Shared Horizons

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

INSIDE

Volume 14 • January - June 2018

General Aviation Manufacturers Association

The General Aviation Manufacturers Association (GAMA), an international trade association founded in 1970, exists to foster and advance the general welfare, safety, interests and activities of the global business and general aviation industry. This includes promoting a better understanding of general aviation manufacturing, maintenance, repair, and overhaul and the important role these industry segments play in economic growth and opportunity, and in serving the critical transportation needs of communities, companies and individuals worldwide. GAMA represents over 100 of the world's leading manufacturers of general aviation airplanes and rotorcraft, engines, avionics, components and related services. GAMA's members also operate repair stations, fixed based operations, pilot and maintenance training facilities and manage fleets of aircraft. GAMA has offices in Washington, DC, and Brussels, Belgium.

Mission

The General Manufacturers Association (GAMA) exists to foster and advance the general welfare, safety, interests and activities of the global business and general aviation industry. This includes promoting a better understanding of general aviation manufacturing, maintenance, repair, and overhaul and the important role these industry segments play in economic growth and opportunity, and in serving the critical transportation needs of communities, companies and individuals worldwide.

Vision

Our vision is to be recognized as the most effective trade association in business and general aviation, aerospace manufacturing, and in the maintenance, repair and overhaul domain through:

- Enhancing Safety through innovation and the promotion of quality training
- Facilitating improvements in certification, audit and regulatory processes
- Fostering sustainable general and business aviation growth
- Promoting the economic impact and societal benefits of general and business aviation
- Achieving organizational excellence

Learn more by visiting www.GAMA.aero & find us on Facebook, Twitter, Instagram and LinkedIn.

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We are pleased to present to you the January – June 2018 issue of "Shared Horizons".

The highlight of the period was our successful participation at the 2018 U.S. – India Aviation Summit in Mumbai, including a very active high-level roundtable meeting alongside the U.S. and Indian governments. The interactions during the Summit succeeded in strengthening bilateral aviation cooperation between the U.S. and India besides creating opportunities for ACP members.

At ACP we have a strong belief that when young people succeed our countries and companies succeed. For young people to succeed they need to have necessary skills and that's where we plan to unite employers, educators and government to develop actions focusing on skills development. Wings India 2018 in Hyderabad provided a strong platform for ACP to support skills development in India's aviation sector where we signed an MoU between ACP and MOCA on Specialized Aviation Training.

ACP continues to grow and we are very excited to welcome new companies that have joined us recently including AAAE, Hypershift Corporation, TriEco LLC and Walter P Moore. These new additions raise our membership total to 30 and bring fresh perspectives to the work we already do.

We look to India's Aviation future with enthusiastic anticipation as the remainder of 2018 looks promising overall for the aviation sector.

(Neelu Khatri)

(Thomas M. Miller)

ACP Milestones

2018
- 2018 U.S. – India Aviation Summit at Mumbai
- Wings India 2018 at Hyderabad

2017
- Eminent Speaker Series 2017 - Blockchain Technology & its effect on the Aviation Industry
- Aero India 2017 at Bengaluru
- ACP & RGNAU partnership to bring the first Executive Development Program (EDP) for Aviation in India
- Creation of Sub-committee on Aviation and Aerospace Skills Development
- Celebration of ACP's "10 years Anniversary Partnership" on December 8, 2017 at New Delhi
- Grant signing ceremony of Sustainability Master plan for Kolkata and Lucknow Airports on September 11, 2017
- ACP's "Innovation in Aviation" workshop with Ministry of Civil Aviation on August 31, 2017 at New Delhi

2016
- Memorandum of Understanding Signing: ACP & Rajiv Gandhi National Aviation University (RGNAU)
- Grant Signing Ceremony: GAGAN Extension Business Case
- Memorandum of Cooperation (MOC) Signing: ACP & National Skill Development Corporation (NSDC)
- ACP project workshop with Ministry of Civil Aviation (MOCA)
- Memorandum of Cooperation (MOC) Signing: ACP & Bhogapuram International Airport Company Ltd., (BIACL)
- India Aviation 2016 at Hyderabad
- Grant agreement signed for Aviation Safety Technical Assistance Phase – II

2015
- Aero India 2015 at Bengaluru
- Grant agreement signed for ProVision Body Scanner System Pilot Project

2014
- India Aviation 2014 at Hyderabad
- Grant agreements signed for ASETEP & India Regulatory Oversight Assistance

2013
- Grant agreements signed for PBN, DGCA officers' training Phase-II and Airport GIS
- U.S. - India Aviation Security Seminar
- U.S. - India Aviation Summit, Washington D.C.

2012
- Grant agreement signed for Total Airspace and Airport Modeler (TAAM)
- India Aviation 2012 at Hyderabad

2011
- Grant agreements signed for DGCA officers' training Phase-I & launching GBAS at Chennai Airport
- U.S. - India Aviation Summit, New Delhi

2010
- Grant agreement signed for Helicopter Safety Technical Assistance
- Automatic Dependent Surveillance – Broadcast (ADS-B) & Ground Based Augmentation System (GBAS) Seminar
- India Aviation 2010 at Hyderabad
- Roundtable Discussion on Airport Regulatory & Financing Best Practices

2009
- Grant agreement signed for Aviation Standard Technical Training
- U.S. - India Aviation Partnership Summit, Washington D.C.

2008
- FAA conducts Air Traffic Management Training Program (ATMTP)
- AAI Air Traffic Control Officers (ATCO) Manpower Assessment Study
- Air Traffic Flow Management (ATFM) Seminar

2007
- MoU between: U.S. Department of Transportation, U.S. Trade & Development Agency and Ministry of Civil Aviation
- U.S. - India ACP Inaugural Session: ACP Formed
- U.S. - India Aviation Partnership Summit, New Delhi

ACP in Partnership with

Ministry of Civil Aviation
Government Of India

Directorate General Civil Aviation

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BUREAU OF CIVIL AVIATION SECURITY

ACP Past Successes

- Aviation Safety Technical Assistance Phase – I
- Technical, Management, and Operational Development Training (TMODT) Phase – I
- Total Airspace and Airport Modeler (TAAM)
- AAI Air Traffic Control Officers (ATCO) Manpower Assessment
- Helicopter Aviation Safety Technical Assistance
- Technical Training for Aerospace Industry
- Technical, Management, and Operational Development Training (TMODT) Phase – II
- Airport Geographic Information System (AGIS) for Indian Airport

ACP Ongoing Projects

- Business Case for GAGAN Extension
- Aviation Safety Technical Assistance Phase – II
- ProVision Body Scanner System Pilot Project
- Aviation Security Equipment Testing & Evaluation Program (ASETEP)
- GBAS Pilot project at Chennai Airport
- Sustainability Master plan for Kolkata and Lucknow Airports

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), other US Government agencies 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.

Airport – Collaborative Decision Making (A-CDM) CONTROLLING CHAOS – SAVING ENVIRONMENT

By Sudhanshu Gupta, Jt. General Manager (ATM), Airports Authority of India, CSI Airport-Mumbai

The objective of the Airport – Collaborative Decision Making (A-CDM) project is to improve efficiency of airport operations at busy airports. The primary focus is on reducing aircraft holding delays at runway holding-point. This results in substantial saving of aviation fuel and reduction in carbon emissions. This is achieved by improving the decision-making process by sharing of relevant processed information among aviation stakeholders.

Airports Authority of India took up first A-CDM project development for Mumbai Airport. All the project activities viz. software development, network design, hardware planning, live testing, implementation and software maintenance were completely done by an in-house team of AAI.

The concept of A-CDM evolved in Europe which was later included in ICAO Aviation System Block Upgrade (ASBU) blocks B0-80 and B1-80 for implementation at all busy airports across the globe. Government of India's Civil Aviation policy also mentions the need of A-CDM implementation at all major Indian airports for promoting sustainable aviation by reducing congestion. In-line with these guidelines, AAI took initiative to implement A-CDM at Mumbai Airport which is operational since 10-12-2015. At the time of writing this article, A-CDM project work was in progress for Chennai and Kolkata Airports.

THE CONCEPT

At busy airports it is very common to see long queue of departing aircraft at runway holding point waiting for take-off. Many-a-times this figure at Mumbai Airport used to go up to 12-15 aircraft. In normal course of handling, there is a concept of one arrival-one departure in single runway operations. In such situation, second departure can go after a minimum gap of 2.5 minutes and the last departure may have to wait for more than 30 minutes. The waiting aircraft are burning fuel, destroying environment, increasing RT congestion and controllers' workload.

The A-CDM System overcomes these problems by providing solution based on shared information among stakeholders. For regulating departures, TSAT (Target Start-up Approval Time) is issued to departing aircraft. Start-up clearances are issued by ATC as per TSAT, rather than EOBT (Estimated Off Block Time). Airline operators are provided with an application interface to submit changed EOBT, i.e. TOBT (Target Off Block Time). The system takes cognisance of revisions every 3 seconds and provides changed TSATs to users through an HMI. The use of A-CDM has reduced the waiting queue at holding point to 2-3 aircraft.

For arriving aircraft, ELDT (Estimated

EFFECT OF ACDM ON DEPARTURE TRAFFIC AT MUMBAI AIRPORT

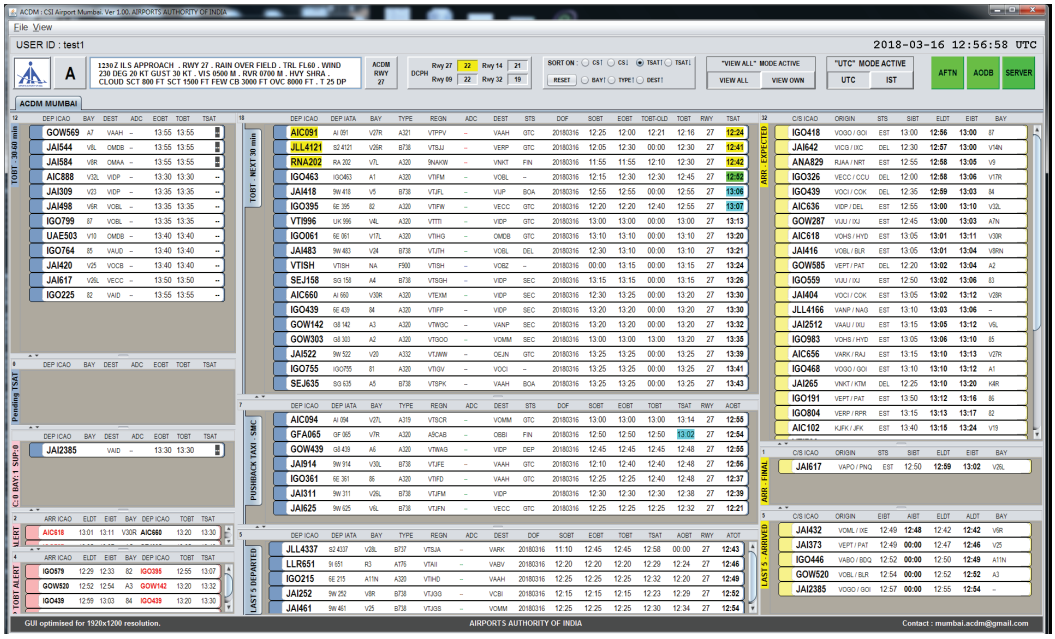
Landing Time) and EIBT (Estimated In Block Time) are provided to all the stakeholders. In addition "arrival on finals" are shown separately to help airlines and airport operator manage resources in an optimum manner.

Above picture is a random screen capture taken from SAGA system showing live positions of Departures and Arrivals on ground and in the vicinity of CSI Airport, Mumbai. Green aircraft symbols are departures and blue symbols are arrivals.

