Shared Horizons

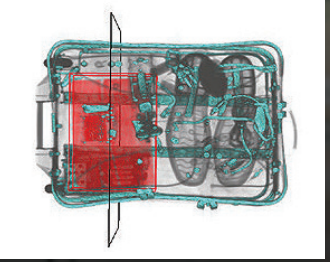
U.S. – India Aviation Cooperation Program: "A Win-Win Partnership"





INSIDE

ProDetect™ CT: The Most Advanced Training for Aviation Security Screeners



Battelle's ProDetect™ CT system is an interactive computer-based training system for aviation security screeners using computed tomography (CT) explosives detection systems. Learn more about why ProDectect CT is the most advanced training available for aviation security personnel conducting screening at airport checkpoints, baggage rooms and cargo processing facilities.

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Message from the Co-chairs

Sundresh Sarup
ACP Co-chair (Industry) &
Managing Director
Logistics Plus India

Vishal S. Amin
ACP Co-chair (Government) &
Senior Regional Representative, South Asia
Federal Aviation Administration (FAA)

We are pleased to present to you Bi-annual issue of "Shared Horizons" - June 2021.

The recently held organizational election has redefined and reinvigorated the US – India Aviation Cooperation Program. Thanks mainly to the wholehearted participation of the ACP members. We have witnessed a smooth and orderly transition to the new leadership of the ACP. Logistics Plus's Mr. Sundresh Sarup was elected by ACP members to serve as the Co-chair (Industry). We are also excited to inform you that US India Aviation Cooperation Program (ACP) is now a fully independent registered body and has been registered under Societies Registration Act, 1860 of Government of India.

Members have also endorsed along with Ministry of Civil Aviation the Priority areas of focus for next couple of years for ACP. This list is an exhaustive list of activities that ACP would undertake. Many activities are on hold as members have prioritized their efforts towards supporting to fight COVID related situations. Nevertheless, ACP in action highlights of the period are Virtual Roundtable with Yamuna Expressway Industrial Development Authority / Noida International Airport Limited & ACP Member Companies; ACP's webinar with AAI on "Water Resources Engineering & Waste Management"; Boeing/USC's SMS Training Program with IAA; ACP's webinar on "Future of Travel & Work Post COVID-19"; ACP's successful participation at Aero India 2021; ACP-MOCA's open discussion on Aviation in US & India, post COVID scenario and exchange of New Year Greetings; ACP-MOCA's interactions on "Ease of Doing Business – Airport Access"; ACP's webinar with IAA "Navigating through COVID Clouds to Safer Cruising Heights"; ACP's webinar "Restoring Confidence in Air Travel" and ACP's successful participation at Wings India 2020

We look to India's Aviation future post pandemic with enthusiastic anticipation and ACP will support the growth of civil aviation in India to new heights.

(Sundresh Sarup)

(Vishal S. Amin)

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ACP Milestones

2021

- Virtual Roundtable with Yamuna Expressway Industrial Development Authority / Noida International Airport Limited & ACP Member Companies
- ACP's webinar with AAI on "Water Resources Engineering & Waste Management"
- Boeing/USC's SMS Training Program with IAA
- ACP Members' own Society "US-India Aviation Cooperation Program" formed and received Certificate of Registration from Registrar of Societies
- ACP's webinar on "Future of Travel & Work Post COVID-19"
- ACP's participation at Aero India 2021 at Bengaluru

2020

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

2019

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

2018

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

2017

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

2016

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

ACP Milestones

- ACP Project workshop with Ministry of Civil Aviation at New Delhi
- ACP reception in honour of India Aviation 2016 participants at Hyderabad
- Memorandum of Cooperation (MOC) Signing: ACP & Bhogapuram International Airport Company Ltd., (BIACL)
- ACP Members roundtable meeting with Ministry of Civil Aviation (MOCA) during India Aviation 2016 at Hyderabad
- Grant agreement signed for Aviation Safety Technical Assistance Phase – II

2015

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

2014

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

2013

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

2012

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

2011

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

2010

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

2009

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

2008

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

2007

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

MOOG

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

Moog India Technology Center, Bangalore

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

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

Boeing 787-9 Test Rigs

Design of Moog Components for Commercial and Business Jets

Hydraulic Flight Control Actuator & Additive Manufactured Manifold

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

System Level Testing

COMAC C919 Iron Wing Test Rig

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

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ACP in Partnership with

Ministry of Civil Aviation
Government Of India

Directorate General of Civil Aviation

भारतीय विमानपत्तन प्राधिकरण
AIRPORTS AUTHORITY OF INDIA

BUREAU OF CIVIL AVIATION SECURITY

ACP Ongoing Projects

- CNS/ATM Modernization Roadmap
- Executive Development Training Program (EDTP) with RGNAU
- Sustainability Master plan for Kolkata and Lucknow Airports

ACP Past Successes

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

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.

