Shared Horizons

U.S. - India Aviation Cooperation Program : " A Win - Win Partnership"

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Shared Horizons • Volume 22 • June 2023

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Bengaluru International Airport Limited (BIAL) Phase II
Bengaluru, India

Delhi International Airport Limited (DIAL) Phase 3A
Delhi, India

Message from the Chairman

Sundresh Sarup
ACP Chairman &
Managing Director
Logistics Plus India

We are pleased to present to you Bi-annual issue of "Shared Horizons" – June 2023.

The main highlights of the last period were ACP Members roundtable with Ms. Enoh T. Ebong, Director – USTDA and Mr. Rajiv Bansal, Secretary, Ministry of Civil Aviation; Executive Development Training Program in India and in Washington D.C. ACP Members roundtable with Ministry of Civil Aviation, ACP Members roundtable meeting with Minister Scindia and Secretary Bansal, during Wings India in Hyderabad.

We are excited to welcome the latest new members to the ACP, ICF.

With sixteen years of partnership, ACP represents the long-term commitment of both Countries' public and private sectors towards the advancement of India's development priorities, while positioning U.S. firms to partner with India in the implementation of India's civil aviation goals and objectives.

The promise of Indian skies is fuelled by a host of factors. One factor is that, as per an IATA report, the country is expected to become the third-largest aviation market in terms of the number of passengers by 2024. On the back of India recently overtaking China as the most populous country in the world — with a strong middle and working-class — domestic passenger traffic soared to around 132.67 lakh in May 2023, a 15 per cent year-on-year growth. A regional connectivity scheme, Ude Desh ka Aam Nagrik (UDAN), launched in 2016, aimed to operationalize 1,000 UDAN routes and revive 100 unserved and underserved airports by 2024. As of December 2022, 453 routes have commenced, and 70 airports are operationalized. India will need about 2,500 aircraft by 2038 per analysis by Boeing and it was not unsurprising to see the recent orders of 470 and 500 airplanes by Air India and Indigo respectively from Boeing and Airbus.

The ACP continues to play an active role in steering capacity enhancement projects and fostering dialogue to promote cooperation through webinars, workshops, seminars and summits. We remain committed to maintaining the momentum to ensure that our member companies deepen their ties with India by enhancing their footprint and to address the diverse needs of the growing Indian aviation market.

I sincerely thank you for your continued support to the program in 2023 and beyond.

(Sundresh Sarup)

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ACP Milestones

2023

- ACP Members roundtable with Ms. Enoh T. Ebong, Director – USTDA & Mr. Rajiv Bansal, Secretary, Ministry of Civil Aviation on January 18, 2023 at New Delhi

2022

- ACP's roundtable meeting with P&W leadership on October 21, 2022 at New Delhi.
- 2nd phase of EDTP from August 14 – 19, 2022 in Washington D.C.
- ACP Members roundtable with Ministry of Civil Aviation followed by EDTP's closing reception on July 23, 2022 at New Delhi.
- ACP's Executive Development Training Program (EDTP) opening ceremony on July 18, 2022 at New Delhi.
- ACP's Farewell reception in Honor of Mr. Philip Matt Ingeneri, ACP Co-chair (Government) & Economic Growth Unit Chief, EEST – DOS on May 19, 2022 at New Delhi.
- ACP Members roundtable meeting with Minister Scindia and Secretary Bansal, Ministry of Civil Aviation (MoCA) on 25th March 2022 during Wings India 2022 at Hyderabad.
- ACP Members meeting with GMR Leadership on March 24, 2022 at Hyderabad.
- ACP Members' participation at Wings India 2022, Hyderabad.
- ACP Members roundtable with Chris Carter, Director – FAA on March 22, 2022 at New Delhi.
- ACP's webinar "Global Crisis – Devastating New Impacts on Aviation" on March 10, 2022.
- ACP leadership's introductory meeting with Secretary Rajiv Bansal, MOCA on March 7, 2022 at New Delhi.
- ACP Members' meet and greet with Honeywell India's New President, Mr. Rajesh Rege on February 23, 2022 at Gurugram.

2021

- ACP's lunch in honor of Ex. Secretary MOCA, Pradeep Singh Kharola with a unique memento on November 24, 2021 at New Delhi
- ACP Members luncheon with Dr. Shefali Juneja, Chairperson of ICAO's Aviation Security Committee on November 18, 2021 at New Delhi
- ACP's webinar with MOCA; FAA & TSA on "Unmanned Aircraft System (UAS)/Unmanned Traffic Management (UTM)" on August 24, 2021
- USTDA-ACP Virtual Seminar on "Conversations on Sustainable Aviation and Climate Resiliency" on August 17-18, 2021
- Virtual Roundtable with Yamuna Expressway Industrial Development Authority / Noida International Airport Limited & ACP Member Companies
- ACP's webinar with AAI on "Water Resources Engineering & Waste Management"
- Boeing/USC's SMS Training Program with IAA
- ACP Members' own Society "US-India Aviation Cooperation Program" formed and received Certificate of Registration from Registrar of Societies
- ACP's webinar on "Future of Travel & Work Post COVID-19"
- ACP's participation at Aero India 2021 at Bengaluru

2020

- ACP-MOCA's open discussion on Aviation in US & India, post COVID scenario and exchange of New Year Greetings
- ACP-MOCA's interactions on "Ease of Doing Business – Airport Access"
- ACP's webinar with IAA "Navigating through COVID Clouds to Safer Cruising Heights"
- ACP's webinar "Restoring Confidence in Air Travel"
- ACP's participation at Wings India 2020 at Hyderabad

2019

- ACP' Year-End Get-Together at New Delhi
- ACP's annual "Innovation in Aviation" workshop 2019 at Hotel – The Oberoi, New Delhi
- ACP Members roundtable with Mr. Thomas R. Hardy, Director (Acting), USTDA & Mr. Pradeep Singh Kharola, Secretary, Ministry of Civil Aviation at New Delhi
- U.S.- India ACP India RTM - Air Navigation Services, July 28 – August 3, 2019 at USA
- ACP Members Meeting with Dr. Guruprasad Mohapatra, Chairman-AAI at New Delhi
- ACP's participation at MOCAs' roundtable discussion on Skills Development at New Delhi
- U.S.- India ACP Aviation RTM - Airport Development, March 24-30, 2019 at USA
- ACP's participation at Aero India 2019, Bengaluru
- ACP's participation at MOCA's 2019 Global Aviation Summit, Mumbai

2018

- Webinar on update of MOCA's Global Aviation Summit 2019 at New Delhi
- Grant agreement signed for CNS/Airspace with AAI
- Grant agreement signed for AAAE/IAAE with IAA & GMRAA to provide Training, Accreditation Programs
- ACP's "Innovation in Aviation" workshop with Ministry of Civil Aviation at New Delhi
- Grant agreement signed for Executive Development Training Program (EDTP) with RGNAU at New Delhi
- RGNAU's Eminent Speaker Series with Mr. Mark Searle, University of California Berkeley at New Delhi
- ACP's Eminent speakers series with Hugo Yon, U.S. Department of State (DoS) & Kristen Davis, U.S. Department of Transportation (DoT)
- ACP Members roundtable with GoI & USG officials during US – India Aviation Summit at Mumbai
- 2018 U.S. – India Aviation Summit at Mumbai
- Announcement of MoU between ACP-MOCA on specialized aviation training at Wings India 2018, Hyderabad

2017

- Celebration of ACP's "10 years Anniversary Partnership" at New Delhi
- Celebration of "ACP Diwali Nite" at New Delhi
- Grant agreement signed for Sustainability Master plan of Kolkata and Lucknow Airports
- ACP's "Innovation in Aviation" workshop with Ministry of Civil Aviation at New Delhi
- Aviation Institute of Maintenance's "The Award Dinner" in partnership with ACP at New Delhi
- Airport construction codes + specifications and 777x Airport compatibility workshop with DGCA
- ACP Members meeting with Enoh T. Ebong, Acting Director-USTDA at New Delhi
- Creation of Sub-committee on Aviation and Aerospace Skills Development
- Eminent Speaker Series - Blockchain Technology & its effect on the Aviation Industry
- ACP's participation at Aero India 2017, Bengaluru
- ACP & RGNAU partnership to bring the first Executive Development Program (EDP) for Aviation in India

ACP Milestones

2016

- Memorandum of Understanding Signing: ACP & Rajiv Gandhi National Aviation University (RGNAU)
- Celebration of "ACP Diwali Nite" at New Delhi
- System Wide Information Management (SWIM) workshop with AAI
- Grant agreement signed for GAGAN Extension Business Case
- Memorandum of Cooperation (MOC) Signing: ACP & National Skill Development Corporation (NSDC)
- ACP roundtable meeting in honour of Lee Zak, Director-USTDA & Sr. USG officials visiting India for US-India Strategic and Commercial Dialogue at New Delhi
- ACP farewell reception in honour of CJ Collins, ACP Co-chair (Government) & Sr. Representative to South Asia, FAA at New Delhi
- ACP Members meeting with Manish Kumar, MD & CEO, NSDC at New Delhi
- ACP Project workshop with Ministry of Civil Aviation at New Delhi
- ACP reception in honour of India Aviation 2016 participants at Hyderabad
- Memorandum of Cooperation (MOC) Signing: ACP & Bhogapuram International Airport Company Ltd., (BIACL)
- ACP Members roundtable meeting with Ministry of Civil Aviation (MOCA) during India Aviation 2016 at Hyderabad
- Grant agreement signed for Aviation Safety Technical Assistance Phase – II

2015

- ACP's Yearend social get-together at New Delhi
- ACP Members meeting with Lee Zak, Director-USTDA during 2015 US – India Aviation Summit at Bengaluru
- 2015 U.S. - India Aviation Summit at Bengaluru
- Workshop on Next Generation Surveillance and Safety using ADS-B Technology at New Delhi
- Grant agreement signed for ProVision Body Scanner System Pilot Project
- ACP Members meeting with USTDA's Global Procurement Initiative (GPI) team at New Delhi
- ACP Members luncheon with Secretary Anthony Foxx, DoT with Delegation at New Delhi
- ACP Members meeting with Hon'ble Minister of Civil Aviation & Hon'ble Chief Minister of Andhra Pradesh at Aero India 2015, Bengaluru
- ACP Members luncheon with Lee Zak, Director-USTDA at New Delhi

2014

- ACP's participation at India – US Technology Summit at Greater Noida
- Honeywell's Udaan' 14 in partnership with ACP on " Propelling India Aviation Growth" at New Delhi
- Grant agreements signed for Aviation Security Equipment Testing & Evaluation Program (ASETEP) & Aviation Safety Technical Assistance Phase – I
- ACP Members roundtable with Ministry of Civil Aviation at New Delhi
- ACP Members meeting with Arun M. Kumar, DG- FCS at New Delhi
- Farewell reception in honour of Margaret Hanson-Muse, Deputy Sr. Commercial officer at New Delhi
- ACP reception in honour of India Aviation 2014 participants at Hyderabad
- Grant agreements signed for Performance Based Navigation (PBN), Technical, Management, and Operational Development Training (TMODT) Phase – II and Airport Geographic Information System (AGIS) for Indian Airport

2013

- U.S. - India Aviation Summit at Washington D.C.
- ACP Members meeting with Lee Zak, Director – USTDA at New Delhi
- Workshop on U.S. - India Aviation Security at New Delhi
- Seminar on General Aviation: The Next Steps at New Delhi
- Seminar on Bilateral Aviation Safety Agreement (BASA) regime at New Delhi

2012

- Honeywell's Udaan' 12 in partnership with ACP on " Indian Air Traffic Modernization & Airspace Decongestion" at New Delhi
- Grant agreement signed for Total Airspace and Airport Modeler (TAAM) at New Delhi
- ACP's participation at India Aviation 2012, Hyderabad

2011

- U.S. - India Aviation Summit at New Delhi
- Grant agreements signed for Technical, Management, and Operational Development Training (TMODT) Phase – I & launching GBAS at Chennai Airport
- Seminar on Airport Economic Reforms – Moving Ahead with Chairman AERA at New Delhi
- Indo – US Aviation Manufacturers Meet at New Delhi