The smoothness achieved in handling departures can be well seen in this picture:

- One departure just taken off from runway 27, followed by a landing.
- One departure has started moving to line up at runway 27. Behind which only one departure will have to wait at holding point.
- Four departures are taxiing and are at various taxiways to reach holding point in different timings.
- In normal course, the departures will keep departing after every arrival. Therefore the number of aircraft at holding position is not likely to cross a figure of three.
- There is a check in the A-CDM system that stops further slot allocation if congestion is predicted at holding point and in the operational area.
- The system decides the departure sequence and automatically

NOTABLE FEATURES OF A-CDM AT CSI AIRPORT, MUMBAI

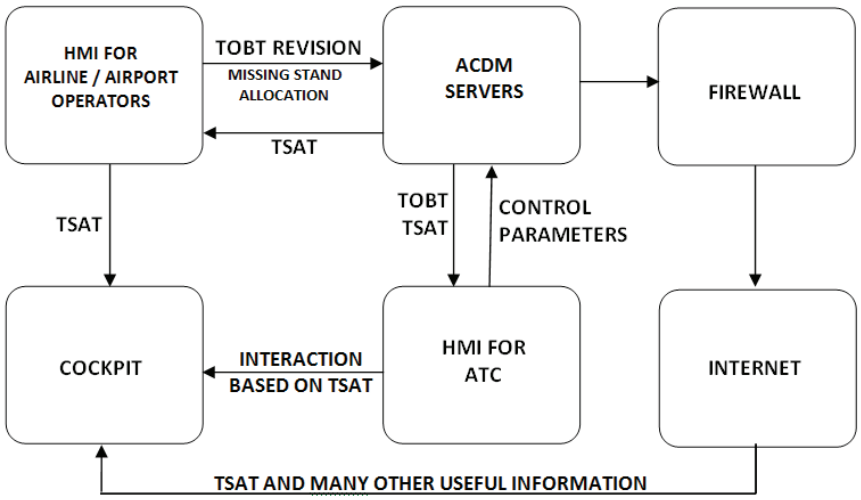


THE HMI FOR AIRLINE AND AIRPORT OPERATORS

calculates TSATs. The TSATs are dynamically reallocated for optimum capacity utilization. Fine adjustments are done by the system by looking at approaching arrival pressure vis-à-vis departure pressure.

- The TSAT times are color coded for fast and easy compliance. TSATs are shown in Green color when they fall in +/- 5 minutes from current time. At TSAT+5 minutes TSAT turns Red, implying that the aircraft operator needs to change the TOBT to get a new TSAT.
- NOTAM Application: All India NOTAMs are processed automatically and shared through web interface. NOTAM bulletins can be generated through web interface.
- Real time information is shared among stakeholders through customized application interface and website. ACDM Application is installed on 33 user computers (on MIAL network) for the use of airport and airline operators so far. MIAL has installed many of its planned 112 display boards for information dissemination.
- Alerts are generated and shared for TOBT and Parking Bay update requirements. If a filed TOBT is not having appropriate turn-around time, airline operator is alerted to change TOBT. Similarly if an arrival is not expecting a vacant bay by its EIBT, airport operator is alerted to change the parking stand.
- Alert is also generated for early arrivals for the airlines to take a note of, as sometimes early arrivals contribute to air congestion.

THE PROCESS FLOW DIAGRAM:



Benefits to Stakeholders:

Stakeholders that are direct beneficiaries:

[1] Airline Operators and General Aviation operators.

[2] Airport Operator

[3] ATC operational units

[4] Public at large (Environmental benefits)

Benefits are many. To name a few:

- Automated Regulation of Flow of departures.

- Transparency due to sharing of operational information with all concerned stakeholders.
- Automated procedures.
- A real and viable solution for efficiency.
- Reduces costs, lowers emissions and improves punctuality.
- Making the system capable of handling disruptions more efficiently.

Economic & environmental impact at Mumbai Airport:

On an average about 12 minutes of fuel, per departure flight, on ground is saved during 12 hours of ACDM operations. During these 12 hours of A-CDM operations at Mumbai on an average 270 departures take place.

Flights are a mix of small, medium and large sized aircraft. As approximately 80% aircraft fall in medium size category, for fuel consumption calculations let us take A320 as sample base. An A320 aircraft consumes approx. 12Kg/Minute fuel with both engines running at idle power.

This study shows a saving of 14.2 Million Kilograms of aviation fuel per annum. In Monetary terms it is approx 11.54 Million US Dollars of annual saving (ATF price@650 USD/KL). This is a direct saving to the airline operators at Mumbai Airport. A-CDM is trying to make its humble contribution towards sustainable aviation.

Carbon dioxide emissions are reduced by 45 Million Kilograms per annum. This is a significant contribution of A-CDM towards saving our environment.

Common Situational Awareness:

Before A-CDM implementation, there used to be endless arguments among Pilots-ATC and Airlines-ATC on various misplaced apprehensions due to lack of information sharing platform. After implementation of A-CDM, all stakeholders are aware of each other's actions. This improved-transparency among stakeholders has made the working environment more relaxed. The blame culture has reduced significantly.

STAKEHOLDERS WORKING ON A-CDM INTERFACE AT JCC

Data Repository:

The data collected in A-CDM database is helping many sections of Airports Authority of India. The RNFC billing section, C-ATFM at New Delhi, SQMS investigations and higher management are the regular users of ACDM repository which is helping them in better and faster decision making.

Operations Support Information through Web Interface:

Mumbai Airport's A-CDM data and some other operationally relevant data is made available through a web portal: www.acdm.in. This web interface is having following information:

- Real-time TOBT, TSAT etc for departures and ETAs for arrivals.

WEB INTERFACE (www.acdm.in)

- Automatically updated all India NOTAMs, NOTAM bulletins & Watch Hours.
- Latest ATIS for 46 Indian Airports.
- Current Meteorological information.
- Various charts and reports of aircraft movements.
- E-AIP and AIP Supplements.

Impact on controllers' workload:

- Simple Application Interface is provided to ATC for viewing and configuration. Drag and drop enabled Electronic Strips are provided for ease of operations.
- The system is capable of dynamically adjusting slots and allotting revised TSATs. No manual input is required for TTOT (Target Take Off Time) or TSAT.
- The system automatically detects change of runway. Subsequently all VTT (Variable Taxi Time) and TSAT calculations are done by the system based on new runway. No manual input required during change of runway.
- Orderly flow of traffic on ground has reduced the chances of human

error. Reduction in R/T congestion has reduced chaos during busy hours.

- Traffic handling in air is optimised due to regulated departures.

Recognition by CANSO

CANSO published a guide "Airport – Collaborative Decision Making: Optimization through Collaboration" for Air Navigation Service Providers in June 2016. After studying existing A-CDM implementation models, CANSO shortlisted nine A-CDM models as reference for implementation across all major airports in the world.

Mumbai A-CDM model was well appreciated by CANSO and is included in this list of reference case studies.

AAI ACDM system is developed by a team of Air Traffic Controllers having 25 years of experience in ATC. Since they are fully aware of aircraft operations and airport operations, the system architecture incorporates most of their concerns by automatically generating Target Start-up Approval Time (TSAT). Any Airport Operator/ANSP interested in implementing ACDM at their airports may contact AAI for controlling chaos at the airports and saving environment.

References

Annex: Case Studies

1. Charles de Gaulle Airport, Paris, France
2. Chhatrapati Shivaji International Airport, Mumbai, India
3. Gatwick Airport, United Kingdom
4. John F. Kennedy International Airport, New York, USA
5. Rome Fiumicino Airport, Italy
6. Oslo Airport, Norway
7. Phoenix Sky Harbor International Airport, USA
8. Singapore Changi Airport, Singapore
9. Vienna International Airport, Austria

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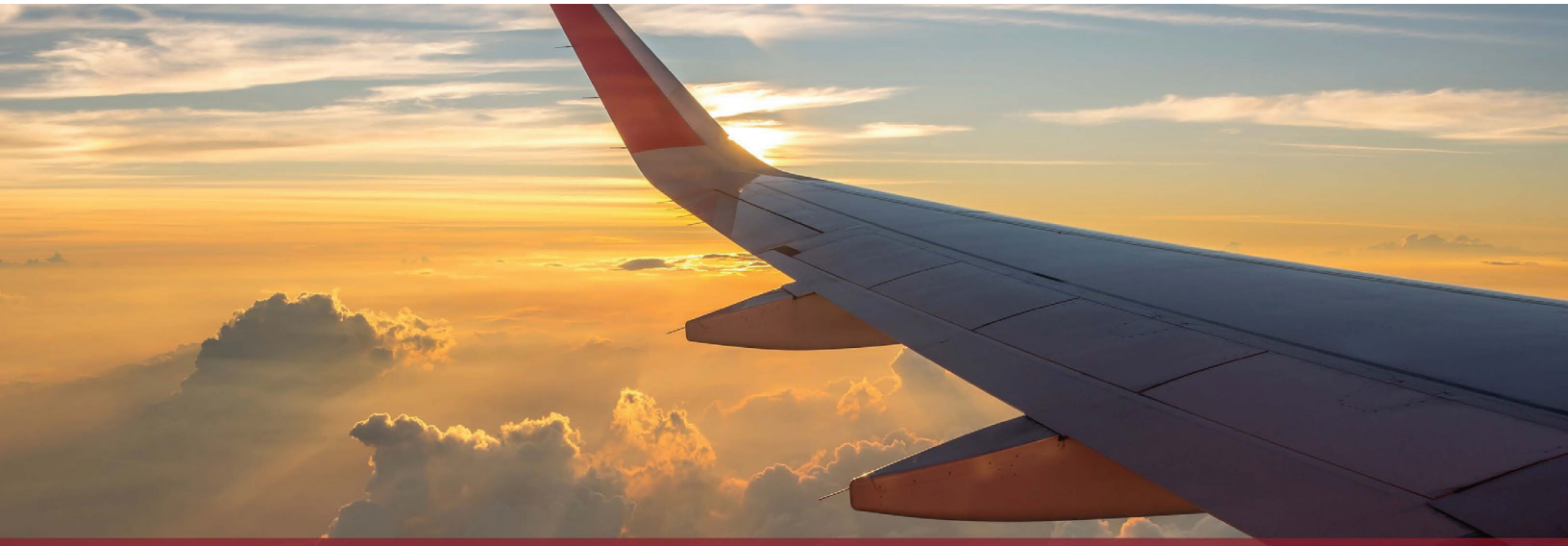

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A Center of Excellence (CoE) Could Be a Game Changer for the Indian Aviation Industry

By Manav Subodh, Managing Director, Hypershift India & Director of International Development, Innovation Acceleration Group, Berkeley Executive Education University of California, Berkeley

ADDRESSING KEY CHALLENGES IN AVIATION

The Indian aviation market, currently pegged as the fastest growing in the world,1 is on a sharp upward trajectory that demands a growth superhighway complete with futuristic infrastructure planning/monitoring, cost-efficient training, comprehensive standardization, and future-ready skills, all supported by robust policy. The first step towards realizing this vision is implementing reform driven by a well-articulated and bold strategy, the concrete manifestation of which would be realized in the form of a dedicated Center of Excellence (CoE).

Hypershift Innovation in partnership with University of California Berkeley plans to establish a world class COE for the Aviation industry in India. The COE will be anchored around the following 3 pillars:

1) ADVISORY: GLOBAL BEST PRACTICES IMPLEMENTATION

In order to perform its role to the fullest, the CoE will draw upon the expertise from the University of California, Berkeley for extensive collaboration - bringing together not only industry professionals, but also dedicated researchers (especially in emerging technologies), public as well as private entities, and academia - with the common aim of achieving development goals.

2) SKILLING AND ASSESSMENT

The pre-requisite to ensuring best practices on par with global standards, seamless technology integration, and sustained service innovation is establishing a unified view of training and doing continuous assessments of existing training programs. By assessing expectations in the varied professional roles in aviation, the proposed CoE will continuously re-evaluate these expectations over clearly-defined periods of time to reflect tasks performed on a daily basis, current trends, and feedback received from practising professionals, key market regulators, policy-makers, and experts from renowned research institutions.

Serious investment in training and capability building is a key imperative, across all professional ranks. Broadly, the lineup of courses must provide insights into the latest trends and help professionals revamp their arsenal of knowledge with courses related to leading practices and cost-reduction strategies that will help explore untapped revenue streams.

For mid- to senior-level management, a specially designed leadership program will facilitate easier navigation to more senior roles, backed by live discussions, case presentations, and so on. Courses will also introduce participants to key leasing and financing schemes, protocols for gaining assistance from government bodies or manufacturers, and strategies for maximizing cost-efficiency while ensuring compliance.

A comprehensive range of carefully designed courses for up-skilling senior management must provide deep insights into marketing and corporate communication strategies towards balancing capacity with demand, as well as identifying and leveraging business growth factors, while maintaining long-term customer relationships. A master planning course for decision-makers will assist in developing persuasive arguments and designing proposals for effective negotiations.