Priorities

- Confident Travel

a. Cooperate on scientific studies and data driven approaches to restore confidence in the flying public

b. Undertake projects to advance cooperation and joint development of technology to make aviation travel safety

- Foster and continue to develop stronger government to government ties

a. System Safety Approach: Promote risk-based data-driven decision making that is built on Safety Management System (SMS) principles to proactively address emerging safety risk by using data to make safer and smarter decisions

b. Continued engagement to improve airport operations, safety, capacity, and innovation and foster growth and safe integration of Unmanned Aircraft Systems operations in the present airspace ecosystem

- Aviation in India's National Logistics Policy

a. Provide US expertise and technology to help modernize and improve efficiency of India aviation supply chains

b. Foster interactions and partnership between U.S.-India aviation cargo industries

- Aviation Maintenance Repair and Overhaul (MRO)

a. Explore opportunities for industry to partner on India's vision to develop an MRO hub

b. Industry-led MRO training to meet expected new demand following national policy changes

- Aviation Training

a. Foster partnership between U.S. industry and Indian pilot training organizations

b. Provide industry-led cooperation to accelerate excellence in airline operations and management

- Aviation Security

a. Undertake projects that investigate use of digital technology and analytics to make airport passenger and cargo flows more efficient, touchless screening and security by evaluating and validating the performance of checkpoint CTs, security scanners, and ASLs

b. Facilitate implementation of seamless process for security access/clearances to aviation facilities for technical experts, pilots & engineers to promote technical cooperation and interaction

- Airspace Optimization

a. Continue cooperation on Communication, Navigation and Surveillance/Air Traffic Management (CNS/ATM) modernization building on developed roadmap

b. Foster US-India government and industry interactions on Unmanned Traffic Management (UTM) implementation in India and explore inclusion in overall CNS/ATM roadmap

c. Safe airspace integration, framework and policy for regulatory capacity building on UTM

- Sustainability

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

b. Facilitate cooperation, joint development and certification of airplane technology

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

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

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

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

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

Commercial Advocacy

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

Single Company Promotion

The Single Company Promotion (SCP) provides U.S. companies with promotional services to help increase awareness of their products or services. This promotional event can be customized and may include seminars, press interactions, or receptions, with a targeted outreach campaign by the U.S. Commercial Service to invite attendees.

Gold Key Service

The Gold Key Service (GKS) arranges pre-screened one-on-one appointments with potential customers or business partners. The GKS services includes up to five appointments with pre-qualified customers, distribution channel firms, appropriate government officials, or other contacts, and optional escort by a U.S. Commercial Service industry expert 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 and can include an on-site visit by a Commercial Specialist; listing of the company's senior management; comments from company references; banking and financial information; and U.S. Commercial Service insights on whether the prospective partner could 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 express interest in your products or services based on our outreach, and includes virtual introductions via teleconference to the identified contacts.

Customized Trade Counseling

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

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

3D X-ray Screener Training – the Key to CT-Screener Success

By David Lieblich, Senior Business and Program Management Representative, Battelle

Computed Tomography (CT) screening technology is essential to civil aviation security for fast and effective threat detection screening of cabin and hold baggage. CT technology accomplishes this by applying automatic threat detection algorithms (ATDs) to high quality three-dimensional (3D) X-ray images produced by the CT machines to automatically identify potential threats at high speed. But because ATDs are not perfect, suspected bags must be reviewed by screeners to ensure that suspected items are not false alarms and not true threats. Therefore, screeners are critical to the application of CT technology for aviation security screening.

To be effective, screeners must learn how to interpret the complex 3D images produced by CT machines quickly and accurately. Interpreting 3D X-ray images is much more difficult than interpreting conventional 2D X-ray images, and thus, image interpretation training (IIT) is critical to a CT screener's success.

