve Air Mobility, an Embraer spin-off, secured $95.6 million in additional funding from Space Florida, supporting its eVTOL programme through 2027. The company also announced new partnerships with Diehl Aviation and ASE to develop cabin interiors and power distribution systems, respectively.

Wisk Aero and Skyports Infrastructure are collaborating to establish a network of eVTOL air taxi services in South East Queensland, Australia. This partnership aims to leverage Wisk's Generation 6 eVTOL aircraft to develop use cases for urban air mobility.

The Farnborough Airshow highlighted these advancements in electric, hybrid-electric, and hydrogen-powered aircraft, underscoring a transformative shift in the aviation industry towards greener and more efficient transportation solutions.

SUSTAINABILITY STEPS. Airbus and Airports Council International (ACI) World have joined forces to advance the aviation industry's environmental goals, focusing on promoting sustainable aviation fuel (SAF), hydrogen technologies, advanced air mobility, operational efficiency, and noise mitigation. Their partnership, announced during an industry event, is designed to support the exchange of knowledge and perspectives on low-carbon operations while effectively communicating progress in reducing the sector's environmental footprint. Airbus has also announced several significant initiatives, including a strategic investment in LanzaJet to accelerate the development of SAF, and a partnership with Avolon to explore financing options for hydrogen-powered commercial aircraft under the ZeroE project. Additionally, Airbus is leading a consortium that has co-invested $200 million in a SAF financing fund to boost production, and GKN Aerospace has committed £4 million to advance Airbus' Sustainable Wing Solutions (SusWingS) research programme, all of which reinforce Airbus' dedication to sustainability.

(Left) Jekta and Zeroavia to partner on hydrogen-electric amphibious aircraft;
(Right) GKN Aerospace and VÆRIDION sign technology collaboration on all-electric microliner aircraft.

The show highlighted advancements in sustainable aviation, AI-driven solutions, advanced air mobility, and cutting-edge technologies, reinforcing the industry's forward-thinking agenda

Meanwhile, Boeing has selected Safran Electrical & Power to provide the electrical power generation system for its X-66 flight demonstrator, part of NASA's Sustainable Flight Demonstrator project. Test flights for this transonic truss-braced wing concept aircraft are scheduled for 2028. Other developments in green aviation include TT Electronics' launch of advanced high-voltage DC power conversion solutions aimed at enhancing the performance of environmentally-friendly aircraft. Additionally, Dutch aircraft developer Maeve has teamed up with Pratt & Whitney Canada to design the M80 hybrid-electric regional aircraft, which prom-

PHOTOGRAPHS: Zeroavia, VÆRIDION

ises a 40 per cent reduction in fuel consumption and emissions compared to existing regional jets, signifying important strides in sustainable aviation technology.

SOME MORE ADVANCEMENTS. L3Harris has recently announced major deals with Japanese and Indian airlines, strengthening its presence in both markets. The company's Reality7e Boeing 787-9 full-flight simulator received its first-ever approval from the Japanese Civil Aviation Bureau (JCAB). This milestone marks the simulator's deployment to All Nippon Airways (ANA), significantly enhancing ANA's training capacity for its Boeing 787 fleet. Additionally, L3Harris has secured a partnership with Air India to supply SRVIVR25 voice and data recorders for the airline's Boeing 737-8 fleet. This deal covers 100 aircraft, with an option for 40 more, further expanding L3Harris's role in avionics and pilot training.

Pratt & Whitney, part of RTX, has partnered with SR Technics to introduce maintenance, repair, and overhaul (MRO) services for the PW1100G Geared Turbofan (GTF) engine at SR Technics' Zurich facility. This collaboration enables full disassembly, assembly, and testing capabilities for the GTF engine, which powers the Airbus A320neo family, enhancing MRO capacity in Europe and supporting the growing demand for these engines.

Avolon has made its largest-ever engine commitment by placing an order for 310 new engines to power 155 Airbus A320neo-family aircraft. The $5 billion order is split between Pratt & Whitney's GTF engines and CFM International's LEAP-1A engines, reflecting the lessor's strong investment in both engine technologies. Separately, CFM International secured another deal with Nordic Aviation Capital, supplying 10 LEAP-1A engines for five Airbus A321neo-family aircraft, with options for additional orders, reinforcing CFM's market presence.

Boom Supersonic continues to make progress on its Overture aircraft, partnering with StandardAero to test and assemble the Symphony engines that will power the supersonic jet. Additionally, Boom unveiled the Overture's Honeywell Anthem avionics suite, which will support the aircraft's advanced flight operations, signaling critical developments in its supersonic air travel ambitions.

Pratt & Whitney celebrated a new customer as Sky Airline selected the GTF engine to power its Airbus A321XLR aircraft. This marks Sky Airline's first partnership with Pratt & Whitney, enhancing the airline's operational efficiency with advanced engine technology for its growing fleet.

Jekta, a Swiss startup, has chosen ZeroAvia's hydrogen-electric fuel cell power generation system for its planned PHA-ZE 100 amphibious aircraft. A full-scale prototype is expected by 2027, with European Union Aviation Safety Agency (EASA) type certification anticipated by 2029, positioning the aircraft as a key player in the future of sustainable aviation.

United Airlines has opted for Honeywell Aerospace Technologies to equip its 737 MAX fleet with cutting-edge avionics systems. This includes 3D weather radar and enhanced traffic avoidance systems, improving flight safety and operational efficiency across United's fleet. Meanwhile, Jekta also revealed plans for a hydrogen-electric version of its PHA-ZE 100 seaplane, further advancing its goal to develop environmentally friendly aircraft.