3) GLOBAL IMMERSIONS

Its important to learn from the best of the best. Visits to world class global organization, sharing of best practices in the spirit of open innovation and trips at leading airports across the globe

will be important elements to develop leadership through global immersions at the COE.

PLACING INDIA ON EVEN FOOTING WITH THE BEST IN THE WORLD

For India to deliver aviation services and innovation on par with the best in the world, it is essential for the industry to have a dedicated forum that brings together its best minds and knowledge, connecting industry professionals with subject-matter experts, as well as international bodies and investors, while creating employment awareness and mindshare on technology breakthroughs and best practices followed by reputed institutions across the globe. In other words, a specialized CoE will be the game changer that will discover and promote industry-leading skills, knowledge, and policies needed not only to meet today's demands but also those of the future.

HYPERSHIFT

1. Tweet by Suresh Prabhu (Minister of Commerce and Industry, Civil Aviation, Government of India), 3 July, 2018.

2. "Comprehensive Skill Gap Analysis and Future Road Map For Skill Development in Civil Aviation Sector", ICRA Management Consulting Services Ltd., 2016.

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Critical Success Factors for the Regional Connectivity Scheme

By Ashwin Noronha, Director, Aerospace & Defence, KPMG in India

India's aviation sector has seen rapid growth in the past few years, with high demand propelling the country towards becoming the world's third largest domestic aviation market. This growth has been driven by scheduled commercial airlines that emphasise on establishing domestic and international connectivity to metros and Tier 1/2 cities – markets where the demand density can sustain their aircraft fleet. India's regional, low-density commuter markets, on the other hand, remain largely untapped.

India has experimented with the idea of regional airlines for over three decades, but with limited success. Over time, the failure of traditional regional airlines such Air Costa and Air Pegasus, gave way to regional arms of, and regional services provided by full-service commercial airlines. Today, India's regional aviation market is dominated by the likes of Spicejet and Air India's Alliance Air. As a result, smaller commuter carriers such as TruJet and Zoom Air face stiff competition and struggle to remain viable.

In the past, the absence of an incentivisation mechanism for regional air connectivity, limited spending power of regional airlines, and low economic activity in remote geographies have heavily contributed to the stagnation of regional air transport. However, the Indian Government's recent efforts to boost regional air connectivity, in the form of the Regional Connectivity Scheme (RCS), have the potential to drive substantial foreign and domestic investment into this sector.

Regional Connectivity Scheme (RCS)

To make air travel affordable and widespread, the Government of India released the Udey Desh Ka Aam Nagrik (UDAN) scheme in 2016, with specific emphasis on capped air fares for pre-planned stage lengths. Under UDAN, the government is offering up rights to operate regional routes through competitive bidding. In order to make these routes viable, air operators are to have monopoly over the routes they win for 03 years, and the option to avail of Viability Gap Funding (VGF) for RCS operations. In addition to these, both central and state governments have announced a slew of tax and duty concessions to promote RCS flights.

Bidding of routes and RCS

In order to accelerate regional connectivity in a structured manner, the government divided the route bidding process into different phases, of which two phases have been concluded so far.

In the first phase, the government awarded over 128 routes, expected to connect 70 different airports across India, to five different air carriers. Air Odisha secured the highest number of routes with 50 routes, followed by Air Deccan at 34 and TruJet at 18 routes. Among scheduled commercial operators, Alliance Air secured 15 routes, followed by SpiceJet, which secured 11 routes.

In the second round of bidding, the focus was on improving connectivity to priority areas like the North East, Jammu & Kashmir, Uttarakhand, Himachal Pradesh, Andaman & Nicobar Islands and Lakshadweep by introducing more operational flexibility and promoting helicopter operations. This phase of bidding saw the government award over 325 routes to 15 air carrier and helicopter operators, that are expected to connect 25 new airports and 31 new helipads to India's aviation network.

While both rounds of RCS bidding were extremely successful at face value, commuter operations remain far from achieving their full potential. Carriers such as Air Odisha and Air Deccan are yet to commence full scale RCS operations,

despite having won exclusive rights to operate certain routes under UDAN.

There are multiple factors that contribute to the lacklustre on-ground performance of UDAN operations in the country. To some extent, the slow uptake of RCS operations can be attributed to an insufficient understanding of region-specific market dynamics, and the absence of an adequate infrastructure ecosystem. Yet, the biggest challenge faced by air operators is the difficulty in obtaining appropriate aircraft and ground assets for sustainable regional operations.

Regional air transport operations until UDAN

Since most regional flights today are undertaken as secondary operations by leading domestic airlines, the specific requirements for commuter aviation play second fiddle to aircraft requirements for the operators' existing high density routes. Coupled with the fact that easy financing and leasing options are available only for aircraft types that have an established global presence, this has led Indian regional operators to opt for quasi-regional aircraft, such as Bombardier's Q-400 series and Airbus's ATR series of aircraft on all regional routes.

However, air operators have been unable to achieve the frequency of flights required to generate and sustain a critical mass of regional passengers, due to a major mismatch between region-specific demand and the capacity of aircraft in use.

With airlines unable to remain viable solely through commuter routes, they are increasing compelled to depend on traffic flow from established metro and Tier 1 markets network to ensure sufficient capacity utilisation. In doing so, stand-alone regional and commuter operators have put themselves in direct and undesirable competition with major scheduled carriers. This competition has often resulted in ceasing of operations and bankruptcy of the regional and commuter operators.

The failure of regional operators, though, is a self-fulfilling prophecy. In any established aviation market, the key to success for regional aircraft operators is to work in conjunction with larger scheduled operators, while ensuring that they both do not compete head-on for the same markets. In order to make this possible, commuter airlines need to create a strong network of regional routes.

To this end, airlines would first have to operate aircraft appropriate for low density regional routes, since the success of regional aircraft operations in India hinges on the type of aircraft being used.

Aircraft selection for regional markets

The selection of aircraft for regional operations, if done properly, plays an important role in the success of commuter airlines - right from creating a robust network, to strengthening local supply chains, capturing critical airport slots and ensuring long-term sustainability through synergising the regional network with domestic and international air networks of larger airlines.

This is true for both – the regional passenger market and the regional freight market. In fact, air freight forms a significant proportion of the demand for regional air transportation, and thus it is important for air operators to leverage the high cargo demand towards maximising aircraft usage and revenue. This need for simultaneously catering to both passenger and freight markets is best satisfied by small combi-aircraft that can be quickly configured to carry either passengers or freight or a combination of both.

There are several regional markets where combining passenger and freight services can be beneficial for the sustainability of airlines.

The North East region, for example, has a unique characteristic, defined by limited surface connectivity, ecological sensitivity, and in some cases a delicate security situation. Here, air freight forms a significant component of air transportation, accounting for about 40% of the revenue generated by carriers1. By opting for combi-aircraft in this region, operators will not only serve the passenger market, but also capture sizeable revenues from the freight market.

Coastal states in peninsular India can also vastly benefit from commuter airlines operating such quickly convertible aircraft. As the traditional ports such as Mumbai, Chennai, Kolkata and Trivandrum become more and more heavily congested, commuter air operators with configurable aircraft can provide much-desired relief by offering a faster alternative to road transportation for freight consignments to smaller, interior airports where scheduled commercial operators may find it unviable to fly. For example, the small port city of Ratnagiri, Maharashtra, offers an immediate opportunity for such operations. As the port capacity in Mumbai gets increasingly constrained, Ratnagiri could potentially act as an intermodal hub for smaller freight consignments, providing an assured market for regional air operators.

Regional carriers that opt for using combi-aircraft will be afforded significant flexibility in managing their passenger and cargo capacity. With the ability to change aircraft configuration on an immediate basis, operators will have means to maximise the utilisation of their aircraft on a daily basis. Operating both configurations during their respective peak times, and a combined configuration during lean hours will ensure that the aircraft fleet generates revenues without losing either markets to competition.

By using smaller, 20-seater combi-aircraft, airlines will have the opportunity to increase frequency of operations while maintaining adequate aircraft utilisation, thus offering more options to both passengers and cargo shippers, capturing critical time slots in newly operational or existing regional airports and stimulating the market. This in turn will allow commuter operators to build a lucrative feed/de-feed market for larger domestic and international carriers, and also successfully compete with surface and shipping transport to connect regions with low accessibility.

Given the Indian Government's push for development and operationalisation of more than 100 airports within the next 5 to 10 years under RCS scheme, the country's regional network would have the capacity to absorb more than 200 twenty-seater aircraft in the same duration.

This potential for immediate high demand presents a lucrative opportunity for aerospace manufacturers to invest in the country, whereby they would be able to easily capture the demand for combi-aircraft, and at the same time be major contributors in the "Make in India" initiative.

Convergence of UDAN and "Make in India": An opportunity for aircraft manufacturers

While the initial demand is expected to be for around 200 twenty-seater commuter aircraft2, market stimulation in the long run could potentially result in regional operations connecting over

[1]Source: KPMG Analysis
[2]Source: KPMG Analysis

400 airports. Coupled with eventual aircraft replacement opportunities and the early-mover advantage of capturing the nascent civil aerospace market, this offers both the industry and the government a golden opportunity to converge their interests and rewrite the way India's aviation and aerospace sectors operate.

So far, India's regional aircraft manufacturing ecosystem has been dominated by state-run enterprises. The aircraft produced by these manufacturers are based on designs which have limited convertibility, and are seldom used for commercial operations due to the implementation of older and less efficient technology.

Thus, there is a significant supply and demand gap in aircraft requirements for regional aviation, which can be easily captured by global aerospace manufacturers. Given India's large scale demand for commuter aircraft and its eventual impact of stimulating the larger hinterland and semi-rural aviation market, a strong case can be made for setting up a dedicated facility for manufacturing and assembly of combi-aircraft within India, which would be essential for supporting and sustaining the rapid growth potential of the country's regional aviation market.

While the potential market for regional air connectivity is highly attractive for both commuter airlines and combi-aircraft manufacturers, it is crucial that an adequate financing mechanism be put in place to ensure tenable and profitable regional operations.

Financing: Need of the hour for air operators

In India's current aviation ecosystem, there is significant need for dedicated financial institutions, backed by both private and public sector banks, which provide easy financing options for regional aircraft operators.

Air operators face a very high the cost of capital primarily due to the sheer cost of acquiring aircraft. Without government assistance and financial support, a new regional operator would be left with no choice but to turn to global aircraft leasing and financing institutions, thus being compelled to buy established aircraft that are not suited for regional operations within India.

This asset financing bank set up for fulfilling requirements of the regional aviation ecosystem will be effective only if it is established as a separate government entity, with active funding participation from different public and private sector banks, such that, it is able to provide cost-effective financing options at very low interest rates spread over a longer amount of time.

The successful development of this ecosystem, with active participation from air operators, aircraft manufacturers, financial institutions and the government, will lay the foundation for creation of a robust and thriving commuter aviation industry, which will stimulate both regional economic growth as envisaged under RCS, and local manufacturing as promoted by the "Make in India" scheme.

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's India Technology Center (MITC) in Bangalore started in 2009 includes a staff of nearly 200 people providing engineering, design, test and certification for mission critical aerospace and defense systems.

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Typical Hydraulic Flight Control Actuator Model & Hardware

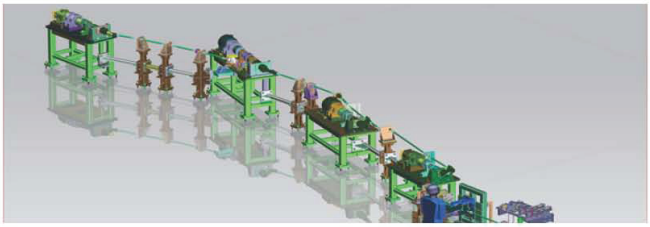
MITC team extensively supported in design and analysis of commercial flight control actuation system hardware consisting of primary flight surfaces on the airplane, as well as the spoilers and horizontal stabilizer, and includes a mix of electrohydraulic (EH) and electromechanical (EM) servoactuators and all associated control electronics. The secondary flight control high lift system is comprised of discrete assemblies including: power drives, electronic controls, trim controls, geared rotary actuators, rack and pinion roller assemblies, transmission shafts, gearboxes, sensors and accessory components.

MITC Provides Software, Electronics, Mechanical Design Support, Qualification Testing for Commercial and 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 B787-8, 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.