2010

- Conference on Civil Aviation: Creating Sustainable Growth at New Delhi
- Grant agreement signed for Helicopter Safety Technical Assistance
- ACP's Roundtable Discussion on Airport Regulatory & Financing Best Practices
- ACP's participation at India Aviation 2010, Hyderabad
- Seminar on Automatic Dependent Surveillance – Broadcast (ADS–B) & Ground Based Augmentation System (GBAS)

2009

- U.S. - India Aviation Partnership Summit at Washington D.C.
- Grant agreement signed for Aviation Standard Technical Training
- Farewell reception in honour of R.K. Singh, Joint Secretary – MOCA at New Delhi

2008

- FAA conducts Air Traffic Management Training Program (ATMTP)
- Seminar on Indo – US Aviation Cooperation – Growth of Civil Aviation in India at New Delhi
- AAI Air Traffic Control Officers (ATCO) Manpower Assessment Study
- Seminar on Air Traffic Flow Management (ATFM)

2007

- U.S. - India Aviation Partnership Summit at New Delhi
- U.S. - India ACP Inaugural Session: ACP Formed
- MoU between: U.S. Department of Transportation, U.S. Trade & Development Agency and Ministry of Civil Aviation

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AIRPORTS AUTHORITY OF INDIA

BUREAU OF CIVIL AVIATION SECURITY

ACP Ongoing Projects

- Airport Emergency and Operations Management Pilot Project and Feasibility Study

ACP Past Successes

- Business Case for GAGAN Extension
- GBAS Pilot project at Chennai Airport
- Aviation Safety Technical Assistance Phase – II
- Aviation Security Equipment Testing & Evaluation Program (ASETEP)
- Airport Geographic Information System (AGIS) for Indian Airport
- Technical Training for Aerospace Industry
- ProVision Body Scanner System Pilot Project
- Technical, Management, and Operational Development Training (TMODT) Phase – II
- Aviation Safety Technical Assistance Phase – I
- Total Airspace and Airport Modeler (TAAM)
- Technical, Management, and Operational Development Training (TMODT) Phase – I
- AAI Air Traffic Control Officers (ATCO) Manpower Assessment
- Helicopter Aviation Safety Technical Assistance
- Aviation Standard Technical Training
- CNS/ATM Modernization Roadmap
- Sustainability Master plan for Kolkata and Lucknow Airports
- Executive Development Training Program (EDTP) – 1
- Executive Development Training Program (EDTP) - 2

MISSION

- The U.S.-India Aviation Cooperation Program (ACP) was established in 2007 as a public-private partnership between the U.S. Federal Aviation Administration (FAA), the U.S. Trade and Development Agency (USTDA), the U.S. Departments of Commerce and State, Transportation Security Administration and U.S. Companies.

- The ACP supports the growth of the Indian civil aerospace sector by working directly with the Government of India (GOI) to identify and execute projects that encourage collaborations between US and Indian stakeholders, in the area of aerospace technology and best practices.

OBJECTIVE

- Promote greater engagement between US and Indian Government agencies and industry to enhance civil aviation in India.

- Undertake projects that advance Cooperation in domains such as aviation safety, security, regulatory oversight and management.

- Provide training and technical assistance to accelerate excellence in aviation operations.

- Within India, increase awareness of, and facilitate access to, US expertise, technology and best practices to assist India's aviation growth.

PRIORITIES

- **Confident Travel**

a. Cooperate on scientific studies and data driven approaches to restore confidence in the flying public
b. Undertake projects to advance cooperation and joint development of technology to make aviation travel safety

- **Foster and continue to develop stronger government to government ties**

a. System Safety Approach: Promote risk-based data-driven decision making that is built on Safety Management System (SMS) principles to proactively address emerging safety risk by using data to make safer and smarter decisions
b. Continued engagement to improve airport operations, safety, capacity, and innovation and foster growth and safe integration of Unmanned Aircraft Systems operations in the present airspace ecosystem

- **Aviation in India's National Logistics Policy**

a. Provide US expertise and technology to help modernize and improve efficiency of India aviation supply chains
b. Foster interactions and partnership between U.S.-India aviation cargo industries

- **Aviation Maintenance Repair and Overhaul (MRO)**

a. Explore opportunities for industry to partner on India's vision to develop an MRO hub
b. Industry-led MRO training to meet expected new demand following national policy changes

- **Aviation Training**

a. Foster partnership between U.S. industry and Indian pilot training organizations
b. Provide industry-led cooperation to accelerate excellence in airline operations and management

- **Aviation Security**

a. Undertake projects that investigate use of digital technology and analytics to make airport passenger and cargo flows more efficient, touchless screening and security by evaluating and validating the performance of checkpoint CTs, security scanners, and ASLs
b. Facilitate implementation of seamless process for security access/clearances to aviation facilities for technical experts, pilots & engineers to promote technical cooperation and interaction

- **Airspace Optimization**

a. Continue cooperation on Communication, Navigation and Surveillance/Air Traffic Management (CNS/ATM) modernization building on developed roadmap
b. Foster US-India government and industry interactions on Unmanned Traffic Management (UTM) implementation in India and explore inclusion in overall CNS/ATM roadmap
c. Safe airspace integration, framework and policy for regulatory capacity building on UTM

- **Sustainability**

a. Foster U.S.-India government and industry cooperation in furtherance of national and international aviation sustainability and climate goals including implementation of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)
b. Facilitate cooperation, joint development and certification of airplane technology

U.S. Commercial Service
U.S. Department of Commerce
U.S. Embassy New Delhi, India

The Commercial Section of the U.S. Embassy promotes U.S. exports, helps American companies do business overseas, and promotes foreign direct investment into the United States. As part of the U.S. Commercial Service's global network, with seven offices across India, over 100 offices in the United States, and more than 80 other international offices, we have many trade and export promotion resources to help you develop your business.

U.S. companies with a commitment to the Indian market can find opportunities in a diverse range of industry sectors. You can connect with these opportunities through our export promotion, trade counseling, business matchmaking, market intelligence, and other services. For more details, please go to: www.trade.gov/India

For Indian companies looking to invest in the United States or searching for U.S. suppliers, the U.S. Commercial Service can also help. For more details, please go to: www.trade.gov/selectusa-home and www.trade.gov/buyusa-india.

Services for U.S. companies include but are not limited to:

Commercial Advocacy: We work with the Advocacy Center at the U.S. Department of Commerce to coordinate U.S. Government resources to level the playing field on behalf of U.S. companies as they compete against foreign firms on foreign government and public tenders and procurements, both civilian and defense.

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International Partner Search Plus: The International Partner Search Plus (IPS Plus) service provides U.S. firms with a list of up to five agents, distributors, or partners that express interest in your products or services based on our outreach, and includes virtual introductions via teleconference to the identified contacts.

Customized Trade Counseling: U.S. companies can benefit from customized trade counseling that provides information on market opportunities, market intelligence, market entry recommendations, the competitive landscape, regulatory issues, and other relevant information.

Digi Yatra: Revolutionizing Air Travel in India with Exemplary Leadership

By Suresh M Khadakbhavi, CEO, Digi Yatra Foundation

Introduction:

Air travel in India is witnessing unprecedented growth, with the country poised to become the world's third-largest aviation market in the coming years. Recognizing the need to enhance customer experience, increase operational efficiency, and generate additional revenue streams, India embarked on a major digital transformation journey. The result? Digi Yatra, a groundbreaking concept that has redefined the passenger journey and elevated travel experiences in Indian airports. Under the exceptional leadership of the Ministry of Civil Aviation, Digi Yatra has become a shining example of innovation, collaboration, and effective implementation.

Background: A 'Concept' to 'Proof of Concept'

Digi Yatra originated during a brainstorming session at an airport, where multiple internal departments explored ways to enhance the passenger experience. The proposal of using "Single token face biometrics" to create a seamless, paperless, and hassle-free journey gained traction. The airport further developed the concept, partnering with leading biometric service providers to conduct a Proof of Concept (PoC) with live flights in early 2017. Passengers immediately embraced the simplicity and convenience of the biometric process, catching the attention of government authorities who were impressed by its potential.

The Digi Yatra Policy: Setting the Stage for Success

Under the leadership of the Secretary of the Ministry of Civil Aviation, a national framework was created to draft the Digi Yatra Policy. This framework comprised a Steering Committee (Digital Cell) and a Technical Working Committee (TWC) with experts from airports, airlines, and relevant agencies. Extensive workshops were conducted to gather consensus among stakeholders, overcoming initial challenges surrounding Aadhaar validation. A Not-for-Profit Joint Venture Company, Digi Yatra Foundation, was formed and tasked with creating the "Digi Yatra Central Identity Management Platform" (DYCIMP), a world-first scalable national-level trusted-traveler program based on a single-token biometric identity.

Vision, Objectives, and Goals: Transforming the Passenger Experience

The vision of Digi Yatra is to create a delightful and memorable digital travel experience. Its objectives include enhancing passenger experience, achieving seamless and paperless processes, improving operational efficiency, and enhancing security standards. Key goals involve setting standards for digital transformation, establishing a pan-India Identity Management service platform, and enabling face biometric boarding processes across all airports in India.

Post-Pandemic: The Evolution from DYCIMP to DYCE

To prioritize data privacy and security, the Digi Yatra Central Ecosystem (DYCE) was introduced, shifting from a centralized to a decentralized model. The Technical Working Committee recommended adopting W3C standards and implementing the concept of Self Sovereign Identity using Verifiable Credentials (VCs), Decentralized Identifiers (DIDs), and a Distributed Ledger framework. Personally Identifiable Information (PII) data is encrypted and securely stored in passengers' smartphones within the DYCE App, following Universal Wallet standards. Verifiable Credentials such as identity, health, and travel data are stored in the secure wallet and shared only by the passengers with authorized verifiers (airports) during travel. The DYCE architecture adheres to Privacy by Design (PbD) principles and complies with

privacy norms and standards, ensuring data protection and minimizing the risk of data loss or breach.

Leadership by the Ministry of Civil Aviation: Guiding Digi Yatra's Success

The Ministry of Civil Aviation played a pivotal role in spearheading the Digi Yatra journey. With remarkable foresight, the Ministry recognized the potential of Digi Yatra and engaged various stakeholders to ensure a coordinated approach. Through workshops, committees, and strategic decision-making, the Ministry fostered collaboration among government agencies, airport authorities, regulatory bodies, and industry experts.
The Ministry's leadership extended beyond addressing regulatory challenges and forging public-private partnerships. The establishment of the Digi Yatra Foundation and the DYCE showcased the Ministry's commitment to creating a scalable infrastructure for Digi Yatra implementation at airports across India. The transition to DYCE in the post-pandemic phase further highlighted the Ministry's forward-thinking approach and emphasis on data privacy and security.

Conclusion:

The leadership demonstrated by the Ministry of Civil Aviation in driving the Digi Yatra initiative has been exemplary. With a clear vision, strategic planning, and a proactive approach, the Ministry has united stakeholders, overcome challenges, and transformed the Indian aviation industry. Digi Yatra has revolutionized air travel by enhancing passenger experiences and positioned India as a global leader in leveraging digital technologies, setting a new Global benchmark in seamless passenger processing. As Digi Yatra continues to evolve, the Ministry's unwavering leadership ensures that the journey towards a seamless, paperless, and secure travel experience remains on track, setting new benchmarks for innovation and customer-centricity in the aviation sector. The next step would be to enable seamless travel for passengers across international borders, covering departure immigration and arrival immigration at the destination airport through the interoperability of Digi Yatra with other global frameworks.

Trusted Traveler Programs for Security and Efficiency

By Gloria Reyes, Representative for India, Transportation Security Administration

Globally, air travel is not slowing down. Although passenger throughput did have a brief pause during the pandemic, many countries are now seeing passenger volume similar to or exceeding pre-pandemic levels. Generally, the long-term aviation demand is growing and the aviation market in India is proof of demand on the industry and infrastructure.

As the world becomes more connected, the need for secure and efficient transportation increases globally. To ease pressure on the transportation system, the concept

of "Trusted Travelers" has emerged as a solution. Trusted travelers are individuals who go through an extensive vetting process, and are approved for expedited processing through certain checkpoints at airport security and border crossings.

The United States Department of Homeland Security (DHS) Transportation Security Administration (TSA) and Customs and Boarder Protection (CBP) offer Trusted Traveler Programs that allow pre-approved, low-risk travelers to move more efficiently through security checkpoints at U.S. airports, land borders, and seaports. Trusted Traveler programs exist in several forms, including TSA PreCheck® and Global Entry, among others. These programs offer a variety of benefits to approved travelers, dedicated security lines and improved processing through security screening, customs and immigration.