Battelle recognized the critical need for high quality IIT training and, in 2017, produced ProDetect™, the first computer-based training (CBT) for CT screeners. Battelle leveraged its extensive background in security screening technology research, development, test, and evaluation (RDT&E) for the U.S. Department of Homeland Security and the U.S. Transportation Security Administration, as well as its software development expertise to develop the ProDetect CT product. ProDetect is continuously improved through direct interaction with the international market and through our distributors. Key insights into the market requirements, based upon our interaction with airports, screening organizations, and government regulators, are listed in the sections below, along with ProDetect's features addressing each.

Machine-specific Interfaces

Avoiding an added learning curve, due to the transition from a generic user interface and generic functionality to a specific CT machine, is a key component screening organizations want. ProDetect provides a user interface that accurately reproduces the machine-specific user interface and functionality (figures 1 and 2).

Until ProDetect was offered, CT simulators, provided by the machine vendors, were the only means of providing realistic training for screeners, but simulators do not provide all the requirements for effective training. ProDetect's unique design facilitates incorporation of any CT machine. It comprises two key components: 1) a high-fidelity reproduction of the machines graphical user interface (GUI) and its functionality; and 2) rendering machine images from Battelle's cabin or hold baggage image libraries to the machine's GUI. Each GUI layout (appearance), controls, and the color palette used to colorize items are high fidelity reproductions of the actual machine interface. Screening organizations have the flexibility

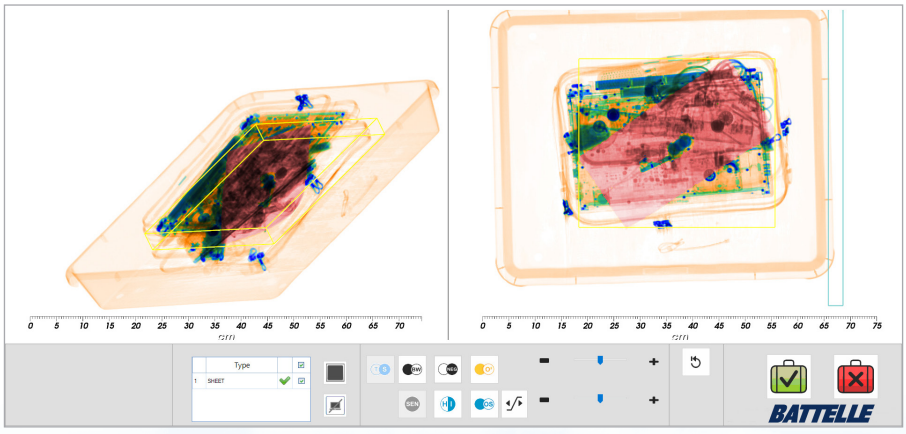

Figure 1. Smiths 6040 CTiX GUI emulated in ProDetect

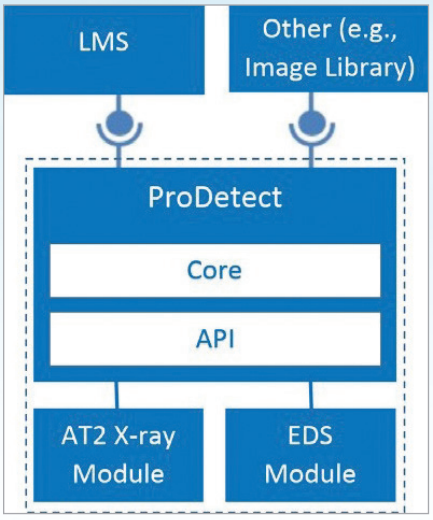

Figure 2. ProDetect Modular Architecture

to include different system GUIs and image libraries within the same CBT system, to accommodate heterogeneous fleets of cabin and/or hold baggage CTs.

Efficiency

Screening operations must work on tight schedules and within small operating margins: screener training must be efficient. ProDetect CT provides independent, self-paced, training to address this. Trainees can access level-appropriate, pre-established, and assigned, training playlists. Their training cab be conducted independently, at their own pace and schedule, and without supervision. This independent, self-paced, CBT approach minimizes training costs for airports and screening companies alike. Additionally, trainees' ability to screen at speed can be developed and tested by varying the time allowed for screening each of the images in a playlist.

Effectiveness

The critical nature of the CT screener's job requires that they not only be efficient at reviewing bags but effective at identifying potential threats that the auto-detector does not identify, while maintaining a low false alarm rate. Effective IIT training is required to achieve, maintain, and improve screeners' operational effectiveness.