System Level Testing

Over this period, Moog has grown from a high technology component manufacturer to become a leading supplier of integrated flight control systems. We are continuously investing to extend the depth of our product expertise while simultaneously expanding our capabilities to take on the challenges and responsibilities of a changing industry. As a result, 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.



Expanding Aviation in the US and India

By Blair Hanuschak, PE, Senior Principal and Director of Airport Projects, Walter P Moore (Washington, DC) & Abhijit Shah, PE, Principal and Managing Director of India Operations, Walter P Moore (Pune)

The global aviation market is robust and growing, and Walter P Moore is proud to support many airports and airlines with multi-faceted expansion programs around the world. Our firm specializes in integrated engineering and consulting services for airports, and our 87 years in business in the US and 7 years in business in India have allowed us to contribute significantly in many different ways to the aviation market.

Through our design of over US$15 billion of airport construction in the last 20 years, we have seen many changes and trends that positively impact the travel experience for passengers, along with financial outcomes for airports and the entities that operate them. Airports have become a sense of pride for the cities in which they're built – serving as the gateway to and from that region. A traveler's first and last impression of a city is the airport in which they pass through, so airport managers are hiring architects, engineers, and contractors that can help them achieve their vision.

Here's a few of the things that we're seeing that excites us about the future growth of aviation in India and the rest of the world.

Airport Cities

Airport Cities is a growing phenomenon. The realization that airports are an economic engine with millions of captive customers (passengers and visitors) has spawned the creation of ancillary business activity on and around airports. Hotels, offices, restaurants, and retail are booming at airports around the world.

Globalization

The world is shrinking. With the creation of airport mega hubs that facilitate mid-point connectivity, to technological advances in aircraft and engines that allow further flight distances, global travel is an easy reality. The world of global commerce demands it, the world of airline alliances and partnerships enable it.

New Terminal Construction

Airports have outgrown their aging infrastructure. The days of "freshening up" existing terminals have given way to full-scale replacement terminals in many cities. As communities strive to create that lasting impression and a sense of place, they've realized that new terminals need to be built to serve the current needs and anticipate the future needs of the travelling public. Terminals need to be built to accommodate future growth, and to be adaptable and flexible to accommodate many changing needs. Technology, amenities, security, passenger processing, concessions, and airline operations can all drastically change in a few short years, and buildings need to be ready to respond. Walter P Moore was fortunate to provide structural and enclosure engineering services for the Louis Armstrong New Orleans International Airport – North Terminal, which is a completely new, 30-gate replacement terminal that will open in 2019.

Image credit: Leo Daly

The firm also recently provided structural engineering, enclosure engineering, and secure design services for new terminals in Las Vegas, Los Angeles, Houston, and Dallas.

Terminal Renovations and Expansions

Not every terminal can be replaced, and sometimes terminal renovations are the right solution. There are many factors that weigh into the decision to renovate or replace, and they should all be weighed carefully utilizing a cost/benefit analysis that considers short-and-long term needs.

We've been involved in many terminal renovation projects across the US in Atlanta, Los Angeles, and Houston that have proven to be incredibly successful for our airport and airline clients. Each one has common goals of improving the passenger experience while also being fiscally responsible. When a "win-win" scenario is achieved, passengers, airports, airlines, and concessionaires and service companies all share in the benefits.

One of the most exciting things we've been involved with includes expanding concessions and amenities within an existing terminal. Creative strategies like horizontal and vertical expansions create spaces where passengers are more inclined to dwell and spend money, building a connection with their airport or airline. These spaces take the form of airline clubs, restaurants, bars, retail stores, and services like spas and business centers.

Other expansions that enhance airport operations are equally important in that they consolidate security checkpoints in order to allow for more efficient passenger experience for O+D and connecting passengers, provide secure connectors between terminals, or provide more space for queuing, passenger screening, or passenger hold rooms.

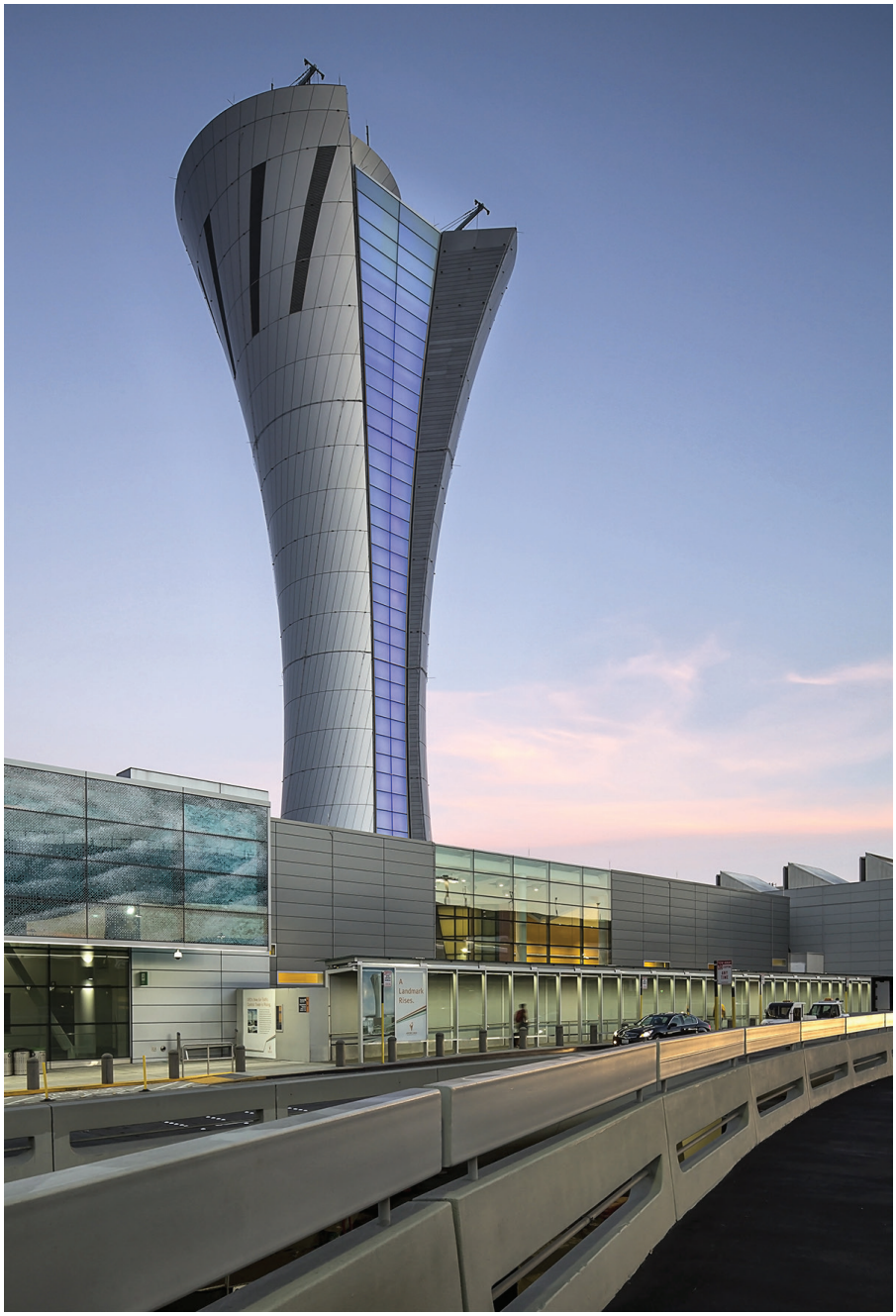


Image credit: John Swain Photography

Multi-level Car Parks

Real estate is a valuable asset, especially on airport property. The advent and explosion of multi-level car parks seeks to optimize the utilization of this valuable property. Finding the right balance between providing close-in parking and shortening customer walking distances, offering multiple levels of conveniences and pricing (short-term, long-term, valet, etc.), and initial capital costs is the task at hand for airports. Customer conveniences such as multiple payment options (pay on foot, credit card, toll tag, etc), space availability systems, vehicular and pedestrian wayfinding, remote baggage check in, and food and beverage concessions are all considerations in today's car parks. We've incorporated many of these features in airport car parks we've designed in Houston, Dallas, Tampa, and elsewhere.

Currently, we're discussing the issues surrounding "future-proofing" of car parks, as airports consider future scenarios where passengers no longer need parking spaces due to their utilization of self-driving cars, transportation network companies (TNC's) like Uber, Ola and Lyft, or other alternative means of transportation to get to and from the airport.

We've done studies about how to re-purpose car parks in the future, so that they can be converted to alternative uses, if needed. Forward-thinking about floor to floor heights, design loads, ramping systems, floor flatness, long-term durability, and other issues may require higher initial capital costs, but could extend the life and future adaptability for the structures.

Consolidated Rental Car Facilities (ConRAC's)

In the late 1990s, airports began to consolidate rental car operations into a common or shared facility, either on-airport or adjacent to the airport. Through the early 2000s, the trend continued to evolve and the second- and third-generation facilities are coming on line that respond to ever-changing needs of this industry.

The rental car industry has seen many challenges from rising fuel prices and economic downturns, to consolidation of companies through mergers and acquisitions, to competition from alternative modes of transportation. Despite these challenges, ConRAC's are growing in size and scale, while still striving to maintain the dual goal of providing excellent customer service and outstanding operational efficiency.

In the last few ConRAC projects that we've worked on including new facilities for Bradley International Airport in Hartford, Connecticut, we've seen trends like Customer Service Buildings shrinking or being replaced with customer facilities in the ready/return space, in order to get people to their cars sooner. We've also seen Quick Turn Around (QTA) spaces being constructed within elevated superstructures that are directly adjacent to the Ready/Return spaces for which they support. The creation of multi-level fuel systems, car wash systems, and maintenance bays in these "stacked" superstructures has provided design and permitting challenges to overcome with local code officials.

Image credit: Dana Hoff

Automated People Movers (APM's)

In the early 1970s, Tampa International Airport was the first airport to use APM technologies as a means of connecting satellite airside concourses with their Main Terminal building. Since then, the use of APM's in the US and worldwide

exploded with the realization that they provide a high level of customer service with a high degree of reliability. Moving millions of passengers each year between terminals, CONRAC's, rail stations, and multi-level car parks saves time, provides a comfortable environment, and overall exceptional customer experience. Airports are realizing that the initial investment in the capital expenditure provides long-term benefits to their customers. Walter P Moore provided structural engineering on the new APM system at Tampa International Airport that opened earlier this year.

Image credit: Randy Van Duinen

About Walter P Moore

Walter P Moore is an international company of engineers, designers, innovators, and creative people who solve some of the world's most complex structural and infrastructure challenges. Providing structural, diagnostics, civil, 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 600+ professionals work across 18 US offices and five 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 governmental facilities. Our local portfolio includes the World's Largest Cricket Stadium in Ahmedabad - the Motera Cricket Stadium. Our aviation experience in our India office includes terminals, ConRACs, and APM's in New Orleans, Newark, and Hartford.

For more information, please contact:

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Passenger Survey On Air Travel: On-Time Performance And Inflight Wi-Fi Most Valued

What do airline passengers care about when it comes to in-flight Internet? It may not be what you think.

A new survey from Honeywell shows seven in 10 airline passengers value a reliable connection more than any other attribute, including speed. Passengers were far more interested in technology that gets their plane to its destination on time – and they ranked "watching live TV" as one of their least important concerns.

What's an airline supposed to do? How can they provide the Wi-Fi that passengers want while also making sure they have the technology that helps planes get to their destination on time and reduce operation costs? Simple: they use connectivity to do both and create the Connected Aircraft.

Enter the Connected Aircraft

The foundational idea of the connected aircraft is integration. It harnesses the power of data analytics with seamless connectivity to and from the aircraft.

For airlines, this means a reduction in cost per available seat mile (CASM), including as much as 5 percent in fuel savings, and a 35-percent drop in operational disruptions.

Passengers get access to the consistent, reliable and global Wi-Fi they are demanding, while flight operations get a more real-time data, reducing disruption and saving 5 percent in-flight time with air traffic control.

Finally, ground operations can reduce grounded time, avoid costly hazards and cut troubleshooting time by 25 percent.

Traditionally, maintenance crews respond reactively to broken mechanical systems. They often spend a significant amount of time assessing the condition of an aircraft once it lands, which leads to delays and grounded aircraft.