PreCheck is a voluntary, expedited screening program which enables vetted low-risk air travelers to enjoy a more efficient screening experience. Passengers who qualify for PreCheck enjoy the benefits of expedited screening and often lower wait times at security checkpoints. By identifying a low-risk population, TSA is able to focus more resources on higher-risk and unknown passengers. Since its inception in 2013, the program has experienced rapid expansion and is now available to travelers on more than 85 participating airlines at domestic airports in the United States, and one international airport; Nassau, Bahamas.

A PreCheck membership allows travelers to receive an expedited screening process, where there is no need to remove shoes, belts, 3-1-1 liquids, laptops, or light jackets. To be eligible for PreCheck, travelers complete a background check by providing biographic information, fingerprints, and an application fee. Upon acceptance, travelers are provided a Known Traveler Number (KTN) to use when booking future airline tickets.

The Global Entry program is an alternative Trusted Traveler program, focusing on international travel for land and sea borders. Similar to PreCheck, Global Entry is an expedited screening program provided by CBP that pre-approves travelers who are low-risk and arriving from participating countries into the United States. Members receive expedited processing when approaching a Global Entry kiosk.

To apply for Global Entry, travelers submit an online

application, complete an in-person interview, provide evidence of citizenship, and submit an application fee. Citizens of India are eligible for Global Entry and must apply through CBP's Trusted Traveler Programs (TTP) website.https://www.cbp.gov/travel/trusted-traveler-programs/global-entry/international-arrangements/global-entry-indian-citizens

Members of Global Entry receive access to PreCheck automatically. Travelers must provide their KTN when booking flights to receive PreCheck.

Trusted Traveler Programs reduce wait times and simplify security screening for known travelers, which results in less time in line and more time using the airport facilities, like restaurants or shopping.

While trusted traveler programs have received positive attention in recent years, the programs have received some criticism. Some argue that these programs create a two-tiered travel system, where certain individuals are granted special privileges and faster processing times simply because they have the money to pay for better service. Others argue that security effectiveness is sacrificed by providing expedited screening. To address these concerns, Trusted Traveler fees have been reduced, creating opportunities for more travelers to apply for PreCheck or Global Entry. Additionally, Trusted Travelers are subject to continuous background checks and can be removed from the program if they violate any of the program's rules or standards.

Overall, the DHS Trusted Traveler programs have been successful in improving security effectiveness and reducing wait times for qualified passengers. These trusted traveler programs benefit every traveler by increasing security across the entire transportation system and allow security professionals to focus on safe travel for passengers across the globe!

Please visit https://www.tsa.gov/precheck for more information on PreCheck and https://www.cbp.gov/travel/trusted-traveler-programs/global-entry for more information on Global Entry.

Logistics Plus India Finds the "Missing Link" for Global Supply Chains

By Sundresh Sarup, Managing Director, Logistics Plus India

Logistics Plus India Pvt. Ltd. (aka LP India) is a leading provider of freight forwarding, project cargo, warehousing, global logistics, and supply chain solutions. LP India, now with 9 offices across the country, is an important division of the U.S.-based Logistics Plus, Inc., which maintains its global headquarters at the historic train station in Erie, Pennsylvania. Logistics Plus, or simply LP as employees often call it, was founded by Jim Berlin, its current CEO, 26 years ago as a lead logistics provider for GE Transportation, a global manufacturer of equipment for the railroad, marine, mining, drilling and energy generation industries.

Jim Berlin, Founder & CEO of Logistics Plus

Logistics Plus now serves thousands of customers, including several prominent Fortune 500 companies, with over 1,000 employees operating in 45 countries around the world. Despite its growth and diversification, GE Transportation, now known as Wabtec Corporation, is still a major client for the company. In fact, LP India has been playing a critical role in supporting the inbound, customs, and unloading aspects of importing these massive locomotives into the country as part of its well-publicized contract for 1,000 new units for Indian Railways.

Logistics Plus has been doing business in India for two decades now. Over the past 10 years, Mr. Sarup has overseen rapid growth and expansion that now includes branch offices in Ahmedabad, Bangalore, Chennai, Hyderabad, Thane, Mumbai, New Delhi, Patna, and Pune.

LP India supports the import of Wabtec locomotives for Indian Railways.

With years of expansion and growth also comes change. Logistics Plus India is no longer known as just a freight forwarder or project cargo provider. They are a complete supply chain management company with service

Logistics Plus Global HQ in Erie, PA USA

offerings and clients across nearly every industry.

One of those new offerings is an International Express service. LP India began an exclusive partnership with FedEx to handle express inbound and outbound loads. After engaging with them in February 2020, the express service became a survival tool for many customers. During the pandemic, LP India was responsible for transporting urgent shipments that included medicines, medical equipment, personal protective equipment (PPE), and more. As the pandemic subsides, the Logistics Plus India team looks forward to continuing this service and becoming a leader in the International Express space.

Ankush Rajurkar, COO for LP India, Jim Berlin, and Sundreysh Sarup, Managing Director for LP India

Another major growth area for the company is on the warehousing side of logistics. In the United States alone, Logistics Plus has over 5 million square feet of warehousing and fulfillment space that is strategically located across the country. LP India has started to follow suit by implementing its own warehouse management solutions. Sundreysh and his team currently manage a warehouse in India that is dedicated to Whirlpool, a global appliance company.

As it has in the past few years, LP India's growth in the aviation industry continues to shine. The company has dedicated aviation logistics specialists that handle consignments for airports, equipment suppliers, navigational support companies, and airlines and part manufacturers. In it's client base, LP India works with some of the most prominent airlines in the world to help develop customized logistics solutions that fit their needs.

So, what's next for LP India?

According to Mr. Sarup, the goal is to continue to grow by providing the company's signature *'passion for excellence'* service in all aspects of supply chain management. That includes full support of the ACP and its many member companies. Mr. Sarup adds “Many logistics companies say 'no' when someone goes to them with a major supply chain issue. Logistics Plus India won't do that. We find a way to say 'yes'. It's how the company was founded and how it will continue to operate.”

Sundreysh Sarup says 'passion for excellence' is what sets LP India apart from other logistics companies

LOGISTICS+®
PASSION FOR EXCELLENCE

Pratt & Whitney: Geared for the next decade of Indian Aviation Growth

By Ashmita Sethi, President & Country Head - India, Pratt & Whitney (UTCIPL)

Indian Aviation is at a landmark moment in time. Passenger demand is back from the pandemic lows, with 2023 monthly passenger numbers now clocking above 2019 levels. Boeing's Commercial Market Outlook projects a long-term passenger growth rate of nearly 7% annually till 2041, and this sustained passenger growth will require a much larger aircraft fleet than the 700+ India has today.

If the historic orders by IndiGo at Paris Air Show in June and Air India's order announcement in February are any indication, airlines are taking a lead on the order book for the 2000+ airplanes India will need in the next two decades.

Efficient Engines: Key to Sustainable Growth

This rapid acceleration and fleet growth outlined above will need efficient, sustainable engines to power these anticipated 2000+ aircraft. World over, aircraft and engine makers are investing in next-gen technology to advance fuel efficiency and reduce emissions even further. At Pratt & Whitney, we are looking at every sector of commercial aviation. For single-aisle aircraft, continued improvements in both propulsive and thermal efficiencies, led by the GTF engine, will create new market opportunities for airlines around the world.

The introduction of the GTF engine in 2016 changed the game. The gear allows the turbine and fan to spin at their optimum speeds. It had never been done before on this scale in the commercial space. The geared architecture, which is scalable, will be the foundation for next

generation platforms. The next generation GTF Advantage will provide additional thrust, fuel savings, and durability. It is being tested to unprecedented levels. Our work on the GTF Advantage is just the first step on the long road to future propulsion systems that will fulfil aviation's commitment to net-zero carbon emissions by 2050.

On the other side, hybrid-electric looks promising for regional aviation, connecting tertiary markets to business centers or hubs – and is well suited for India's UDAN scheme – which continues to expand with 215,000 flights operated so far, and has 1,000 UDAN routes and 100 airports, heliports, and water aerodromes waiting to be operationalized. While we are still in early days of developing technologies like hybrid-electric, we are also looking to demonstrate its potential on larger scale GTF

engines for single-aisle aircraft. As battery technology continues to advance, efficiency benefits of hybrid-electric systems will only increase.

Combined with the work we're doing to increase the efficiency of today's jet engines, and increasing the use of sustainable aviation fuels (SAF), all these improvements to propulsion systems get us closer to our goal of achieving net-zero carbon emissions for civil aviation by 2050.

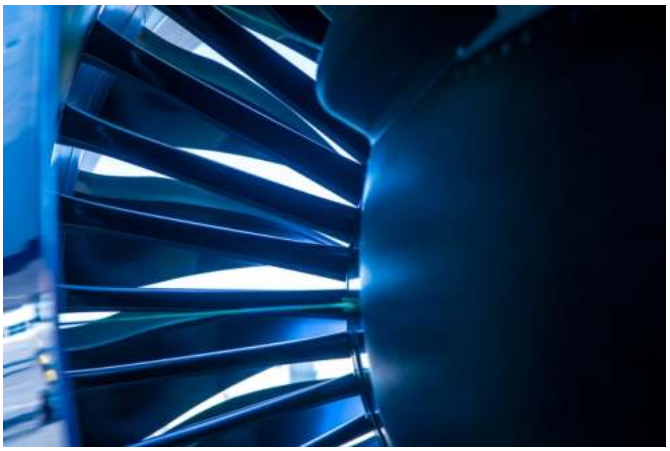
Fleet Growth Backed by Ecosystem Growth & Innovation.

Along with sustainable, efficient flight, supply chain, engineering, MRO and innovation will be critical to Indian aerospace ecosystem's sustained growth. The massive fleet expansion will need to be backed by a growing maintenance, repair and overhaul (MRO) infrastructure, which accounts for both airframe and engine MRO. While India commits to its vision of becoming a regional aerospace and MRO hub – we need to be cognizant that big goals need big thinking, and big investment.

As part of that 'big thinking' India must focus on amplifying its core strengths – specifically its engineering and innovation capabilities, that has driven investment from global OEMs till date.

At Paris Air Show 2023, Pratt & Whitney launched the Percept AI-based aircraft engine analysis tool in collaboration with Indian start-up AWIROS. Percept is a computer vision product whose cloud-based interface allows users to capture images and videos of aircraft engines on their mobile devices and receive real-time responses on parts availability. This helps enable faster and cost-efficient turnaround of leased engine assets. Once this tool is mature, instead of an inspector having to examine an engine and check part-by-part, Percept automates this inspection, and reduces time taken by nearly 90%.

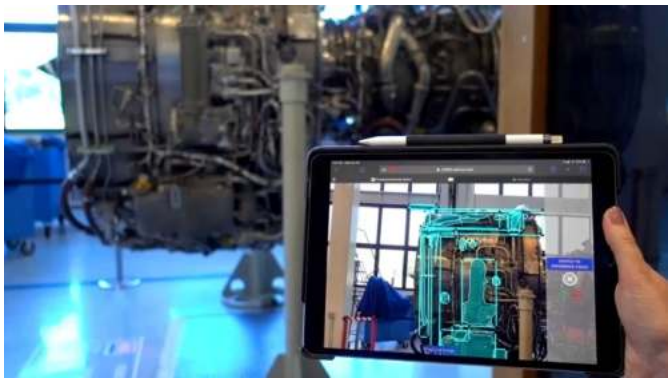
This is a great example India's innovation capabilities delivering significant value for the global aftermarket. Over the next few decades, India is well positioned to drive more such innovation to become integral to the global aerospace sector and shaping the future of flight.



Committed to India's Aerospace Ecosystem

Just as Pratt & Whitney is committed to partnering with airlines to reach net-zero, we are committed to our partnership with India.

India's aviation hub Bengaluru is home to Pratt & Whitney's India Engineering Center – a state-of-the-art center that will have 500+ engineers working on cutting-edge technology and advanced products from our diverse portfolio, that will propel the future of flight. Our India Capability Center is also located in Bengaluru and plays an instrumental role in Pratt & Whitney's global supply chain transformation.