ProDetect's features are designed to achieve learning effectiveness. First, trainees receive immediate feedback on each bag "trial" (bag resolution): errors are identified, and successes are reinforced, providing an effective means of learning. Second, ProDetect's immersive training module provides in-depth instruction on required information and skills, to ensure proper skill retention. Reinforcement of key aspects of the bag/threat the trainee just completed is achieved by entering a series of follow-up modules, as described below.

The immersive training mode displays the same bag views (whole bag, slice/slab, and threat) used in the main training interface, with full GUI controls available. In conjunction with this view, three modules provide immersive training: 1) A Question and Answer (Q/A) module poses specific questions about the bag/threat with immediate feedback on the trainee's answers; 2) A second module challenges trainees to place a dot on the threat in the bag image, with feedback on the accuracy of the placement. This discourages guessing and enhances learning and understanding; 3) A tutorial module provides IED recognition training. Technical detail about each component (power supply, initiator, explosive, and switch-PIES) of an IED is included in this module as well as pictures of the components, 2D X-ray images, and

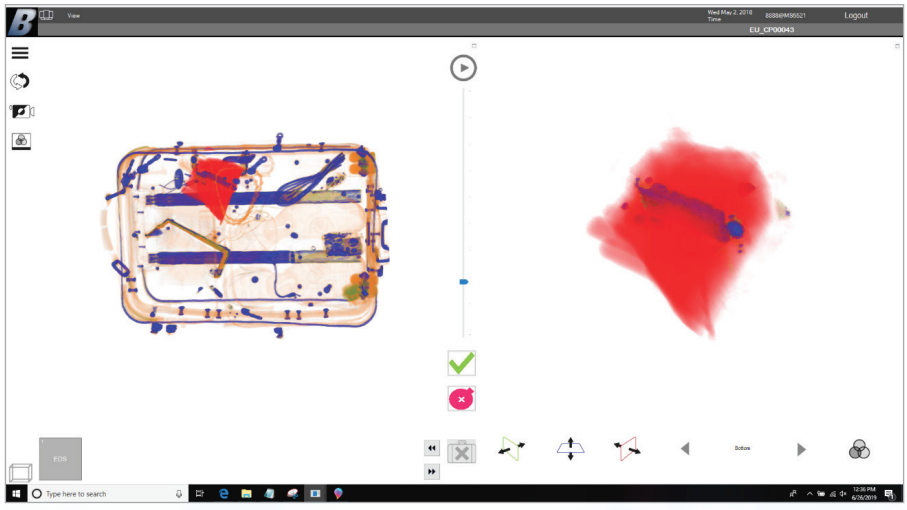

Figure 3. Leidos ClearScan GUI emulated in ProDetect

an image of the assembled IED. In addition to these immersive training modules, ProDetect's IED Builder module allows trainees to virtually build their own IEDs by selecting one of each of the four components (PIES) that constitute an IED from an extensive menu of components. IED Builder then virtually builds the IED and presents it as a photo and as a 2D X-ray image. IED Builder allows trainees to familiarize themselves with IEDs independently and at their own pace in the same way that ProDetect's main modules do. Each of the features described is designed to enhance screener's effectiveness. Together, these modules provide a powerful means of developing and improving screener performance.

Supervisory Controls

Airports and screening company management want the ability to organize their own training, localize their bag images and playlists, and produce reports that analyze and summarize training results for internal purposes and regulatory review.

ProDetect CT was derived from a human factors research platform: it is rich with capabilities and flexibility to address the range of supervisory needs for localization and reporting detail. Supervisors can establish as many user groups as necessary to accommodate their needs and assign any trainee to multiple groups, as appropriate. Custom playlists can also be developed for training and/or testing, from one of ProDetect's training libraries of cabin or hold baggage images. Supervisors can also add images imported from their own machines to supplement their Battelle-provided playlists. A supervisor can assign one or more labels to the images, including: type of image (threat, shield, clear) and degree of difficulty, to aid in playlist development. Degree of difficulty characterization will facilitate automated adaptive training in a future ProDetect release. Finally, supervisors can develop their own questions to localize the immersive training section.

ProDetect provides exceptional depth and flexibility for reporting of training results and in screener-assessment capabilities/tools. Supervisors can filter training reports based on Group, User, Time Period, and/or Playlist, indicating successes, failures, and probability of detection. Results and can be displayed as tabular data or graphs. In addition, ProDetect can capture every action taken by a trainee during bag trial exercises including controls used, mouse clicks made, elapsed time for each action, and decisions taken. This data can be downloaded to be external data bases for further analysis. Such analysis can be used, for example, to distill the training screening characteristics of the best screeners into protocols and training to improve the performance of other screeners.