With connected maintenance, an aircraft can transfer data directly to maintenance crews to address any potential mechanical issue before it grounds the plane, saving time and keeping operations smooth.

With connected ground handling applications, ground handlers receive and distribute flight information more efficiently, improving on-time performance and, ultimately, passenger experience.

On-time takeoffs, easier assessments for maintenance crews, happy passengers and cost savings for airlines – It's seamless, with the right connectivity.

The Future...

The real value of connectivity is more than cabin entertainment; it is in behind-the-scenes applications like flight data analytics, connected maintenance and real-time weather information that increase the number of on-time arrivals.

Most travelers will never know that a solid, global, dependable Internet connection was the reason they landed on time, or were able to avoid a storm and touch down early. The beauty is, they don't need to. The connected aircraft simply delivers.

Honeywell

THE POWER OF **CONNECTED**

Aviation Institute of Maintenance (AIM)

By La Vern Phillips, Director - Business Development , AIM

The most important aspect of air travel is the safety of the passengers and the flight crew. Flight and cabin crew members receive current and recurrent training in the model flown on a regular basis. Passengers even receive a safety briefing before each and every flight. But who ensures that the aircraft itself is safe for flight? That's the job of the aircraft maintenance professional who makes his or her contribution to every flight taking place around the world. Safety begins with these maintenance professionals and in the USA, they are known as FAA mechanics with a rating in airframe and powerplant, aviation maintenance technicians, or just A&Ps. In Europe, and in other parts of the world, these same aviation professionals are called aircraft maintenance engineers, AMEs, or just engineers. Where do these maintenance professionals learn about safe maintenance practices and all the complex systems that make flight possible? It begins with basic maintenance training.

Aviation Institute of Maintenance (AIM) owns and operates eleven Aviation Maintenance Technician Schools (AMTS) certificated by the U.S. Federal Aviation Administration (FAA). AIM schools are located throughout the United States in the major metropolitan areas of: Atlanta, Dallas, Houston, Indianapolis, Kansas City, Las Vegas, Orlando, Philadelphia, San Francisco, Virginia Beach and Washington DC. As the world's largest trainer of these licensed technicians, we take safety seriously from the very beginning. Students learn the hazards and dangers of working on and around aircraft. Throughout their training program, safe working practices are embedded into their training, to the point they become inherent.

To ensure that newly certificated (licensed) aviation technicians are properly trained, the FAA curriculum is defined in Federal Aviation Regulations (FAR) Part 146, Appendixes in three separate areas: General, Airframe and Powerplant.

General Subjects: FAR 147, Appendix B

Basic Electricity; Aircraft Drawings; Weight and Balance; Fluid Lines and Fittings; Material and Processes; Ground Operations and Servicing; Cleaning and Corrosion Control; Mathematics; Maintenance Forms and Records; Basic Physics; Maintenance Publications and Mechanics Privileges and Limitations.

Airframe Subjects: FAR 147, Appendix C

Part I – Airframe Structures

Wood Structures; Aircraft Coverings; Aircraft Finishes; Sheet Metal and Non-metallic Structures; Welding; Assembly and Rigging and Airframe Inspections.

Part II – Airframe Systems and Components

Aircraft Landing Gear Systems; Hydraulic and Pneumatic Power Systems; Cabin Atmosphere Control Systems; Aircraft Instrument Systems; Communication and Navigation Systems; Aircraft Fuel Systems; Aircraft Electrical Systems; Position and Warning Systems; Ice and Rain Control Systems and Fire Protection Systems.

Powerplant Subjects: FAR 147, Appendix D

Part I – Powerplant Theory and Maintenance

Reciprocating Engines; Turbine Engines and Engine Inspection.

Part II – Powerplant Systems and Components

Engine Instrument Systems; Engine Fire Protection Systems; Engine Electrical Systems; Lubrication Systems; Ignition and Starting Systems; Fuel Metering Systems; Engine Fuel Systems; Induction and Engine Airflow Systems; Engine Cooling Systems; Engine Exhaust and Reverser Systems; and Propellers.

Throughout the course of their

instruction, students get hands-on, practical training of about 1,000 hours during their 22 months of classes. Classes are taught four days per week, six hours per day allowing Friday to be available for making up material missed during scheduled class time and for assisting those that may need additional practice or instruction, which is free of charge.

After 2,040 hours of classroom instruction, practice labs and actual return to service experience, students are prepared to enter the workforce and continue their training on specific model aircraft, engine or systems as needed by their employer. Before that happens, they need to obtain their FAA Mechanic's Certificate with a rating in Airframe and Powerplant. The FAA requires each applicant pass three written exams (General/Airframe/Powerplant) and an Oral and Practical (O&P) Exam administered by a Designated Mechanic Examiner (DME), who is a representative of the FAA. The O&P is a full day exam that demonstrates the practical application of the knowledge, skills, and abilities learned at an AMTS. Once the DME is satisfied that the applicant is qualified, he or she receives their temporary license that day, and in about two weeks, they receive their official Mechanic's Certificate with the appropriate ratings.

AIM also assists graduates in obtaining employment after graduation. Airlines (major and regional); Maintenance, Repair and Overhaul (MROs); and repair stations begin to interview students weeks prior to graduation for entry level positions. The employer of the newly licensed technician provides the on-the-job-training (OJT) on specific aircraft models, or systems they manufacturer or operate. Some international graduates find employment in the United States, but most return to their home country to seek employment.

AIM also offers a short course to assist experienced engineers in attaining their FAA Mechanic's Certificate (license) with a rating in Airframe, Powerplant, or Airframe and Powerplant under Part 65 of the Federal Aviation Regulation. With documentation supporting work experience in at least 50% of the areas listed in FAR 147, Appendixes B, C and D, the FAA will provide authorization to take the required written exams and then the O&P required to earn an FAA license. AIM spends one week in review of each area: General, Airframe and Powerplant. After each week of classroom and lab, candidates take the FAA written exam and prepare for the O&P exams. Following the initial three weeks of classroom review and testing, the final two weeks are for scheduled O&P exams conducted by the FAA's DME for the school location as listed on the FAA website.

Other aviation programs offered at AIM are: Aircraft Dispatcher (FAA license), Aviation Maintenance Technician – Helicopter (advanced turbine helicopters), Aviation Maintenance Technical Engineer (avionics) and an avocational course for Flight Attendant. Housing assistance is provided for full time students and for the experienced engineers seeking the FAA license.

Each campus location is approved to participate in the Student Exchange Visitor Program (SEVP) and issue the I-20 that permits qualified international students to attend higher education in the United States. Housing assistance is also available to international students. Student Services, as well as Career Placement assistance, is available. This cultural exchange experienced at AIM broadens students' cultural awareness and prepares them for a global career in aviation maintenance.

For additional information, please contact: LaVern Phillips, Phone: +1 (757) 490-3151, Email: aimbusdev@aviationmaintenance.edu

Glimpses of 2018 U.S. – India Aviation

n Summit, May 9-11, 2018 at Mumbai

Glimpses of 2018 U.S. - India Aviation Summit, May 9-11, 2018 at Mumbai

Site visit of Chhatrapati Shivaji Maharaj International Airport during U.S. - India Aviation Summit

Site visit of Air India Mumbai Operations during U.S - India Aviation Summit

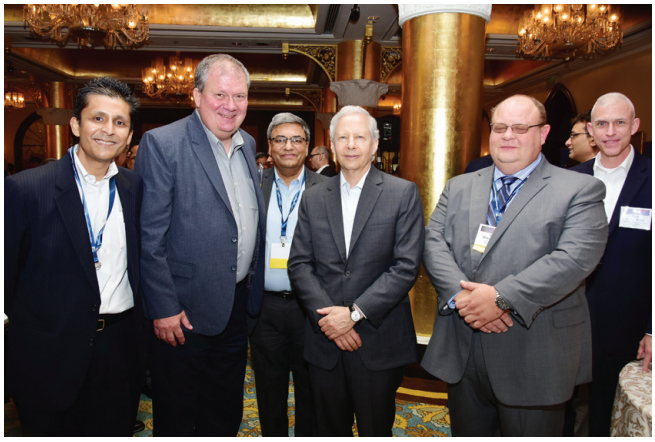
ACP Members meeting with GoI & USG officials during U.S. - India Aviation Summit

Hon'ble Amb. Kenneth Juster delivering remarks at opening reception of Summit

Glimpses of 2018 U.S. - India Aviation Summit, May 9-11, 2018 at Mumbai

(L-R) Honeywell's Ashwini Channan; Sandeep Bahl,ACP & Lokesh Srivastava from TAL during Aviation Summit

FedEx's Team with Vikram Mahajan, USISPF & Sundreysh Sarup Logistics Plus at Summit



Harris Team members with Amb. Kenneth Juster during opening reception of Summit

Neelu Khatri, ACP Co-chair (Industry) & President Honeywell Aerosapce (India) during opening receptionof Summit

Sanjay Malhotra, JEPL with JS Rawat, DGCA & Ayush Mani Tiwari BCAS at Summit

State Government of Maharashtra's officials with RN Choubey Secretary-MOCA at Summit

Glimpses of 2018 U.S. - India Aviation Summit, May 9-11, 2018 at Mumbai

DJ Rao, DoS; BS Bhullar, DG-DGCA; BP Sharma, CMD-PHL with Hon'ble Amb. Kenneth Juster during Summit

Lighting of the lamp at U.S. - India Aviation Summit

Release of U.S. - India Aviation Summit briefing book

Announcement of agreement between Landrum & Brown & Airports Authority of India (AAI) during Summit

Announcement of agreement between Smiths Detection & Airports Authority of India (AAI) during Summit

Announcement of agreement between Harris Corporation & Airports Authority of India (AAI) during Summit

Glimpses of 2018 U.S. - India Aviation Summit, May 9-11, 2018 at Mumbai

General Session I — India's Projected Aviation Growth in Next Five Years and Emergence as the Regional Civil Aviation Leader during Summit

Release of KPMG's Public book on GAGAN by Secretary Choubey during Summit

Press conference during U.S. - India Aviation Summit

Neelu Khatri, ACP Co-chair (Industry) & President Honeywell Aerospace (India) introducing luncheon speaker Vinay Dube, CEO - Jet Airways to audience during Summit

Announcement of L-3 Aviation - Gets approval from DGCA for Flight data recorder and cockpit wise recorder CAR14

FAA delegation during U.S. - India Aviation Summit

Glimpses of 2018 U.S. - India Aviation Summit, May 9-11, 2018 at Mumbai

(L-R) Glenn Wicks, TWG; BS Bhullar, DG-DGCA; Verinda Fike, USTDA & Tuhinanshu Sharma, Director-DGCA during Summit

General Session II — Regional Connectivity: Linking Hubs and Underserved/ Unserved Airports at Summit

Concurrent Sessions I A. Introduction of New Concepts and Technologies to Improve Worldwide Airspace Management at Summit

Concurrent Sessions I B. Digital Trends and Transformations for Airport Development during Summit

One-on-One Business Development Meetings between Official India Delegates and U.S. Companies

Glimpses of 2018 U.S. - India Aviation Summit, May 9-11, 2018 at Mumbai

One-on-One Business Development Meetings between Official India Delegates and U.S. Companies

(L-R) Dr. Shefali Juneja, JS-MOCA; Mehnaz Ansari, USTDA & Heather Lanigan, USTDA during Cultural Program of Aviation Summit

Cultural program during U.S. - India Aviation Summit

(L-R) Tuhinanshu Sharma, Director- DGCA; Verinda Fike, USTDA; Mehnaz Ansari, USTDA & Heather Lanigan, USTDA during Cultural Program of Aviation Summit

Team members' of L-3 SDS & Aviation with Erick Kish, US-FCS & Vikram Mahajan, USISPF during Cultural Program of Summit

Glimpses of 2018 U.S. - India Aviation Summit, May 9-11, 2018 at Mumbai

Mehnaz Ansari, USTDA delivering remarks on Summary of Summit Day One Highlights

General Session III — Best Practices in Aviation Safety: Runway Safety during Summit

General Session IV — Aviation Security Regulations and Standards during Summit

Concurrent Sessions II A. Human Resource Planning To Support Tomorrow's Civil Aviation Workforce – Forging Interest, Recruitment, Training And Retention during Summit

Concurrent Sessions II B. Air Cargo Development at Summit

Concurrent Sessions III A. Expanding General Aviation/Business Aviation in India during Summit

Glimpses of 2018 U.S. - India Aviation Summit, May 9-11, 2018 at Mumbai

Concurrent Sessions III B. Environmental Sustainability in Aviation, Including Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) at Summit

Heather Lanigan, USTDA delivering remarks on Summary of Key Takeaways of Summit

Team members of Harris Corporation with Hon'ble Minister of State Jayant Sinha & A.K. Dutta, Member-ANS, AAI during Summit

Sessions' Moderators at 2018 U.S. – India Aviation Summit

(L-R) Chris Rocheleau, U.S. FAA; Thomas R. Hardy, USTDA; Palash Roy Chowdhury, UTC; Dan Weiss, United Airlines & Sandeep Bahl, ACP with Hon'ble Minister of State Jayant Sinha at Summit

Hon'ble Minister Suresh Prabhu delivering closing remarks at 2018 U.S. – India Aviation Summit

U.S. Commercial Service
U.S. Department of Commerce
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. Department of Commerce's global network with seven offices throughout 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 of 1.3 billion citizens can find opportunities in diverse industry sectors. You can connect with these opportunities through our export promotion, trade counseling, business matchmaking, and other services. For more details, please go to: www.export.gov/india.