Our first significant investment in India, the Customer Training Center in Hyderabad (which opened in 2015)

continues to deliver training on our engines for technicians and engineers from across the world. We have been working with Indian suppliers for over a decade and have sourced nearly $55 million in the past 10 years from India. We have also sourced over $500 million in Engineering Services from India in the past two decades. These numbers will only grow as Indian suppliers integrate into a robust, global aerospace supply chain.

Through direct and indirect investments, Pratt & Whitney continues to support the evolution of the Indian aviation sector. We have been the engine power of Indian aviation for seven decades now, and as Pratt & Whitney moves towards celebrating a century of going beyond in 2025, this commitment and relationship will only become stronger.

GO BEYOND

MOOG

Moog is a global designer, manufacturer and integrator of precision motion control products and systems, and is a world leader in flight control systems and critical component control applications. Moog has been in India for more than two decades, and Moog India Technology Center (MITC) in Bangalore established in 2009 includes a staff of 200+ employees providing engineering, design, test and certification support for mission critical aerospace and defense systems.

Moog India Technology Center, Bangalore

MITC Provides Software, Electronics, Mechanical Design, Test Equipment Support and Qualification Testing for Commercial & Business Jets

Moog provided lateral control electronics (LCE) for Boeing 747-8, Level A software for flight control systems on the Gulfstream G280/G650 business jets, system analysis and independent verification and validation (IV&V) to support the overall system certification. MITC was also engaged in supporting Boeing B787-9, Airbus A350-900, A350-1000, Embraer E190/E175, COMAC C919, Gulfstream G500/G600/G650 aircraft programs in mechanical detailed design and electronics system design activities. Moog is also supporting expansion of MRO facilities for Wide Body Commercial Aircraft ATA Chapter 27 LRUs in Middle East & Asia Pacific regions.

Boeing 787-9 Test Rigs

Design of Moog Components for Commercial and Business Jets

Hydraulic Flight Control Actuator & Additive Manufactured Manifold

MITC team extensively supports design and analysis of commercial flight control actuation system hardware consisting of primary flight surfaces on the airplane, as well as the spoilers and horizontal stabilizer, and includes a mix of electrohydraulic (EH) and electromechanical (EM) servoactuators and all associated control electronics. The team also supports design and realization of 3D printed prototype manifolds and actuators using Additive Manufacturing Technology. Presently, extensive testing, process certification of these products is in progress.

System Level Testing

COMAC C919 Iron Wing Test Rig

Over the years, Moog has grown from a high technology component manufacturer to become a leading supplier of integrated flight control systems. COMAC C919 Iron Wing is fully commissioned and System Level Hardware/Software testing is being carried out at our facility. We are positioned today on virtually every aircraft in the marketplace, supplying reliable flight control systems and specialized control products that are highly supportable and add significant value for our customers.

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Lockheed Martin Values Opportunities In India

At Lockheed Martin, we see a tremendous opportunity in India to build on our seven decades of association and the strong foundation established through the two joint ventures in Hyderabad, expanding in multiple domains including air, land, sea, cyber and space to meet the customers' mission needs.

Sikorsky, a Lockheed Martin company marks its 100 anniversary this year. More than a century ago, founder Igor Sikorsky's dreamt about designing and building aircraft for a nascent industry. His invention, in the capable hands of aircrews around the world, has become a powerful tool for saving lives and performing missions in the direst and most dangerous conditions. For 100 years, Sikorsky has been pioneering flight solutions that bring people home everywhere, every time including the S-92 and the S-76.

The safe and reliable S-92 helicopter performs a variety of missions, including offshore oil transportation, search and rescue, and Head of State. It is no wonder why 13 nations have selected the S-92 helicopter for their critical Head of State missions. Whether it's cabin size, range, or noise levels, the S-92 is specifically designed with fatigue management in mind. The S-92 boosts offshore crew readiness and productivity. With over 2.1 million fleet flight hours the S-92 is best in class for safety and reliability.

India's connection with S-92 is through the Tata Sikorsky Aerospace Ltd. (TSAL) joint venture between Tata Advanced Systems Limited (TASL) and Sikorsky, a Lockheed Martin company in Hyderabad established over a decade ago. TSAL is fully integrated into the global supply chain for manufacturing aerostructure components for the S-92 helicopter. Since production began in 2010, TSAL has delivered 157 aerostructure component sets to Sikorsky's S-92 assembly plant in the United States.

The S-76 possesses an excellent reputation throughout the world, with superior safety and performance records and a vast array of available optional equipment to address almost any unique customer requirement. It is a helicopter that services many missions including, Head of State, VIP, corporate executive transport, offshore oil and gas, search and rescue including shipboard operation, emergency medical service, utility, law enforcement, aerial surveillance, sightseeing/leisure travel, television news, and highway patrol. The S-76 family has accumulated over 7.6 million flight hours and is among the safest in the world.

The S-76C++ has been utilized in India for several years in support of VIP/executive transportation as well as support of the offshore oil industry and in 2021 was joined by the S-76D. The S-76D brings an integrated all glass cockpit, advanced all composite blades and fuel efficient engines. Aircraft noise and vibration levels allow working meetings in the cabin while being friendly to the neighbors.

Lockheed Martin continues to invest in advancements that support autonomous and optionally-piloted operations, like Sikorsky's MATRIX™ Technology, will change the ways aviators and air crews execute their missions, assisting when flying with reduced crew or limited visibility. MATRIX is like a virtual second pilot that will help operators fly safely and confidently in dangerous and complex missions. It can leverage full authority flight control inputs for autonomous flight – including takeoff, route planning, obstacle avoidance, site selection and landing. MATRIX Technology will enable operators to fly more manned missions in adverse weather or restricted visibility, fly missions more effectively in complex and obstacle rich environments, eliminate sources of pilot and operator error, and reduce operating costs.

The technology has been integrated and extensively flight tested on various aircraft including the S-76B and a Black Hawk. During 2022, Sikorsky in partnership with the Defense Advanced Research Projects Agency (DARPA), successfully demonstrated Sikorsky's MATRIX™ technology autonomy system, which forms the core of DARPA's ALIAS (Aircrew Labor In-cockpit Automation System) project.

LOCKHEED MARTIN

Kempegowda International Airport Bengaluru (KIAB)- A Majestic Leap in Sustainability

By Lukas Szymczak, Director - Airports and Special Projects

Introduction

Kempegowda International Airport Bengaluru (KIAB) or BLR Airport is among the world's busiest and fastest-growing airports with 33 million annual footfalls. With a vision to enable journeys, create experiences and touch lives as the new gateway to India, BLR Airport that is operated by Bangalore International Airport Limited (BIAL) has witnessed tremendous growth and evolution in the last few years. While economically the airport continues to achieve higher benchmarks with its aero business (airlines and cargo) and non-aero business (F&B and retail), it has also set a standard for itself and in the industry when it comes to sustainable practices.

The sustainability vision, 'Touch lives by nurturing a sustainable future through initiatives that drive economic, social, and environmental transformation,' is an apt corollary to BIAL's vision. Supporting this vision is the sustainability strategy that has provided impetus to its growth. At the core of BIAL's sustainability journey are six pillars that form the roadmap to a brighter future: Water Stewardship, Net Zero Carbon Emission, Community Aligned Noise Management, Circular Economy, Sustainable Procurement, and Sustainable Mobility. These pillars are supported by the airport's core values of Corporate Social Responsibility (CSR), Behavioral Change, and Compliance. This strategic framework directly contributes to 11 of the United Nations' Sustainable Development Goals (UNSDGs) and indirectly contributes to the other six UNSDGs. BIAL is also a signatory to the United Nations Global Compact initiative — a voluntary leadership platform for the development, implementation, and disclosure of responsible business practices.

With the newly opened Terminal 2 (T2), the airport has presented to the world a terminal that's not just sustainable but also modern and technologically advanced while it's rooted in its culture. The four pillars that have inspired T2 are Terminal in a Garden, Sustainability, Technology, and Art & Culture, that have been captured throughout the design, architecture, and processes at the new terminal. The new terminal is an epitome of sustainability. T2 was planned, designed and built to be a sustainable building. It has been awarded the LEED Platinum Pre-certification* from USGBC (U.S Green Building Council); the largest airport in the world to be certified prior to commencement of operations. The usage of natural building materials, harvested rainwater, recycled and treated wastewater in addition to natural light filtering through the skylights, contribute to the sustainable nature of T2.

However, it's not just T2, BLR Airport runs on sustainable practices that have significantly reduced its environmental footprint.

100% Renewable Energy

BLR Airport is a torch bearer in sustainability with usage of renewable energy across the campus and 100% of its aviation power consumption per annum is powered by renewable resources. Renewable electricity infrastructure includes onsite power generation and offsite Power Purchase Agreement (PPA) for solar, hydro and wind power for airport operations. This allows the airport to operate without interruption. As majority of its electricity comes from renewable sources, BLR Airport is able to avoid the release of more than 70,000 metric tonnes of carbon dioxide each year.

Water positive

BLR Airport aims to create a sustainable environment through responsible water consumption and water

replenishment that are socially equitable, environmentally sustainable and economically beneficial. With this objective the organisation has always focused on building Sustained Water Positivity considering future terminal expansions. With its processes, BLR Airport has been able to achieve a water positivity index of 2.36 - which means that the airport replenishes more water than it consumes. The communities around have benefited from the water conservation initiatives, and the region has transformed from being water-scarce to an area that has developed and flourished.

In addition to this, a cutting-edge conservation technology is implemented to save water across both the terminals. All the terminal washrooms have fixtures that use less water. The green landscape is maintained by a weather-based Smart Automatic Irrigation System that is controlled by a smartphone app, making it the first of its kind. To water the plants efficiently, it analyses factors such as evapotranspiration, moisture in the soil, and the weather. With this system, the airport is able to save more water compared to traditional methods.

Environmental and ecological balance

Aviation accounted for 2.4 per cent of our global carbon emissions in 2018 according to an Issue Brief published (in October 2019 and revised in June 2022) by the Environmental and Energy Study Institute. The growth of air travel and freight have has significantly impacted climate change. Passenger air travel is a key factor in producing the highest and fastest growth of individual emissions, at least before the pandemic according to the Issue Brief.

While the aviation industry is working towards minimising its impact, BLR Airport has implemented processes to mitigate the adverse effects of its energy consumption. As India's first greenfield PPP airport, the environmental responsibilities were carefully managed throughout the entire process of setting up the airport.

To lower the amount of energy required for cooling, chiller plants with high efficiencies are utilised and this plant optimisation has resulted in savings of over 1.7 million kwh. Through its energy conservation, BLR Airport has been able to save 2.2 million kwh of energy every year which is enough power to supply 9,000 homes with electricity for one entire month. LEDs are used to provide illumination for the runways and streetlights around the area. The newly commissioned South Runway Airfield Ground Lighting is powered with LED lights, making it the first airfield in India to be fully powered with LED lighting system. The recently refurbished North Runway is also powered with LED Airfield Ground Lighting. streetlights, perimeter lighting & airfield lights have been converted to LED lighting. Entire apron's high mast lights have been converted to LED lighting. This helps to conserve energy without compromising lighting quality or visibility. In 2020, BLR Airport achieved one of its goals of becoming Energy Neutral.

While energy consumption maybe a primary concern, as a travel hub that operates 24/7 facilitating movement of millions of passengers every year, there is another key aspect of environment management that needs particular attention – the use of plastic. At BLR Airport retailers are strongly encouraged to use bagasse packaging because it is 100 percent biodegradable and compostable. Single-use plastics are no longer allowed in airport retail, food, and beverage establishments. A new facility for the treatment of solid waste is under construction and will lead to zero waste to landfill.

While passenger-facing measures are visible at the terminals, sections of the airport campus roads have been constructed using plastic waste – a first time in the industry. Following the success of a trial road that utilised plastic waste replacing 6% bitumen, the airport constructed polymerised roads that are capable of withstanding adverse weather conditions. Electronic charging pods are installed at various points in the campus for EVs which facilitates sustainable mobility. Moreover, the campus has been made much greener with several trees from a variety of species that have been planted across the campus.