ITP Aero has renewed its partnership with Pratt & Whitney Canada (P&WC), ensuring the continuation of maintenance, repair, and overhaul services for the PW800 engine's mid-turbine frame (MTF) and low-pressure compressor (LPC) modules until 2028. This extension solidifies ITP's role as a strategic partner in the global MRO market, supporting Pratt & Whitney's efforts to expand its service capabilities.

(Left) Hanwha exhibited its advanced aero-engine;
(Right) Space Zone at FIA2024.

In another development, the Cameroon Civil Aviation Authority (CCAA) has signed a memorandum of understanding (MoU) with Luxembourg-based Vallair Group. The agreement focuses on enhancing aeronautical training, aircraft maintenance, disassembly, and workforce development in Cameroon. It also aims to transfer Vallair's expertise in aircraft maintenance while developing a comprehensive aircraft and engine recycling ecosystem in the region.

FIA2024 showcased the aerospace industry's unwavering commitment to innovation and technology, emphasising sustainability, AI-based solutions, advanced air mobility, and pioneering advancements. The event featured a diverse range of cutting-edge solutions, from automated inspection systems to hydrogen power products and next-generation technologies. As the aerospace sector evolves, the Farnborough Airshow remains a vital platform for revealing the future of aviation and aerospace technology. SP

PHOTOGRAPHS: Hanwha, FIAFarnborough / X

MOVING TOWARDS AIRCRAFT MANUFACTURING

India's ambition to produce its own commercial aircraft is not new, but the government now seeks to go beyond, aiming to not only meet domestic demand but also emerge as a global exporter of commercial aircraft.

IN A SIGNIFICANT MOVE towards making India self-reliant in the aviation sector, the government has announced plans to establish a Special Purpose Vehicle (SPV) focused on the development and manufacturing of indigenous commercial aircraft. Civil Aviation Minister K. Rammohan Naidu outlined the government's vision to create a robust aircraft manufacturing ecosystem in India. This long-awaited initiative aims to reduce India's dependency on foreign manufacturers for its growing aviation needs.

While acknowledging this gap, Minister Naidu stated that the SPV is still in its early stages, with further details to be shared once concrete steps are in place. "India is a major client for large original equipment manufacturers (OEMs) like Airbus and Boeing, so they have a strong inclination to partner with us," Naidu said, emphasising that the SPV will bring together a wide range of stakeholders, including these OEMs. The goal is to leverage their expertise and knowledge to develop a sustainable aircraft manufacturing ecosystem in India. He also stressed the need for a large-scale manufacturing initiative that could reduce India's reliance on foreign companies for parts, components, and aircraft. He underscored the potential economic benefits, which align with India's broader vision of "Atmanirbhar Bharat".

Kinjarapu Rammohan Naidu, India's Minister of Civil Aviation

"Building our own planes is an idea the government is strongly pushing. There have been instances of aircraft manufacturing in India, with HAL being the major player, but we want to scale it up significantly," Naidu stated. He highlighted that the proposed SPV will focus on addressing critical concerns such as technological know-how, supply chain infrastructure, and market opportunities, with a timeline of five years to lay the groundwork for the aircraft manufacturing plan.

In parallel with these manufacturing efforts, the government is working on the policy front to promote aircraft production. The new 'Bhartiya Vayuyan Vidheyak' bill, which is set to replace the nearly century-old Aircraft Act, introduces legal frameworks that support the design and manufacturing of aircraft in India. Naidu mentioned that the bill includes provisions that will give legal backing to aircraft design, a critical step towards enabling local manufacturing.

The government has also been advocating for global OEMs like Airbus and Boeing to set up final assembly lines (FAL) for passenger aircraft in India. While Airbus is collaborating with the Tata Group to establish both a military and a civilian helicopter FAL in the country, there has been no commitment from either Airbus or Boeing to set up a commercial aircraft FAL in India. The absence of such facilities has long been a hurdle in India's aviation ambitions, but the government's new initiative could change this dynamic.

India's potential to become a global player in aircraft manufacturing is immense. With over 1,500 aircraft on order, the country represents a massive market. The challenge now is to transform this demand into a self-sustaining manufacturing ecosystem that reduces reliance on international suppliers.

For India to achieve this goal, it will need not only the involvement of global OEMs but also the development of local talent, infrastructure, and supply chains. Setting up an indigenous aircraft manufacturing industry will require collaboration between various stakeholders, including private companies, public-sector entities like HAL, and global aviation experts. Naidu emphasised that while the road ahead is challenging, the government's commitment to this vision is unwavering. "India's aviation market is poised for exponential growth, and we need to ensure that we are not just consumers but also producers of aircraft. We want to inform the industry that the government is taking definitive steps towards this," Naidu said. He further added that India's goal is to not only meet the domestic demand for aircraft but also position itself as a competitive exporter in the global aviation market.

The initiative to manufacture aircraft in India represents a crucial and a bold step towards self-reliance in the aviation sector. By establishing an SPV and working closely with global OEMs, the government is finally laying the foundation for a future where India can build and export its own commercial jets. The move aligns with the broader national vision of "Atmanirbhar Bharat," creating opportunities for economic growth, job creation, and technological advancement. India's aviation sector is at a pivotal moment, and the decisions made today will shape the industry's future. While the journey towards indigenous aircraft manufacturing will undoubtedly be complex, it is an essential one for India's long-term growth and self-sufficiency in the global aerospace landscape. SP

— ROHIT GOEL

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