If you're an Indian company looking to invest in the United States or searching for U.S. suppliers, the U.S. Commercial Service can help you as well. For more details, please go to: www.buyusa.gov/india.

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

Commercial Advocacy Service: We work with the Advocacy Center in 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 procurements, both civilian and defense. This includes Indian government as well as PSU and DPSU procurements.

Single Company Promotion: The Single Company Promotion (SCP) provides U.S. companies with promotional services to help increase the awareness of their product or service. This promotional event can be customized and might include a seminar, press interaction, or reception, with a targeted e-mail or direct mail campaign to invite attendees.

Gold Key Service: The Gold Key Service (GKS) arranges pre-screened one-on-one appointments with potential business partners. The GKS services includes up to five appointments with pre-qualified distribution channel firms, appropriate government officials, or other contacts, and possible escort by a U.S. Commercial Service staff member for meetings.

International Company Profile: An International Company Profile (ICP) is a due-diligence check that helps U.S. companies evaluate potential business partners. An ICP provides a detailed background report based on a variety of research sources, including an on-site visit by a Commercial Specialist, listing of the company's senior management, comments from company references, banking and financial information, and CS India insight on whether the prospective partner can meet your business needs.

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 have expressed an interest in your product or service, and includes virtual introductions via teleconference to the identified contacts.

Customized Trade Counseling: U.S. companies can benefit from customized trade counseling that can provide information on market opportunities, market entry recommendations, regulatory issues, and other vital information.

U.S. COMMERCIAL SERVICE
United States of America
Department of Commerce

Landrum & Brown

By Debayan Sen, Associate Director – India, L&B

Landrum & Brown (L&B) is a leading global consultancy specialising in aviation planning and development for close to seventy years. You could say that airports and aviation are in our DNA.

L&B is a global organisation that has worked on projects in every continent. In an industry as international and dynamic as aviation, our clients benefit from our unsurpassed breadth of international experience as well as our local and regional presence. We are proud to say that we have worked across all seven continents, including Antarctica.

Airport infrastructure and operations are technically complex with multiple stakeholders, different ownership models, business needs, emerging technologies and wide ranging, economic and community impacts. L&B's range of capabilities offers an integrated solutions approach to our clients.

Our team members range from technical planning and architectural design professionals to economic, financial and environmental specialists.

L&B's Asia Pacific regional presence is unsurpassed in the airport consulting industry. The Asia Pacific headquarters in Melbourne was established in the year 2000 closely followed by the China regional office in Shanghai.

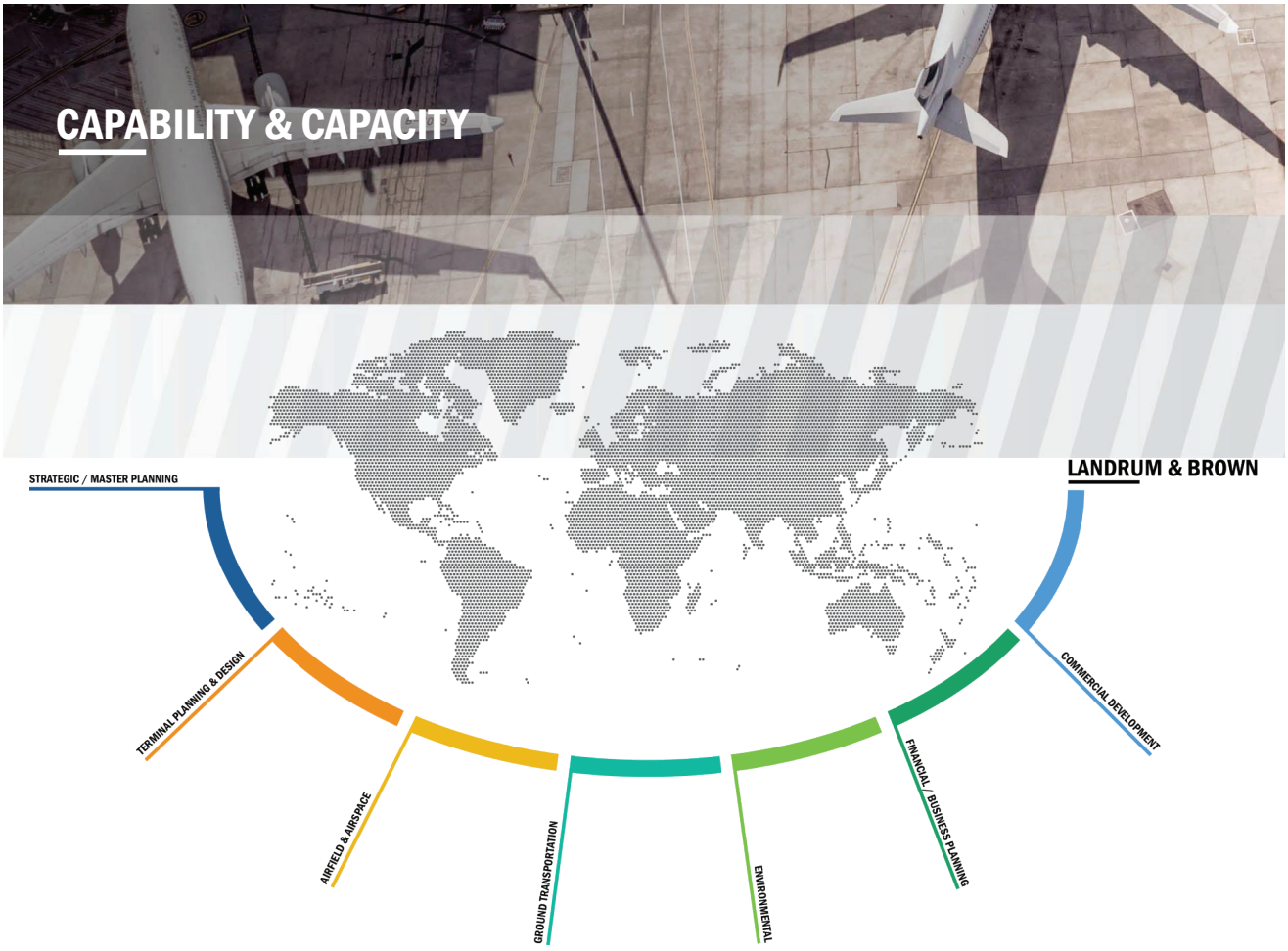
Other offices have been established in India, Bangkok, Hong Kong, the Middle East and South Africa. Over 50% of L&B global business is now accounted for in these regions. We adopt a deliberate strategy to continue building our capabilities, addressing high growth markets by growing and broadening resources. To that end, L&B recently acquired the Ambidji Group, a highly respected Melbourne based air transport consultancy. This acquisition adds valuable skillsets to L&B, including airspace planning, air traffic management system development, aviation policy regulation and strategy development, airport business analysis and transactional advisory services for investors in aviation infrastructure.

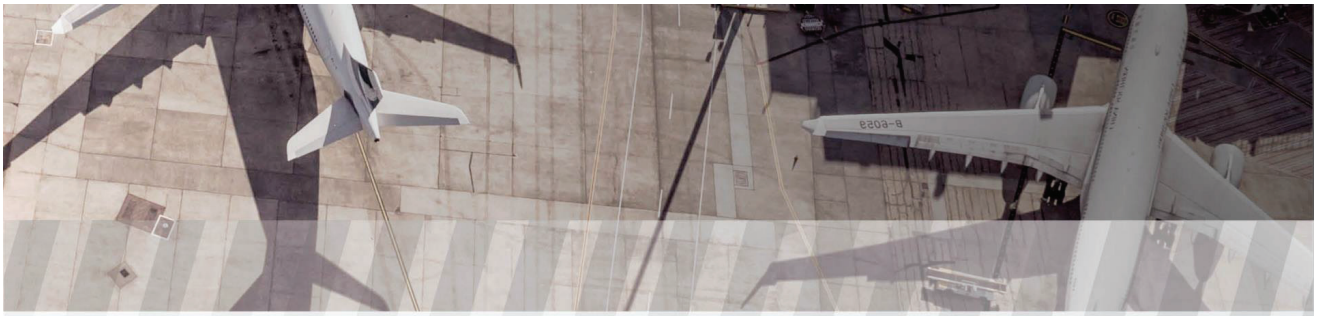
We have also enhanced our capabilities to integrate design services with terminal planning. This offers our clients a 'one stop shop' approach during early design stages, thus allowing for a higher level of terminal and commercial development, supported by communicative and evocative visualisations.

With over a decade of experience in the India market, Landrum & Brown (L&B) have completed multiple airport consulting assignments for all the major privatized airports in India. L&B's in depth knowledge of the Indian market is unparalleled and L&B staff are often called on to provide commentary on policy initiatives and regulatory issues and invited to speak at leading airport conferences and participate in training of senior executives in the Indian government and industry.

L&B staff based in Mumbai and Delhi continuously research and track trends in the India market. Related macro issues such as economics, demographics, consumer trends, regulatory developments and

technology are researched and updated. The highly skilled team of analysts provide intelligence in a variety of areas covering not only aviation but also related macro issues such as economics, demographics, consumer trends, regulatory developments and technology.





AIRPORT PLANNING & STRATEGY

Through airport master plan and strategic studies we provide airports with the development

TERMINAL PLANNING & DESIGN

We translate aviation planning and analysis into architectural concepts and designs, offering seamless integrity

AIRFIELD / AIRSPACE

Airfield layout planning, airspace planning and air traffic management efficiency in the terminal area

GROUND TRANSPORTATION

We ensure that all of the major infrastructure elements (airfield, terminal, ground transport) are in balance.

ENVIRONMENTAL

We underpin our work with specialised focus on world best practice in airport environmental and sustainability approaches.

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We work to optimise the performance of airport and aviation enterprises.

COMMERCIAL DEVELOPMENT

Our team examines all opportunities and challenges conventional thinking to explore innovative and robust solutions to unlock the full revenue potential of the airport.

ADDITIONAL SERVICES

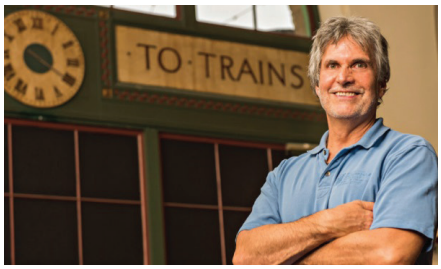
L&B services extend well beyond the airport boundary to encompass aviation sector-wide planning, regulatory strategy development and policy reform.

L&B

Aviation Planning at the Leading Edge

Logistics Plus Connects Businesses to India from Around the World

Logistics Plus India Pvt. Ltd. (aka LP India) is a leading India freight forwarder, project cargo manager, and global logistics company. LP India 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, 22 years ago as a lead



Jim Berlin, Founder & CEO of Logistics Plus Inc.

logistics provider for GE Transportation, a global manufacturer of equipment for the railroad, marine, mining, drilling and energy generation industries.