Conclusion

BLR Airport's operator BIAL has achieved significant milestones with the implementation of its sustainability practices. The latest recognition is for Terminal 2 that has received the prestigious IGBC Platinum certification by the Indian Green Building Council under the IGBC Green New Building rating system. BLR Airport also achieved ACI's highest Level 4+ Transition and Green Airports Recognition under the Airport Carbon Accreditation (ACA) program. This prestigious accreditation, led by the Airports Council International (ACI), reflects BIAL's unwavering commitment to efficient carbon management and sustainability. Furthermore, BIAL has received ACI's Green Airports Recognition 2023 Platinum award in the 15-35 million passengers per annum category, as a recognition of its Plastics Circularity initiatives such as single-use plastic elimination and roads from plastic waste at BLR Airport.

BLR Airport's steadfast commitment to sustainability is a fundamental principle ingrained in its business philosophy. It's sustainability-centric practices enforce policies and design interventions that architects, designers, engineers, concessionaries, and developers adhere to, aligning with the company's holistic vision of sustainable development.

Along with making the airport a sustainable entity, BIAL is also working on making the region and communities around it sustainable. The Kempegowda International Airport Foundation (KIAF), a subsidiary of Bangalore International Airport Limited (BIAL), was incorporated in March 2020 under Section 8 of The Companies Act, 2013 as a Non-Profit Organisation. The Foundation's main objective is to create social value through targeted interventions for communities around the Airport and social ecosystem at large.

The Foundation has identified five flagship initiatives - Namma Shikshana (Holistic Education), Namma Arogya (Promotion of Health), Namma Ooru (Integrated Development), Namma Nela-Namma Jala (Water & Sanitation) and Namma Parampare (Conservation of Culture & Heritage) - as platforms for implementing programs in identified thematic areas. The five pillars are aligned with the United Nations Sustainable Development Goals (UNSDGs).

With initiatives that are not only helping the airport contribute to the larger cause of the environment but are also helping in honouring the region it is present in, BLR Airport is building a formidable path to being a completely sustainable entity. Environmental, social and governance initiatives are deeply embedded within the DNA of the organisation's culture.

About Turner

Turner has been working in India since 2007, with our headquarters in Mumbai. We are proud to have shaped some of the country's landmarks and continue to deliver an impressive portfolio of iconic and award-winning

developments.

With regional offices in Delhi, Bengaluru, and Hyderabad, our team of over 450 professionals across provides project management, construction management, program management, and preconstruction advisory services.

We have managed the construction of aviation, residential, mixed-use, commercial, retail, hospitality, and cultural projects across India.

We combine local knowledge with global best practices to serve our clients' needs.

Our dedication to driving the most significant value during a project's planning and preconstruction stages, fostering innovation, and embracing emerging technologies enables us to positively impact our clients and ensure their visions are realized.

Key Contacts
Jairam Panch
Vice President & Managing Director

Atul Shirke
Deputy Managing Director

Omkar Patil
Assistant Manager- Business Development

Turner

ACP Activities Over the Period

Celebrating the 247th Anniversary of USA on July 12, 2023

U.S. FCS organized India Cyber Security Trade Mission on May 22, 2023 at New Delhi

ACP Members with JS AO, MoCA during curtain raiser ceremony on May 18, 2023 at New Delhi

ACP Members Get-together on May 10, 2023 at New Delhi

ACP Members introductory meeting with new DG, DGCA Vikram Dev Dutt on March 22, 2023 at New Delhi

BELL 407GXi
INSTRUMENT FLIGHT RULES (IFR) KIT UPGRADE

Navigate low visibility days and increase mission capabilities with IFR

For 30 years no new single engine helicopter was certified for IFR – until now. With this single-engine IFR certified aircraft, owners/operators can now maximize their uptime and accept more flights knowing that they will be completed safely. For pilots on search and rescue or medical first responder teams, don't let low visibility keep you from answering your calls.

THE BELL 407GXi IS THE MOST COST EFFICIENT IFR SOLUTION ON THE MARKET TODAY

Certification

- Single-Pilot IFR Kit received STC certification on August 15, 2019
- Certified under the FAA and applicable to all Bell 407GXi's
- Bell will pursue STC validation from other countries

Availability

- Bell 407GXi only
- Installation only at Bell Facilities
- Available from the factory on new 407GXi
- Bell can retrofit on previously delivered 407GXi

Advantages

- Increased mission capability by alleviating cancelled flights on low visibility days
- Better situational awareness and overall better ground-reference position information
- Integrated Garmin G1000H™ NXi avionics suite displays approach plates and airport facility diagrams directly on Multi-Function Display (MFD)
- Three-axis autopilot couples to fly approach patterns

407GXi COCKPIT WITH IFR INSTALLED

What would you say to the HEMS community about the IFR Feature?

"It is next-gen safety, any 407 operators out there that are evaluating their fleet needs to consider purchasing a 407GXi with an IFR kit. Even if you stay VFR, you have the integrated ability to handle an inadvertent IMC much better than you can without that package installed. The 407GXi is simply the most efficient air medical helicopter out there."

Tom Klassen
Executive Director at HALO-FLIGHT

SINGLE PILOT IFR KIT INCLUDES:

- 2nd Generator and Generator Control Unit (GCU)
- Additional Cooling Ducts
- 2nd Pitot/Static System
- Additional Aircraft Essential Power Distribution Bus for Critical Systems

ADDITIONAL KITS REQUIRED TO MEET IFR SUPPLEMENTARY TYPE CERTIFICATE (STC):

- Bell Autopilot - 2-Axis Automatic Flight Control System (AFCS)
- Autopilot - Addition of 3rd Axis
- Mid-Continent MD-302 Standby Attitude Module (SAM)
- Radar Altimeter - Garmin GRA™ 55
- Bell 407GXi Standard 28 Amps Battery (Gill/Teledyne Sealed Lead Acid)

NEW | **TEXTRON FINANCING OPTIONS AVAILABLE**

If you have more questions about the IFR kit please contact your sales rep, or visit us at: bell.co/contactsales

bellflight.com

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CML 407GXi IFR FactSheet 8.5x11 211103 R05

ACP Activities Over the Period

ACP Members presented plaque to DG, DGCA Arun Kumar to thank him for his support extended to ACP during his 9 years at MOCA/DGCA on February 21, 2023 at New Delhi

Signing ceremony of Boeing & GE/CFM

ACP Members roundtable with Ms. Enoh T. Ebong, Director – USTDA & Mr. Rajiv Bansal, Secretary, MoCA on January 18, 2023 at New Delhi

A fruitful visit by MOOG's Director Mr. Pete & Mr. Mohan with Secretary Bansal, MoCA on January 11, 2023 at New Delhi

ACP Chairman Mr. Sundresh Sarup great catching up with Boeing Leadership on December 14, 2022

Collins Aerospace facility inaugurated by Chief Minister of Karnataka and President of Collins Aerospace on December 7, 2022

ACP Activities Over the Period

Signing ceremony of Veoci's project Airport Emergency and Operations Management Pilot Project and Feasibility Study with AAI on December 1, 2022

ACP's productive meeting and discussions with DG, BCAS and his team on November 17, 2022 at New Delhi

ACP Members at India Space Congress 2022 on October 27, 2022 at New Delhi

Blue Origin organized a reception in honor of India Space Congress 2022 on October 22, 2022 at New Delhi

ACP Members roundtable meeting with P&W leadership on October 21, 2022 at New Delhi

ACP – Boeing good discussion on training opportunities with IAA on October 17, 2022 at New Delhi

ACP Activities Over the Period

India Aerospace Trade Mission on September 19-23, 2022 at New Delhi

2nd phase of EDTP from August 14 – 19, 2022 in Washington D.C.

ACP's Executive Development Training Program (EDTP) closing reception on July 23, 2022 at New Delhi

ACP Members roundtable with Ministry of Civil Aviation on July 23, 2022 at New Delhi

ACP's Executive Development Training Program (EDTP) opening ceremony on July 18, 2022 at New Delhi

Great workshop "Ideas to get SMART technology driven airport system" by Collins Aerospace team with Member – ANS, AAI with his team members on June 10, 2022

A Unified Approach to UAS Traffic Management

By Ravi Manral, Business Operations Manager, ANRA Technologies

Over the last ten years, technological development in the unmanned aircraft (UA) industry has disrupted aviation, introducing enhanced capabilities at an unprecedented speed. As a result, States and regulators have received an increasing number of applications for access to low-level airspace, where the operations of manned aircraft are generally limited or restricted. At the current pace, civil unmanned aircraft system (UAS) operations are expected to surpass the number of manned aircraft operations in the near future.

The International Civil Aviation Authority (ICAO) defines UAS traffic management as "a specific aspect of air traffic management which manages UAS operations safely, economically and efficiently through the provision of facilities and a seamless set of services in collaboration with all parties and involving airborne and ground-based functions."

Through UTM, it is envisaged that civil aviation authorities (CAAs) and ANSPs, to the extent that they are involved, will be able to make real-time information regarding airspace constraints and flight intents available to UAS operators directly or through a UTM service provider. The UAS operator would then be responsible for managing its operations safely within these constraints, with out receiving positive air traffic control (ATC) services from the ANSP. The primary means of communication and coor dination between the ANSP(s), UTM services providers, operators and other stakeholders may be through a distributed network of highly automated systems via application programming interfaces (APIs), and not between pilots and air traffic controllers via voice communication.

In Europe, an equivalent concept was named 'U-Space.' This represents a set of procedures and services that enable safe integration of uncrewed aircraft into the air traffic management system.

UTM is a set of services designed to ensure the safe, secure, fair and efficient integration of crewed and uncrewed aircraft in the airspace by means of collaboration between all involved parties. Through the use of UTM services, operators can obtain information about airspace, rules and other aircraft to name a few.

Given that a diverse set of UAS stakeholders are looking towards UTM as the means to safely scale operations, regions should be mindful to develop a global infrastructure and regulatory paradigm that is able to harmonize with existing Air Traffic Management technologies and safely support the growing needs of emerging aviation stakeholders at the desired pace.

A Unified Approach

A common framework is needed to facilitate harmonization between UTM systems globally and to enable industry, including manufacturers, service providers and end users, to grow safely and efficiently without disrupting the existing manned aviation system. ICAO has identified UTM system that provides the following benefits:

- Continued safety of all air traffic, crewed and uncrewed
- Safety of persons on the ground
- Complex low-level UA operations
- Ongoing support of technological advancements
- Evaluation of security and environmental risks
- Provision for a global, harmonized framework for low-level UTM

A simple, safe, fair and efficient UTM system solution which establishes guidelines for organizational constructs and qualification processes can be

implemented in such a way that independent entities can offer UTM services or, alternatively, can be implemented by an ANSP. In order to realize scale, USS operations should be able to be provided by different traffic management entities, as long as they meet the required performance standards and authorizations and are able to connect to the network of available and qualified for that region.

This future traffic model involves a federated UTM system in which uncrewed aircraft are connected to UTM systems consisting of a highly automated set of software services. Such services will assist UAS operators with flight planning and real-time communication within the UTM network, ensuring safe operation for both crewed and uncrewed aircraft.

It is critical that industry consensus standards are developed for this UTM system to promote and define interoperability along with the performance-based characteristics needed to safely and fairly deploy these UTM solutions.

Digitization is fundamental to a fully scalable traffic management system capable of handling the growth of unmanned air traffic and its safe integration with manned aircraft. Data must be digitized, machine-readable and be of sufficient fidelity to support various use cases.

Conclusion

The future of autonomous aircraft operations relies on a cooperative UTM infrastructure built and supported bya network of USS will drive innovation and opportunity, ultimately supporting safety and automation. Properly implemented, a flexible approach to UTM will improve safety in our skies for crewed and uncrewed aircraft.

About ANRA Technologies

ANRA Technologies is an international provider of airspace management solutions for unmanned aircraft operators and airspace managers. ANRA offers intelligent and modular traffic management software capabilities for UAS Traffic Management (UTM)/U-space and Urban Air Mobility (UAM) operations. For organizations that need an enterprise-class drone operations solution, ANRA offers Mission Manager, and for delivery solutions, ANRA offers DELIVERY. Learn more by visiting www.flyanra.com.

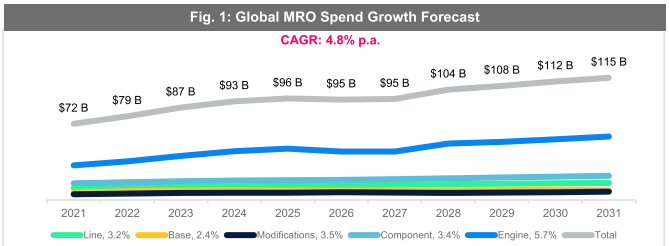
ANRA TECHNOLOGIES

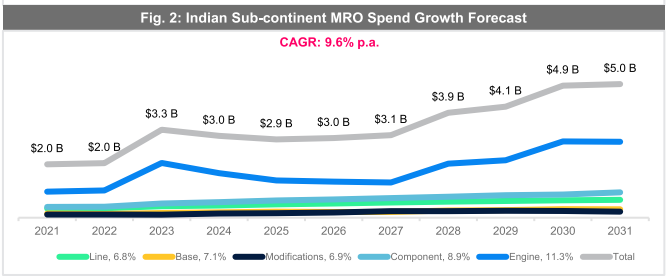
MRO in India: Intriguing Growth Story over the next decade

By Allan Bachan, Shipra Jaipuria and Manvi Rathi (ICF Consulting)

In January 2023, India achieved a significant milestone by becoming the 3rd largest aviation market in the world. The country witnessed a remarkable expansion in its airport infrastructure, with the number of airports soaring from 74 in 2014 to an impressive 147 in 2022. ICF predicts an annual passenger traffic increase of 7.4% per annum over the next decade for this market. To facilitate this growth, it is estimated that India will require approximately 2,210 new airplanes over the next two decades. Indian carriers will outpace global growth at nearly 7% per annum and more than 80% of new airplane deliveries to this market will be for growth, while 20% will be for the replacement of ageing jets. This positive outlook is reinforced by recent substantial aircraft orders by Indian airlines, including Air India's order of 470 planes and a 500-plane order from IndiGo Airlines in the first half of 2023.

With an expanding aviation market, synonymous with an unprecedented rise in the in-service aircraft fleet, the Indian MRO industry has emerged as a key player, to ensure sustenance of the nation's aviation infrastructure. Currently in a burgeoning phase, the potential here is significant, given ICF estimates the MRO spend by Indian sub-continent to grow rapidly from $2.0 billion in 2021, to USD $5.0 billion by 2031, registering a CAGR of 9.6%, as compared to the global average of 4.8%.





Source for Fig. 1, 2 & 3: ICF Analysis and Forecast
Note: Indian Sub-Continent includes India, Pakistan, Sri Lanka, Bangladesh, Bhutan, the Maldives, and Nepal

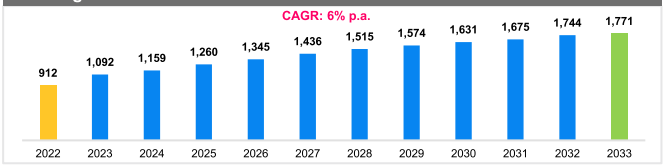
At present, Indian airlines export almost 80% of their MRO requirements to foreign players, due to the dearth of commensurate MRO capacity within the country. Globally, MRO costs constitute upto 10-15% of an airline's operating cost, the second-highest cost item after fuel expenses. As per DGCA India, this expense category is higher in India, amounting to ~17% of total costs, presumably due to the associated export costs. To retain this revenue domestically, it is imperative to focus on enhancing existing capabilities, increase overall investment and international collaborations, and implement industry-focused policy reforms, to further enhance investments and ease of doing business.

Multiple factors contributing to the attractiveness of Indian MRO sector

Unprecedented rise in aircraft fleet, ensued by faster aftermarket growth

The large outstanding order-book of Indian airlines, along with the projected growth rates, is alluring domestic and foreign investors, OEMs, and leading MROs from across the world to invest in the sector.

Fig. 4: Indian Sub-Continent - Growth Forecast of "In-Service Fleet"



Source: ICF Fleet Forecast
Note 1: Indian Sub-Continent includes India, Pakistan, Sri Lanka, Bangladesh, Bhutan, the Maldives, and Nepal
Note 2: The figures are prior to the recent IndiGo order of 500 aircraft

As per Boeing's Commercial Market Outlook 2023-2042, the OEM forecasts that the services market would grow at 3.9% annually—ahead of its prediction of 3.5% annual fleet growth. The fastest growth is estimated to be in South Asia (mainly India) and Southeast Asia, at 7.5% and 7.1% respectively.

Well-qualified technicians at extremely competitive rates

India is well recognized for its academia and technical skillsets, supported by nearly 6,000 AICTE approved engineering colleges, and has been empirically proven to produce some of the best talents across various industries.

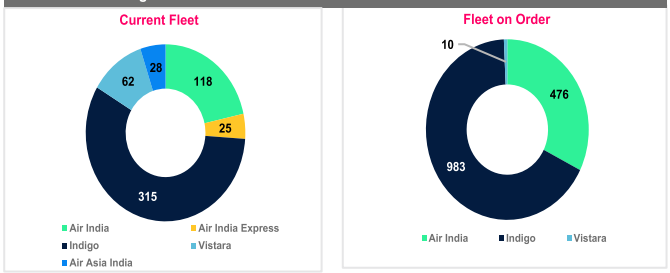
Google, Mastercard, Pepsi and Microsoft are some of the largest companies where Indians have occupied key positions. According to Gulf Today, around one-third of all engineers in Silicon Valley are of Indian origin, and approximately 10% of the world's largest tech companies have CEOs of Indian origin. Additionally, as per a recent study by Nasscom, India supplies 2.14 million STEM graduates annually, placing it second globally, next only to China.

India also enjoys highly educated labor at competitive rates, vis-à-vis global counterparts. As per estimates, Indian MRO workforce costs range between $30-35 per hour, about 50-60% lower than those in Western Europe or the US.

Existing and prospective scale of large airlines in the country

IndiGo, the country's largest airline, at a market share of over 60% as of May 2023 and Air India (consolidated Tata Group airlines), at a combined market share of about 26%, together constitute almost 90% of the market today.

Fig. 5: Current & Ordered Fleet of IndiGo Airlines and Air India



Source: CAPA Fleet- June 2023

Given their current sizes, along with impressive order-books, they have crossed the stage of reliance on outsourcing. Thus, there is an opportunity to insource and build their own maintenance capabilities.

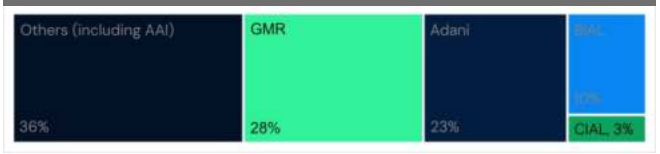
A strive in this direction has already been initiated whereby Tata Group owned Air India, along with Lufthansa Technik, Air France-KLM's engineering department & SIA Engineering are reportedly trying to form a consortium to acquire and privatize AIESL i.e. the existing engineering arm of Air India. Also, IndiGo already has two MRO facilities at Delhi and Bangalore, the latter being inaugurated in Nov. 2022, with the goal to reduce dependence on overseas maintenance and emanate cost

efficiencies.

Consolidated ownership structure across aviation landscape

The existing ownership structure of the airports landscape in the country is restricted to a few largeconsortiums. Thus, it would be smoother to negotiate and finalize broad partnerships ensuring expansive coverage across the length and breadth of the country. Additionally, the entire stretch can be covered through a handful of central airports i.e. Delhi, Mumbai, Hyderabad, Bangalore and Nagpur, to name a few, can cover almost all of India within a three-hour flight time.

Fig. 6: FY 2023 - Market share of Airport Operators in terms of Pax Size



Source: ICF Analysis
Note 1: GMR includes: DEL - a JV consortium of GMR, AAI & Fraport AG; HYD - a public-private consortium of GMR, AAI, Telangana Govt.. & MAHB
Note 2: Adani includes BOM, which is a joint venture of AAHL & AAI

Opportunity to accelerate development for future aircraft

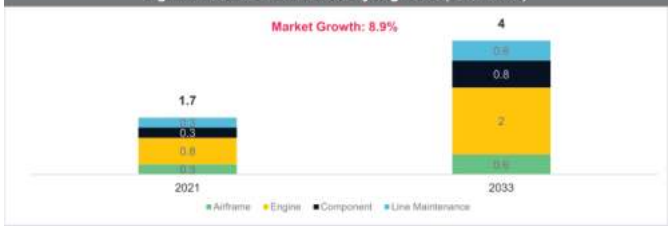
Given the nascent stage of MRO technologies in the country, there is a circumstantial opportunity to expedite development in alignment with future technology of aircraft. As per estimates, ~57% of India's current commercial airline fleet and over 90% of the order book comprises of new generation aircraft.

While the existing competition would invariably be trying to streamline their capabilities to service the more sophisticated and efficient nature of new-generation aircraft and engines, we can define a more sustainable solution from scratch.

Expanding service portfolio

Currently, Indian MROs are primarily focused on airframe maintenance. However, engine and component maintenance also have a large profit potential. As per Oliver Wyman, they account for 60-65% of the work by value globally. Therefore, there is an emergent need to augment the existing capabilities accordingly.

Fig. 7: Indian MRO market size by segments (US$ billion)



Source: Oliver Wyman

A strong endeavor in this space has been undertaken by the France-based company Safran, by announcing the set-up of an engine MRO facility in Hyderabad by 2025, utilizing a foreign direct investment of $150 million. The aim is to make it the biggest MRO facility in India, with a capacity to handle 250-300 engines annually.

Key government interventions to boost prosperity in the sector

In line with the ambition to make India a prominent global MRO hub, the government has introduced various policies & regulations in recent times to realign the sector's interests with international standards and requirements. Certain critical measures undertaken are as under:

- Reduction in indirect tax (GST) rates on MRO services from 18% to a more favorable 5%
- Permitting 100% Foreign Direct Investment (FDI) in MRO via the automatic route
- Earmarking eight airports for investment in MRO facilities i.e. Begumpet (Hyderabad), Bhopal, Chennai, Chandigarh, Delhi, Juhu (Mumbai), Kolkata and Tirupati

• Introduction of an MRO policy with highly liberalized land rentals and abolishment of royalties – with entities setting up MRO facilities to be allotted land for 30 years instead of the current 3 to 5 years
• Identifying the "place of supply of service" as "location of recipient" to discourage import of MRO services by airlines

Digital Transformation- Need of the Hour

Boeing's Commercial Market Outlook 2023-42 forecasts that the services market would grow at 3.9% annually, with digital services being one of the main drivers of this growth, accounting for 26% of total market over the next 20 years, compared with 30% for MRO.

In times of supply chain disruption and workforce challenges, the services sector recognizes the need to implement a gamut of digital strategies/ products across the ecosystem, encompassing both "hard services" (maintenance, repair etc.) as well as "soft services" (software, digital solutions, etc.) to increase efficiency and optimization i.e. a technology-based full-service after-market entity.

India is very well-placed to take a lead in this area given its reputation as a "nucleus of technology" across industries. Multiple Indian companies have contributed towards software development for existing Boeing and Airbus aircraft like HCL, Cyient, Neewee etc.

References of similar initiatives undertaken in India and globally are as follows:

- TATA Consultancy Services, an Indian entity, has partnered with Virgin Atlantic to launch a cloudfirst digital transformation – running the airline's end-to-end technology services to facilitate increased automation and analytics-enabled decision making
- Lufthansa Technik has created an unprecedented "Digital Tech Ops Ecosystem" by bringing together AMOS, AVIATAR and Flydocs - to reduce overall MRO costs, increase operational stability & aircraft availability, and optimize asset values.

Road ahead for the evolvement of the MRO sector in India

The Indian MRO sector has taken-off on a remarkable success journey, boosted by the country's bullish aviation market and its aspirations to become a global hub for MRO services. The sector has proven its resilience and adaptability, withstanding the challenges caused by the COVID-19 pandemic and emerging stronger than ever.

It is a critical element in the overall aviation value chain and can be instrumental for the industry to flourish in the long-term. For airlines to be able to focus on their core operations and optimize operational costs, it is vital to off-load the maintenance of aircraft to an **indigenous full-service after-market entity based on a "technology platform.**

A success-model for this market, given its current dynamics, would imply building a **robust MRO facility around one of the larger airline players in the country,** by way of suitable partnerships with established MRO players, to ensure seamless and evolving growth, born out of genuine need of an airline.