Logistics Plus Global HQ in Erie, PA USA

Today the company serves thousands of customers (including major companies like GE, Google, and WeWork) with over 500 employees operating in over 20 countries around the world. Despite its growth and diversification, GE Transportation 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 nearly two decades, but five years ago, the company decided to make additional investments in the region with the creation of LP India. Sundreysh Sarup was selected to lead the new division as its managing director with headquarters in New Delhi. Over the past five years, Mr. Sarup has overseen rapid growth and expansion that now includes branch offices in Bangalore, Chennai, Jallander, Gurgaon, Mumbai, and Pune.


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

"Sundreysh has assembled a very competent team for us in India," said Mr. Berlin. "Thanks to his leadership over the past five years, LP India has become an important division for the overall company, and has really established Logistics Plus as a company that views logistics in, out and within India as critical to global supply chains."

LP India solutions include air, ocean, ground or rail transportation, as well as warehousing, project cargo, customs, compliance, and total supply chain management. The division has acquired particular expertise serving the aviation and transportation industries. One of the more interesting projects LP India has successfully completed was two years ago when it played a major role in the logistics behind the construction of an important bridge in the Himalayan mountains of northern India between the cities of Sonprayag and Gaurikund. The bridge, constructed across Mandakini River, was completed in the record time of 30 days thanks, in part, to the logistical support LP India provided to the overall construction project.

"The site for the bridge posed many challenges," said Mr. Sarup, managing director for LP India. "The history of floods demanded elaborate logistical

planning and execution. The logistics of transporting a bridge to Sonprayag 250 kilometers from Rishikesh was no simple matter. It took significant planning and great coordination to ensure all of the equipment and parts arrived to the job site on time and intact. I am very pleased the project was a success, which will most certainly give a boost to commercial activity within the region."

Bridge-Building Logistics in the Himalayan Mountains of India


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

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 and logistics. That includes full support of the ACP and its many member companies. Mr. Sarup adds "What we like to say is that we put the "plus" in logistics by doing the big things properly, and the countless little things, that together ensure complete customer satisfaction and success."

LOGISTICS+®
PASSION FOR EXCELLENCE

L3 Aviation Products India Receives CAR 145 Certification From Directorate General of Civil Aviation

L3 Aviation Products announced that its Maintenance, Repair and Overhaul (MRO) facility in India has received CAR 145 certification from the Government of India's Directorate General of Civil Aviation (DGCA). L3 Aviation Products is one of the first avionics manufacturers to set up an MRO facility in India to repair and sustain its avionics equipment for Indian aircraft.

The DGCA approval authorizes the facility to repair products for Indian commercial aviation customers. The certification covers L3 Flight Data Recorders, Cockpit Voice Recorders, and Cockpit Voice and Data Recorders. L3's FA2100/FA2300 family of Flight Data Recorders is fielded on several Hindustan Aeronautics Ltd. (HAL)-built aircraft and is widely installed on commercial airliners and business jets in India. With achievement of the CAR 145 approval, L3 now is authorized to repair and provide service to both military and civil aircraft customers.

"Since 2015, L3 has provided military avionics for several HAL-built aircraft and has also supported HAL's effort to build civil-certified airplanes by providing fully certified avionics products and conducting repair and maintenance in country," said Tony Nardone, President of L3 Aviation Products. "This will ensure OEM-level quality and support, reduce turnaround times and provide a best-value solution."

L3 Aviation Products is a provider of commercial and military avionics. The company manufactures a diverse line of safety- and efficiency-enhancing products for next-generation requirements, including transponders, ADS-B systems, configurable voice and data recorders, collision avoidance systems, navigation products, display systems and processors. L3 Aviation Products also offers aftermarket services, including MRO and integrated performance-based logistics for military and commercial systems. To learn more about L3 Aviation Products, please visit www.L3aviationproducts.com.

About L3 Technologies

Headquartered in New York City, L3 Technologies employs approximately 31,000 people worldwide and is a leading provider of a broad range of communication, electronic and sensor systems used on military, homeland security and commercial platforms. L3 is also a prime contractor in aerospace systems, security and detection systems, and pilot training. The company reported 2017 sales of $9.6 billion. To learn more about L3, please visit the company's website at www.L3T.com.

Aviation Products

Optimising Checkpoint Design from a 360 Degree Perspective

In the face of increasing passenger volume, new regulations and ever evolving threats, airports are constantly challenged to maintain operational efficiency whilst striving to improve security effectiveness. The security checkpoint is a critical point in the passenger journey and having a correct strategy here is pivotal to the success of broader operation of an airport.

When approaching checkpoint design, installation and maintenance, consideration is given not only to how the complete system can function smoothly and efficiently, but also how it integrates with the whole kerb to gate experience. Airports who get this right will be rewarded with high levels of security; a cost-effective process; improved on-time performance for airlines; increased passenger satisfaction; and sustainable business growth.

Technical solutions supported by operational analysis should be tailored to meet specific business and regulatory requirements of each airport. The building blocks (e.g. sensors, baggage handling and management software) may remain constant but there are significant differences in how they can be configured, deployed and operated. Combining the most suitable technical solution

with appropriate processes and fully trained security staff for individual airports delivers both operational and economic benefits.

THREE COMMON GOALS

Despite differences of scale and commercial opportunity, airports typically share three fundamental and interdependent objectives: effective, compliant security; operational efficiency; and a good passenger experience.

They also have underlying challenges in common: physical environment, traveller profiles, passenger peaks and staffing levels.

Solutions developed from an overall perspective are generally supported with a business case which considers operational performance data; cost; and business and regulatory obligations. This enables the use of current performance analysis and future performance modelling to identify efficiencies at task level and assess the effect of changes

Solutions that represent the highest level of security standards for today and tomorrow. Always in line with regulatory requirements.

Striving for productivity, increased throughput, reduced costs is a key contributor to optimum operational efficiency.

Reduced queuing times and a streamlined screening for a pleasant, smoother and faster inspection process for the travelling public.

to staffing, processes and deployed technology.

EFFECTIVE SECURITY

Optimum, compliant security for any airport is a complex balance of various factors such as deployment of different certified technologies and their detection performance, images per person (IPP), analysis time, false alarm rates, alarm resolution methods, as well as measuring and improving operator performance.

Although airport trials have demonstrated that CT technology can reduce IPP to between 1.5 and 2.5 depending on the time of year, throughput benefits may not be realised if the CT equipment is operating at a slower belt speed than currently deployed machines.

CT technology produces 3D images, which are more complex. While analysis may take longer, it supports the option for centralised screening by multiple personnel, enabling higher throughput of images. Operators are based in a remote location with a calm environment where decisions can be made without distractions of a busy checkpoint. Networked images are collected from all security lanes and delivered to the next available operator who chooses to send the tray through to the passenger or automatically divert it to a bag search point.

False alarms trigger additional security measures which can prove extremely disruptive in a busy airport. Therefore a low false alarm rate is more important to some operators than others. Where fast throughput is essential, it is important to not only have a high-speed belt, but also to ensure the screening equipment receives a steady flow of trays.

OPERATIONAL EFFICIENCY

Productivity, increased throughput, reduced costs and a boost to airport retail revenue are some measures and benefits of optimum operational efficiency in airports. Proficient screening, for instance, increases throughput and reduces the number of required secondary checks. When further investigation is needed, the system will support a directed search by indicating the exact spot (in the baggage, or on the person) where the image appears suspicious. In turn, staff productivity improves with

fewer staff being able to cope with growing passenger numbers, reducing the screening cost per head. Control of the process can be improved through system networking; effective connectivity; and the use of remote, central screening.

Achieving higher levels of operational efficiency requires a review of the existing lane design and components, the process used to gain optimal performance, and a well-managed and motivated team operating the checkpoint.

In a conventional lane, the loader is positioned to ensure bags are separated on entry to the X-ray equipment. However, technology has transformed this role by automating the spacing between trays. Now, the loader is focused on getting passengers ready and supporting them through the divestment process. New designs provide the facility for several people to simultaneously prepare and feed their trays into the lane; and also space to reorganise themselves and their belongings at the other end of the checkpoint. These developments make customer service even more important as people need to understand exactly what to do: the result is less time spent at the checkpoint and a better passenger experience. Automatic tray return also helps streamline the process of security scanning.

A faster, simpler screening process with shorter queues and fewer trays is sure to please the travelling public and happy relaxed passengers moving quickly through the checkpoints have more time and are more likely to spend money airside. According to an ACI Research Report, when passengers perceive an improvement in the quality of service experience, it results in a more than proportional growth of the airport's non-aeronautical revenue (NAR).*

A GOOD PASSENGER EXPERIENCE

Larger airports focus on reducing costs through better operational efficiency and building revenue by improving the passenger experience. A shorter time in security screening translates to more free time spent in the airport, providing excellent potential to grow retail business. Airports with fewer retail opportunities generally share similar objectives and challenges in terms of efficiency and customer service.

The security checkpoint is an essential but often frustrating stage for the travelling public – improving things here can have a very positive impact on how passengers view the total airport experience. Queuing times, the nature of the screening process itself and interaction with staff are all key factors.

Queuing is affected by a combination of lane throughput speed, concept of operations (CONOP) and the capacity of the screening point in relation to the number of passengers. To achieve an acceptable queue time, the checkpoint should be able to handle volumes which exceed predicted peak levels. The capabilities of the checkpoint and the potential throughput can be simulated through modelling – which in turn can help to better understand the total screening capacity and ultimately avoid queues during busy periods by supporting the opening of lanes and allocation of screening staff.

Although the checkpoint is a key stage in the journey through the airport, the passenger experience extends to other process points such as check-in, immigration and boarding gates.

It is now possible to measure the performance of each area to better inform decisions on capacity.

THE OVERALL APPROACH IN ACTION

Some forward-thinking airports have

already taken the overall view in re-designing their checkpoints. In UK, for example, Bristol Airport blended design, space management and the latest security technology to meet increasing security demands while creating a relaxing ambience for an industry leading passenger experience. The look and feel of the security checkpoint was particularly important as it is traditionally seen as a stress point in the journey from kerb to gate.

The enlarged security search area layout and process were tailored to include 10 checkpoint lanes on top of two dedicated Fast Track zones, as well as a preparation area for people to get their belongings ready for screening.

An automated tray return system with extended conveyor belts provides smooth progress through metal detectors, X-rays and security scanners as required. All of this against the backdrop of Europe's largest digital wall, measuring 14 metres in length and displaying a mix of information on overseas destinations and short films featuring inspirational journeys made by local designers.

AND FOR THE FUTURE...

Future objectives do focus on creating an environment where everyone is checked and screened quickly with minimum inconvenience, within a process which operates at optimum efficiency. Development and testing of the next generation of systems is already underway with risk-based security at the centre of emerging concepts.

Effective security strategies look at aviation's primary threats as well as a risk assessment of passengers and their travel characteristics. Behavioural analysis is already regularly used to identify people profiles which require greater attention. Biometric identifiers may also become much more widely deployed and become an integral part of a smart checkpoint.

The vision behind the Smart Security programme (joint IATA and ACI initiative) is a continuous journey from kerb to airside; where passengers proceed through security with minimal inconvenience; security resources are allocated based on risk; and airport facilities can be optimised. This could, in theory, lead to a document-free environment where passengers are recognised as they enter the airport and receive their individual flight information automatically on arrival.

With risk-based concepts, technologies and processes advancing at such an impressive rate, we can begin to look forward to a radical transformation in air travel.

*Source: Does passenger satisfaction increase airport non-aeronautical revenues? Airports International Council 2016 Research Report.

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Delhi presents exicitng opportunities ahead for Long Haul LCCs expansion

By Sandeep Bahl, Program Director US-India Aviation Cooperation Program

Positioning Delhi as the main gateway and transfer HUB

With almost 20% yoy growth in passenger number projected for 2018-19, Delhi airport is expected to handle 70m passengers, operating beyond its capacity. Operator Delhi International Airport Limited (DIAL) is working on the master plan to increase the capacity of the terminal and airside with renovations at Terminal 1, new ATC tower ready for operation soon and the fourth runway in 2019 would help to reduce air congestion and handle more flights as it will take the per hour capacity of Delhi airport from 75 flights to 96.