Incorporating the global supply chain into the scale needed to support India's growth will require robust planning and diligence. In ICF's experience of advising both global OEMs/ MROs as well as firms locally in India, this is particularly true when trying to apply global norms to India's complex regulatory and economic landscape.

Water Recharge, Reuse, and Flood Risk

By Hrushikesh Sandhe PE LEED AP, Head of Infrastructures Services, Walter P Moore

Water management for reuse or infiltration is one of the sustainable aspects of design. But if water management is evaluated in isolation of flood risk, then the design for the site or any facility will not be resilient. With climate change impacts and increased rainfall intensities, water management solutions must be evaluated from a flood risk management perspective.

The traditional approach of collecting rainwater through a drainage network and discharging it to a river is not a sustainable and effective solution. It is often useful to maximize the infiltration capacity of a site at the source of flooding. Thus, practices such as low impact development (LID) have frequently been suggested as adaptation strategies to local climate change. There has been a lot of high-intensity, small-duration events recently that surcharge drainage systems or sometimes flood streams and rivers too. The potential effects of LID can be useful to mitigate or reduce the effects of such flash flood events. The site discharge should be controlled to pre-development quantities as possible. Additionally, instead of looking at solutions only at the site level, a holistic watershed-based approach will be more effective.

Collecting rainwater using the drainage system and discharging it to public drainage or open channels has been the traditional stormwater management approach for airport facilities. However, due to increases in airport facilities, passengers' footfall, and climate change, the operators have understood the value of rainwater harvesting. Airports have significant impervious areas and the runoff collected can be diverted to locations that can help retain, infiltrate, or store water that will help reduce dependency on the public water system.

Low Impact Development is an approach used commonly in the United States for site level control or infiltration of rainfall runoff. The primary benefit of this technique is to filter first flush sediments before entering the public drainage system and protect the water quality of rivers from pollution. The additional benefit is also detention of low but more frequent rain events which helps prevent flooding on-site and off-site.

LID techniques are primarily nature-based solutions and hence can help achieve site level landscaping objectives. Typically, LID approaches can work effectively for small drainage areas around one acre. Hence if this technique discussion is involved in the initial stages of planning, the appropriate locations of solutions and overflow can be identified.

At locations where the groundwater table is typically low, priority should be given to collecting runoff from the site and infiltrating into the ground. As part of the design process, overflow can be designed for major events (five years + return interval) to pass without surcharging on the site.

The distributed infiltration-based LID can be effective at reducing discharges for higher-frequency events, despite urban landscapes and high-intensity rainfall.

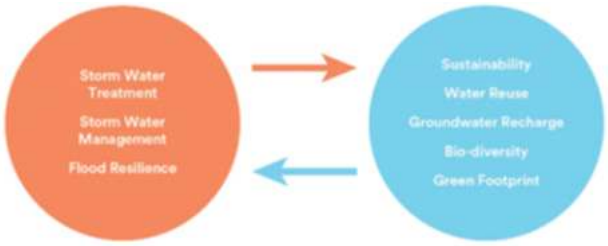


Figure 1: Water Recharge, Reuse, and Sustainability

A geographic information system (GIS) is a framework that analyses spatial location and organizes layers of information into visualizations using maps. GIS can be used at the planning level to help identify preliminary locations of LID solutions.

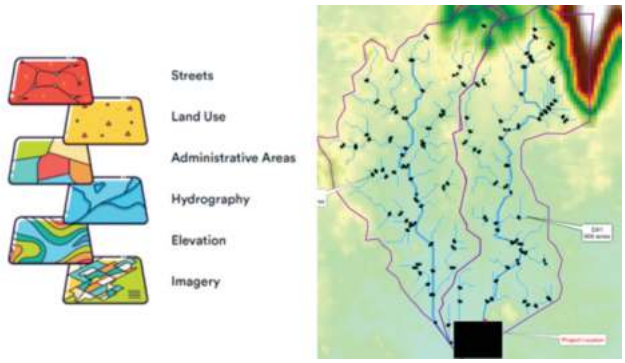


Figure 2: Geographic Information System (GIS) Technology application for Water Quantity Estimates

GIS technology can be used to interpret site survey data, onsite and offsite, utility mapping, critical structures identification based on aerial images, site elevation gradation, etc. The hydrologic calculations such as catchment delineation, time of concentration, flow direction, etc. can be developed using GIS tools.

GIS tools can be used for catchment delineations for the site, which will help calculate runoff quantities onsite and offsite. Based on the runoff quantities within property boundaries and contour data, GIS tools can help to identify locations for LID solutions.

Prior to beginning the LID planning process, it is important to understand the architectural vision of the facility. Hence its recommended to review the most current master plan data of the site for storage or infiltration locations, outfalls, utilities, etc. GIS tools will be used to analyse the master plan data and maps.

The design process should check whether a proposed solution integrates well with the existing infrastructure. The proposed options should be analysed for sustainability and the cost of construction. LID techniques such as rainwater harvesting, infiltration, underground tanks, etc. can be used for proposed water reuse solutions.

The most common LID techniques suitable for Airport facilities are grass swales, infiltration trenches, bioretention, permeable pavers, tanks, etc.

Infiltration Trench | Bioretention

Permeable Pavers | Storage Tank

Based on the solutions recommended on site, a water balance analysis should be performed for the proposed development requirements to understand how LID techniques can help achieve onsite water demand, sustainable water reuse, and recharge targets.

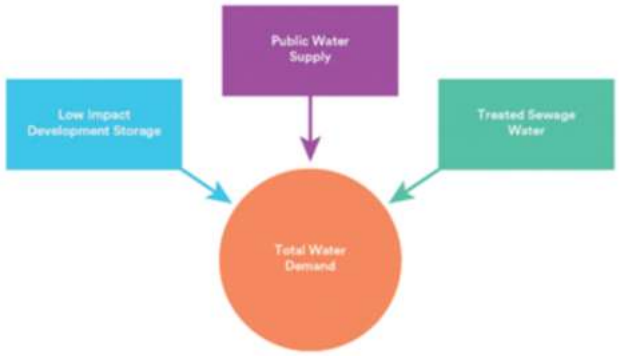


Figure 3: Water Balance Cycle

Flooding is caused due to increases in impervious areas and lack of detention to control proposed runoff which leads to the surcharge of urban drainage systems. LID also helps prevent flood risk, especially for smaller frequent events (two-year, five-year, and 10-year return intervals). The infiltration and detention capacities of LID solutions provide runoff quantity control at a site level, thus helping to reduce stress on the drainage system and natural receiving streams. In the urban setup, where due to increases in impervious areas the runoff from a site can directly discharge into a public drainage system, LID helps disconnect the area. This helps increase the time of concentration and peak volume which helps prevent or reduce the risk of downstream flooding.

LID implementation at an airport also helps exhibit environmental and social awareness responsibility. These solutions help to alleviate flood risk by reducing peak flow using infiltration techniques, improving groundwater recharge, and reducing dependency on public water. The opportunity to increase water sustainability using these nature-based solutions.

Figure 4: Flooded Roadway

Walter P Moore is an international company of engineers, designers, innovators, and creative people who solve some of the world's complex structural and infrastructure challenges. Providing structural, diagnostics, civil, water resources, traffic, parking, transportation, enclosure, and construction engineering services. We design solutions that are cost and resource-efficient, forward-thinking, and help support and shape communities worldwide. Founded in 1931 and headquartered in Houston, Texas. Our 700+ professionals work across 24 U.S (United States) offices and six international locations. Walter P Moore established an office in India in 2011. The office enhances the firm's ability to serve clients and projects throughout India for a wide variety of project types including aviation, commercial, residential, healthcare, hospitality, sports, entertainment, and government facilities.

United Airlines

By Harvinder Singh, Country Manager - India, United Airlines

United Airlines, Inc. (United) is the only U.S. airline to consistently serve India for well over a decade. Currently, United is operating a daily flight between Delhi and Newark/New York City, which it has operated since 2005. United's India flights are conveniently timed to connect to the airline's extensive network of destinations throughout the Americas beyond Newark and to points across India such as Mumbai, Bengaluru, Chennai, and many others via United's partner Vistara Airlines beyond Delhi. At United, “Good Leads The Way”. With U.S. hubs in Chicago, Denver, Houston, Los Angeles, New York/Newark, San Francisco and Washington, D.C., United operates the most comprehensive global route network among North American carriers and is now the largest airline in the world as measured by available seat miles. United customers in India may book flights by visiting united.com or contacting United reservations on 91-124-4315500 (Delhi), or via their travel agent.

UNITED AIRLINES

A STAR ALLIANCE MEMBER

Establishing an Airline Network based on HUB

By Sandeep Bahl, Executive Program Director, ACP

The word "hub" is derived from the structure of a wheel, where the hub is the central point from which spokes radiate forth to the edge. An airline hub, also known as a hub airport, is a city or airport where the airline has a larger presence. These cities frequently serve as regional gateway towns or host the airline's corporate headquarters and administrative offices. It is typically referred to as a focus city or a secondary hub if an airline has a sizable presence in a city without offices.

Inbound and outgoing flight prices from airlines with hubs in particular locations are frequently among the most affordable for that city and nation.

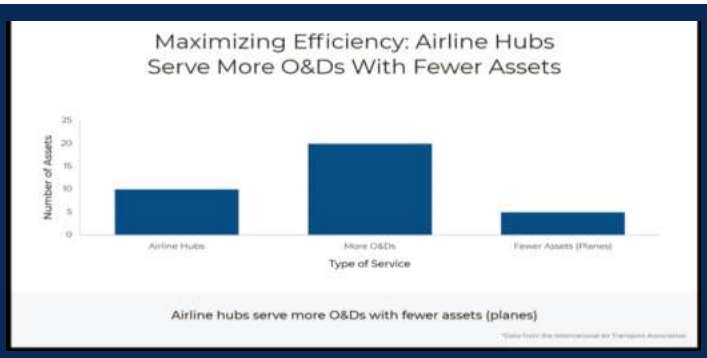
Since travellers can be directed into a few hubs rather than serving their whole itinerary with direct flights from every airport, the hub-and-spoke system enables airlines to serve more cities with fewer aircraft. In USA large airlines have multiple hub airports and each of these hubs serve a distinct purpose in the overall network of airline. United Airlines' hub in Chicago has approximately 792 flights (738 domestic destinations and 54 international) and another hub in Denver has 625 flights (25 international destinations and 600 domestic). United runs multiple daily flights between these hubs. Along with hubs, airlines occasionally increase service in "focus cities." Focus cities are best understood as smaller hubs that often serve more constrained routes within an area.

As air transportation systems are hierarchical in structure, there are various categories of aviation hubs that are currently in use. Federal Aviation Administration (FAA) classifies commercial air-transportation hubs as large, medium, and small hubs based solely on the percentage of annual passenger enplanements. Hub categories for Primary Airports are defined as a percentage of total passenger boardings within the United States in the most current calendar year ending before the start of the current fiscal year. The categories are as follows: Airport Categories | Federal Aviation Administration (faa.gov)

1. Small hub primary - airports with 0.05–0.25% of the country's annual passenger boardings
2. Medium hub primary - airports handling 0.25–1% of the country's annual passenger boardings
3. Large Hub Primary - airports handling over 1% of the country's annual passenger boardings

These straightforward divisions provide a challenge for two reasons. The first is that, depending on the criterion used, hub network systems may include numerous levels in a hierarchy, meaning that airport classifications are likely to go deeper than two or three categories. For instance, based on geographic coverage, hubs may be divided into national hubs, regional hubs, tiny nodes, or central hubs, hubs, and non-hub nodes. The second argument is that the FAA classification based solely on passengers ignores how hubs are run, the consequent relationships among hubs, as well as those factors that are related to how hubs are operated.

Airlines can transfer flows while lowering operating costs thanks to hub network structure's economies of scale, which in turn increases profitability. As a result, the hub sites and linkage assignments are strategically chosen



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Several Factors Contribute To A Sustainable Hub

1. **Local Demand** — Sizeable local demand with high propensity to travel *(large city such as* Delhi or Mumbai*)*
2. **Hub Geography** — Geography conducive to connecting passengers in an efficient manner with access to a large number of markets *(low circuitry and high coverage – Nagpur, Hyderabad or Bangalore)*
3. **Management & Operations** — Hub structure and management consistent with hub's mission relative to other hubs in the network
4. **Infrastructure** — Scaleable landside and airside infrastructure with relatively low operating costs
5. **Hub Strategy** — Strategy to defend hub over the long-term

1

taking into account operational regional coverage and rivalry with other carriers.