"The addition of new routes in domestic and international sectors by major airlines and a steep rise in the flow of transit traffic has helped Delhi Airport emerge as one of the busiest in Asia and among the top 20 in the world. Airlines see opportunities in Delhi airport as it has a large catchment area, while most other airports have constraints," said Prabhakara Rao, CEO of DIAL[1]

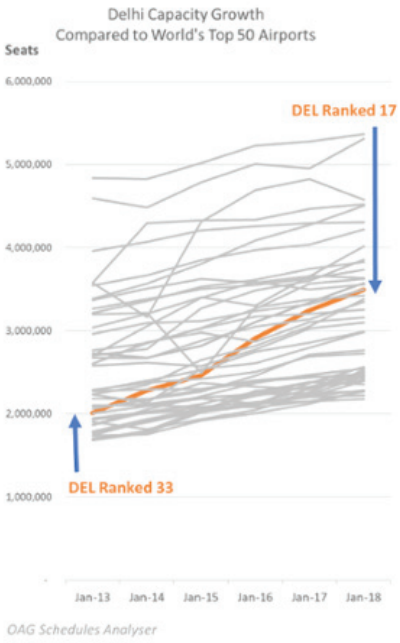
Besides the transfer traffic Delhi and its large catchment area itself presents a huge opportunity for generating demand for in and outbound travel. The catchment area of Delhi now has easy accessibility as well with new 135km Meerut to Delhi Highway opened recently will reduce the travel time from 3 hours to just under an hour. National Capital Region as per McKinsey Urban World has highest concentration of India's middle income earning household and will surpass 15m household with next 7 years.

Picture - 1

Delhi's Double Delights: Airport's capacity growth and government's liberalize policy

A recent study by OAG[2] revealed Delhi airports massive capacity growth in past five years as Delhi became top 17th airport of the world in 2018, a huge jump from rank of 33rd in 2013. Analysing a little deeper this huge growth is due to capcaity increase by low cost carriers (LCCs) like Indigo (India's largest airline) and Spicejet. Together India's LCCs have massive 44% of Delhi capacity and contiues to grow their presence in Delhi market.

But Delhi as a capital and main gateway to India has only 26% of international capacity most of that from other countries' carriers and Air India due to consolidation of hub operations at Delhi.



Picture - 2

India has ambition to grow its pie of international capacity and make Delhi as a transfer hub. The National Aviation Policy of 2016[3] actually supports this ambition and specifically made provision in this regard as follows:

a) The government plans to liberalize the regime of bilateral rights leading to greater ease of doing business and wider choice to passengers.

b) The government will enter into an 'Open sky' ASA on a reciprocal basis with SAARC countries and countries with territory located entirely beyond a 5000 km radius from New Delhi. Unlimited flights above the existing bilateral rights will be allowed directly to and from major international airports within the country as notified by MoCA from time to time.

Particularly to the bilateral traffic rights Page 14 of 36 of policy documents state that:

a) The government plans to liberalize the regime of bilateral rights leading to greater ease of doing business and wider choice to passengers.

b) The government will enter into an 'Open sky' ASA on a reciprocal basis with SAARC countries and countries with territory located entirely beyond a 5000 km radius from New Delhi. Unlimited flights above the existing bilateral rights will be allowed directly to and from major international airports within the country as notified by MoCA from time to time. However, the points of call at other airports under the existing ASA will continue to be honored till the same are renegotiated.

c) For countries partly or fully within 5000 km radius, where the designated carriers of India have not fully utilised 80% of their capacity entitlements, but foreign carriers /countries have utilised their bilateral rights and are pressing for increase in capacity, a method will be recommended by a Committee headed by the Cabinet Secretary for the allotment of the additional capacity entitlements.

d) Whenever designated carriers of India have utilised 80% of their capacity entitlements and seek additional capacity entitlements, the Page 15 of 36 capacity entitlements (bilaterals) will be renegotiated in the usual manner.

Long Haul Low Cost Flying is here

Not many airlines utilized this opportunity arising out of India's civil aviation policy but recently WOW Air of Iceland noticed this and announced its desire to fly to Delhi from Reykjavik. The idea is not only to connect Iceland to Delhi but to tap into the massive India – North America market and with attractive ticket prices of Long Haul Low Cost Carrier's (LHLCC). WOW has one way prices as low as Rs 13499 ($210) from New Delhi to all major North American cities it serves. (As per picture 3)

WOW's low prices are not a surprise – "here is a good market for this segment in India if a good product is offered at the right price. Imagine the demand that a fare of Rs 10,000-15,000 on Delhi-London will have," SpiceJet chairman Ajay Singh had said.[4]

India has emerged a big market for new aircrafts orders

With current 500 aircraft flown by scheduled Indian commercial airlines at this moment the order book of Indian carriers stands at over 1,000 aircraft. Many of these new orders are for narrow body but long range aircraft with a range of approx 6000 to 7000kms.

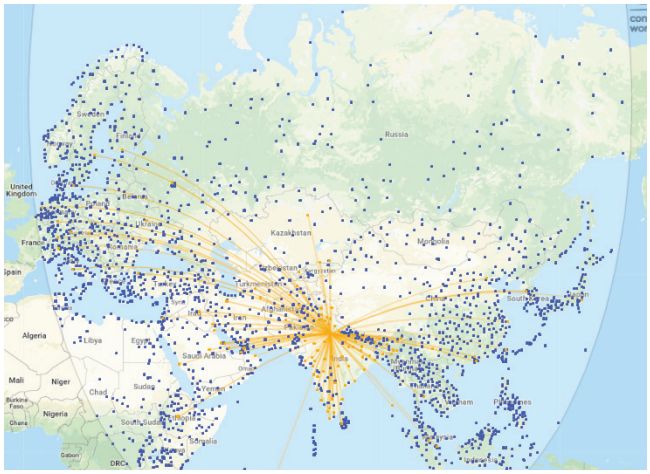
Spice Jet had placed an order for up to 205 Boeing aircrafts out of which 155 are B-737max and an optional order for 50 more of a mix of wide and narrow body planes. IndiGo has also placed a massive order of A320/21 neos. IndiGo's order consists of 405 planes of 186-seater Airbus A320neo and 25 planes of 232-seater A321neo. GoAir, a Mumbai based low cost carrier has order book of 137, A320neo and has started taking delivery from last year

to expand its network. Air Vistara[5] and Jet Airways recently announced to purchase new airplanes where as Air Vistara will increase its current fleet of 21 planes to 40 planes by placing new orders of 19 planes consisting of Airbus 320 neos and Boeing 787 aircraft as the carrier embarks on ambitious expansion plans, including flying overseas and Jet Airways has recently ordered 75 new Boeing 737-8 max.

Picture - 3

But where is the largest opportunity to fly these planes besides capturing the domestic growth.

B737 max 8 has a range of 6400kms and hence can fly from India over to all major cities in China (the fastest growing market for outbound travelers) and even to Japan. A321 neos has a range long enough to fly New Delhi to cities in Europe in west and all the way to Japan in the east. Utilizing these new cost efficient narrow body planes India's LCCs have great opportunity to connect competitively traffic to and from India to Europe on their west and to countries of South East and North Asia. Over the last seven years, Delhi airport's traffic has almost doubled and its share of transfer passengers increased from 9.3% in 2010-11 to 20.5% in 2016-17. The traffic segment from Europe to SE and North Asia and vice versa is a lucrative one and Indian carriers can fill in the niche of low cost travel.



Picture - 4

Picture - 5

A review of map from OAG Mapper shows as per picture 4, there are literally hundreds of yet-to-be-served destinations from Delhi to Europe, Africa, Central, SE and North Asia for airlines to consider using B737 max and A321 neo planes. Some of the lucrative new un-served destinations that Indian carriers can capture are shown in picture 5.

Existing Indian carriers have very competitive low cost amongst there global peers and are using technological innovations to give customers with control over the way they travel.

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1 https://www.pressreader.com/india/hindustan-times-delhi/20180301/281668255472301
2 https://www.oag.com/blog/delhi-delights-future-focus-for-one-of-india-oldest-cities?
3 http://www.civilaviation.gov.in/sites/default/files/Final_NCAP_2016_15-06-2016-2_1.pdf
4 https://timesofindia.indiatimes.com/business/india-business/spicejet-eyes-rs-25000-return-fare-to-western-europe-on-its-proposed-budget-long-haul-flights/articleshow/58588493.cms
5 https://www.ndtv.com/india-news/air-vistara-to-buy-19-airbus-boeing-planes-in-deals-worth-3-1-billion-1881340

Picture 1: Delhi's Household in 2025 McKenzie Urban World
Picture 2: Range of A321 neo from Delhi
Picture 3: WoW's fares and destinations as of March 2018 (www.wowair.com)
Picture 4: Cities connected with Delhi (March 2018)
Picture 5: new unserved destinations from Delhi

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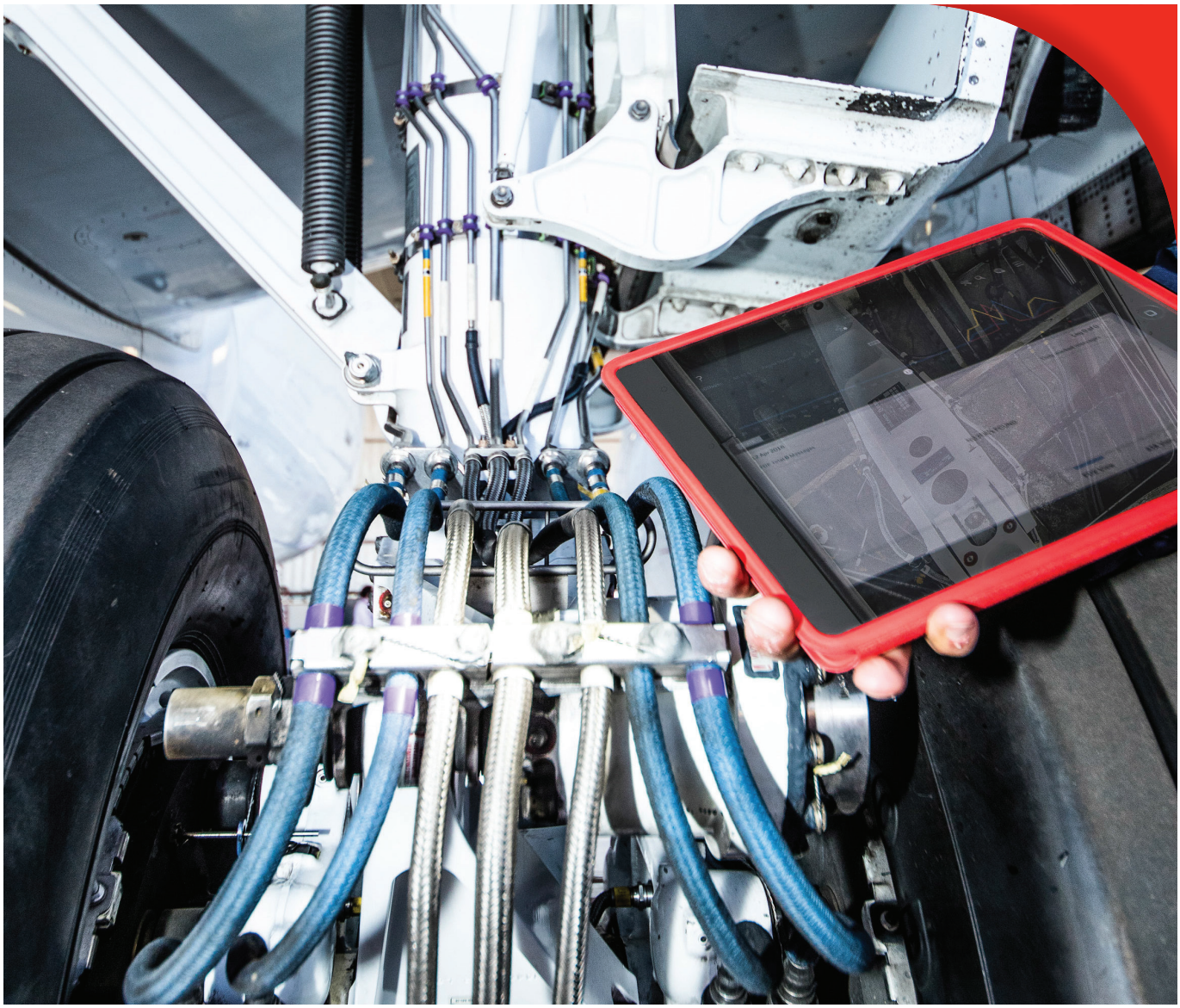

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