Several things must be in place for an airport to become a major airline hub. Here are some typical concerns, while specific requirements may vary depending on area rules and industry dynamics:

1. Geographical Location: For an airport to function as a hub, its location is essential. The ideal location would be at a convenient geographic halfway point between two important cities, allowing for quick connections and shorter travel times.

2. Air Traffic Demand: There should be a sizable amount of passenger traffic at the airport, with passengers travelling to and from different local and international places. Strong local economic activity, a thriving tourism sector, and a sizable local population can all support long-term passenger demand.

3. Infrastructure and Capacity: An airline hub needs sufficient infrastructure, including runways, taxiways, terminal buildings, and parking lots, to support increasing flight operations. To avoid traffic and guarantee efficient operations, there must be enough room for extra planes and passengers.

4. Connectivity: It's important to have excellent transportation connections to the hub airport. Passengers from nearby regions may readily access the airport because to the availability of adequate road and rail networks. Accessibility can be further improved by intermodal connections like high-speed rail or specialised airport express services.

5. Runway Length and Configuration: The runway(s) at the airport should have sufficient length to support a variety of aircraft types, including long-haul wide-body jets. Additionally significant considerations include the layout and number of runways, which have an impact on the airport's capacity and capability to manage simultaneous takeoffs and landings.

6. Airline Partnerships: A successful hub must have the capacity to draw in and forge alliances with significant airlines. The hub airport can provide a wide range of destination alternatives and effortlessly link travellers to various regions thanks to partnerships with numerous carriers.

7. Facilities for Customs and Immigration: To handle international passenger traffic, adequate facilities for Customs and Immigration are required. Passport checkpoints, designated customs areas, and facilities for luggage handling and security screening should all be present at the hub airport.

8. Passenger facilities: An airline hub should provide a variety of facilities for passengers, including pleasant waiting rooms, dining and shopping options, lounges, and effective security and baggage handling procedures, in order to ensure a favourable travel experience.

9. Airline Support Services: For airlines using the hub as their base of operations, the presence of maintenance, repair, and overhaul (MRO) facilities, cargo handling capabilities, and ground handling services is essential. These services guarantee the effective handling of cargo and baggage as well as the smooth operation and maintenance of aeroplanes.

10. Government cooperation: The establishment of an airline hub is significantly aided by government cooperation. Attracting airlines, fostering competition, and investing in infrastructure development can all be

Successful Hubs Are Supported By Strong Demand

Key Factors For Hub Development	Important Attributes To Consider	Optimal Conditions For Success
1. **Local Demand**	• Current regional population and predicted growth • High propensity to consume air travel • Alternative airports	• Large local populations with significant growth projected • Affluent, strong economic center with limited alternatives to air travel • No competing airports
2. **Connecting Demand**	• O&D circuitry • O&D coverage	• Geographic location with the most direct line-of-flight for the highest number of O&Ds • Service to large number of spoke cities reaching a high percentage of connecting O&D passengers

Demand identifies which hubs are the most desirable, the most scalable and have the potential for the greatest revenue production

3

Hubs Serve More O&Ds With Fewer Assets

- Hubs allow airlines to connect more cities with fewer flights, aircraft and equipment than a point-to-point model
- New spokes produce geometric increases in number of markets served
- Adding new spokes to a hub is less expensive than a new point-to-point market, however unit costs may be higher due to decreased utilization

Hub and Spoke (Demand collection)
- A hub connects the same six cities with only five round-trip flights
- Adding one spoke (7) increases the number of markets served from 15 to 21

Point-to-Point (Random collection)
- Connecting six cities on a point-to-point basis requires 15 round-trip flights
- Only a few large cities have a population base sizable enough to enable point-to-point service

2

made easier by supportive laws, incentives, and regulations.

It's crucial to keep in mind that converting an airport into an airline hub is a challenging and intricate process that frequently calls for extensive forethought, funding, and cooperation between airport officials, airlines, and numerous stakeholders.

The growth of an airline hub is significanty influenced by an airport's geographic location for a number of reasons.

1. A hub airport serves as a hub for connecting flights, which leads to efficient connections. The airport can reduce the distance travelled by passengers during their connections by being situated at a convenient geographic midway between important destinations. This shortens trip times and improves the hub's general effectiveness.

2. Geographical Reach: A well placed hub can act as a doorway to numerous areas or continents. It enables airlines to streamline their operations and provide connectivity to several locations. Regardless of the direction they are travelling, passengers can converge at the hub and quickly connect to their intended destinations.

3. Lower Fuel Consumption: By situating themselves at a midpoint, airlines are able to optimise their flight paths and lower fuel usage. More direct flight paths can be utilised by aircraft, reducing detours and conserving fuel. This helps airlines cut costs while simultaneously lessening the impact of air travel on the environment.

4. Time Zone Considerations: Strategically placed airline hubs that span many time zones can ease connections between flights that operate in various regions. Airlines are able to offer convenient departure and arrival times as a result, accommodating customers who are travelling across time zones. Additionally, it lessens the effects of jet lag for those taking lengthy flights.

5. Market Demand and Catchment Area: An airline hub's location should take into account both the market's needs and the catchment area it intends to service. The airport can access a sizable pool of potential customers and entice airlines to commence operations there by carefully placing the hub in a location with a high population density, vibrant commercial activity, or well-liked tourist destinations.

6. Competitive Advantage: In terms of accessibility and travel ease, a strategically placed airline hub can provide competitive benefits over other airports. The hub's lower travel distances and more effective connections may be preferred by passengers, making the airport a desirable option for airlines trying to increase their market share.

At their hubs, airlines may run banks of flights, where numerous flights arrive and depart quickly. The non-banks could be thought of as the "valleys" and the banks as the "peaks" of activity at the hubs. Passengers benefit from quick connections because of banking. Although having multiple planes on the ground at once might cause congestion and delays, an airline must combine a lot of resources to handle the surge in flight requests during a bank. Additionally, banking could lead to wasteful aircraft usage, with aircraft waiting for the next bank in spoke cities.

As a substitute, some airlines such as Southwest have de-banked their hubs and implemented a "rolling hub" where flight arrivals and departures are spaced out throughout the day and hence doesn't use the

Sufficient Capacity Required To Support A Major Hub

	Key Factors For Hub Development	Important Attributes To Consider	Optimal Conditions For Success
Airside	1. Current airspace capacity	• Arrival / departure flow rates under different weather conditions, airport delays, utilization of current infrastructure	• High-traffic handling capability, both airside and landside with existing infrastructure and minimal delays
Airside	2. Future airspace capacity	• Long-term runway construction	• Below maximum capacity to provide operational buffer and room for future growth
Landside	3. Gate capacity	• Total number of gates and availability	• High number of gates with near-term availability to support growth
Landside	4. Gate utilization	• Departures per gate	• Lower utilization of existing gates to support growth within existing facility

Hubs with limited capacity for growth present revenue and operational challenges

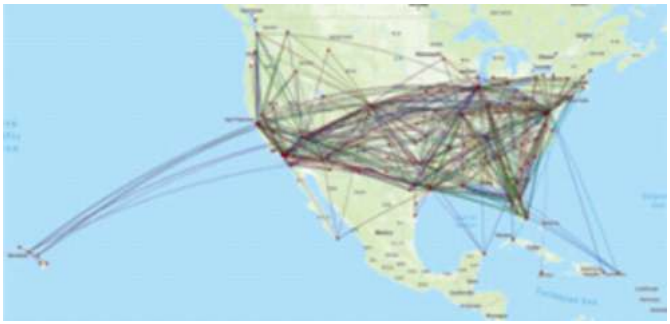
How are minimum connection times determined?

According to Airlines for America the trade association that represents most carriers in the U.S., airlines consider factors including airport layout, average boarding time and flight duration when considering their own minimum connection policies. Carriers have internal rules that are specific to each airport depending on terminal layout, concourses for inbound and connecting flights, and whether itinerary is domestic to international, international to domestic, international to international or domestic to domestic. Factors such as deplaning duration of an inbound flight and average time needed to board the connecting flight are considered as well. Carriers' reservation systems will not build an itinerary that violates its minimum connection times.

Multiple Hubs Provide Balance And Options

- A network of hubs has several benefits versus a single hub
  - Improved passenger convenience and additional itinerary options
  - Increased number of O&Ds served on single connections
  - Reduced circuitry on a larger number of markets
  - Increased efficiency of passenger routings and deployment of aircraft
- Geographically diverse hubs with complementary hub missions will increase system coverage while minimizing displacement
- Specialty hubs and focus cities serve unique purposes
  - Delhi's large local market offers point-to-point flying to domestic cities combined with connections to all across globe
  - Indigo's Istanbul operation enables connections throughout Europe with partner Turkish Airline
- Partner hubs offer a cost-efficient manner to increase presence in additional geographic regions

conventional hub-and-spoke network used by other significant airlines.



In its base cities, Southwest Airlines favours a point-to-point system along with a rolling-hub model. Southwest does not have hubs and does not want its operational sites to be referred to as hubs. By extension, this means that Southwest serves major airports in Atlanta (ATL), Baltimore (BWI), Chicago (MDW), Dallas (DAL), Denver (DEN), Houston (HOU), Las Vegas (LAS), Los Angeles (LAX), Oakland (OAK), Orlando (MCO), and Phoenix (PHX).

Airlines can transfer flows while lowering operating costs thanks to hub network structure's economies of scale, which in turn increases profitability. As a result, the hub sites and linkage assignments are strategically chosen taking into account operational regional coverage and rivalry with other carriers. Overall, the effectiveness, convenience, and market reach of an airline hub are influenced by the location of the airport. It enables airlines to provide better connections, enhance aircraft routes, and take advantage of market demand, increasing passenger flow and fostering hub expansion.

Vistara's flight from Delhi to Frankfurt, a codeshare partner Lufthansa's hub connects to 11 destinations in Europe. Arriving from Europe to Delhi on Vistara there are connections to India and to Vistara's South Asia network.

Content sourced from OAG ; Date 15th June 2023

Strong Hubs In India Can Be Connected To Network Of U.S. Hubs

- More connecting options in India and U.S. hubs increases likelihood of developing sustainable flights between India and U.S.
- Potential for new service to secondary India hubs and focus cities via North Asia or Europe. Indigo's Delhi hub connects to vast network of Turkish Airlines hub in Istanbul.

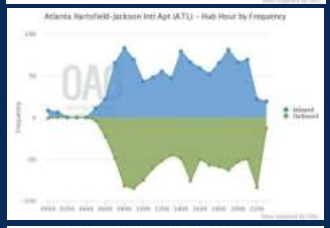
DELHI Airport total destinations served 123, domestic 69, International 54

6E DEL-IST flight codeshare on 83 flights beyond IST connecting 40 destinations in Europe and USA.

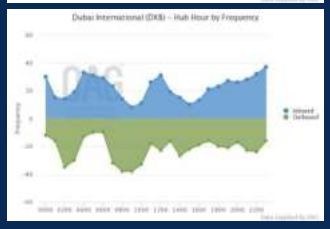
Content sourced from OAG ; Date 15th June 2023

7

Flights	DELHI
DOM	440
INT	138
Daily Total	578



Flights	ATLANTA
DOM	1324
INT	131
Daily Total	1455



Flights	DUBAI
DOM	
INT	537
Daily Total	537

Content sourced from OAG ; Date 15th March 2023

Final Thoughts on the Model and Economic Importance of Airline Hubs

1. Preferred hubs will benefit structurally in the long run.
2. Location and demand: a solid local foundation strengthened by connecting traffic
3. Income premium: Gains from leadership role at hub for presence
4. Operations: the ability to expand airside and landside capacity to accommodate development at a cost that is comparably lower than that of comparable airports
5. Hubs are dynamic and need a lot of management attention to run profitably.
6. The foundation of hub economics is the generation of revenue premiums to pay for the costs of maintaining a hub operation.
7. By creating new O&D flows and raising RASM, effective revenue and yield management can increase revenue.
8. It's important to balance inbound and outgoing capacity with clearly defined connection possibilities.

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