Flexible Architecture and Future Growth

Airports and screening organizations alike want assurance that their training systems will be flexible enough to grow and adapt to new screening platforms, training curricula, regulatory requirements, and standalone or networked environments. In response, ProDetect was designed with a flexible architecture (figure 2) which starts with an operating "core" that manages its fundamental processes. This core interfaces with external modules to provide external training functionality and to access external resources such as learning management systems (LMS) or image libraries. In this way, ProDetect can expand and adapt to new capabilities and requirements without having to update the entire application.

Summary

ProDetect represents state of the art CBT training for CT screeners and is based on Battelle's extensive experience with screening technology RDT&E and on feedback from screening specialists at airports, screening companies, and aviation security regulators around the world. Go to www.battelle.org/aviation-security for more details about Battelle and ProDetect CT.

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It can be done

The Aviation Industry in 2021 – The Road to Recovery

Contributed By: Siddharth Sen, Customer Business Director - Honeywell Aerospace, India

2020 was a defining year for all of us as COVID-19 literally transformed our world. Simple tasks like buying groceries or exercising at the local gym are now starkly different than prior to the pandemic.

COVID-19 also had a profound effect on the way we do business, with companies across virtually all sectors being impacted by the economic turbulence of a virus that has spread around the world at a speed we have not seen in modern history.

Globally, attention is already turning to the question of how we effectively vaccinate the millions of people across the world in a safe but fast manner. The hope is that once enough people have been vaccinated, the world can finally focus on recovery.

But in the here and now, technology is already a key enabler in helping the world to manage the COVID-19 pandemic. As a technology company serving many critical sectors of the global economy – from petrochemicals to aviation to infrastructure to logistics – Honeywell is certainly not immune to this crisis. But we are also well-positioned to play a critical role in enabling economic recovery through technology and innovation.

Our focus on creating innovative, software-led technologies and our commitment to pursuing digital transformation across our organization – two initiatives that we embarked on long before the pandemic hit – have enabled us to rapidly pivot our business to focus on the solutions the world needs as it emerges from the impact of this crisis.

From healthcare to remote operations to healthy buildings to personal protective equipment (PPE), we have solutions that can play a central role in helping the world back to its feet and spur economic growth in the "new normal" that COVID-19 has created for us.

Aviation industry in 2021

Many countries across the world are still grappling with the pandemic and having their international borders still closed. The hope is that in 2021, the aviation industry will see improved performance compared to 2020, however this is contingent on countries being able to manage the pandemic outbreak and international borders reopen.

According to IATA, passenger numbers are expected to grow to 2.8 billion in 2021. That would be a billion more travelers than in 2020, but still 1.7 billion travelers short of 2019 performance. Passenger yields are expected to be flat and the load factor is expected to improve to 72.7% (an improvement on the 65.5% expected for 2020, but still well below the 82.5% achieved in 2019).

IATA also indicated that the cargo side of the business is expected to continue with strong performance. Improved business

confidence and the important role that air cargo should play in vaccine distribution is expected to see cargo volumes grow to 61.2 million tons (up from 54.2 million tons in 2020 and essentially matching the 61.3 million tons carried in 2019).

Airlines are collectively eager for travelers to return and governments would be more than happy for borders to reopen once again so that business can resume. The question is do people want to travel again?

Findings of Air Travel Survey

Based on the findings of our recent anonymous travel survey, an overwhelming 81% of all respondents are ready to take their next flight within 12 months. This shows the appetite for travel has not waned whether for leisure or business, however the way we travel has changed permanently.

Gone are the days when a traveler's biggest worry was whether they will get their desired inflight meals or preferred seats. These days, based on our travel survey findings, hygiene and safety measures related to air travel are most important for travelers. Nearly half (49%) of all respondents indicated that they want assurances on the cleanliness of airport and aircraft surfaces, mandatory usage of personal protective equipment such as mask and gloves, and the ability to social distance before they will consider flying again.

Not surprisingly, an overwhelming majority, 81%, indicated that the three most desired items they want airlines to provide as complimentary on board are masks, hand sanitizers and surface wipes. Additionally, in a reliance on new technology over traditional processes, nearly two-thirds of respondents (65%) preferred the use of ultraviolet (UV) light to treat airline cabins rather than relying on manual cleaning by airline staff (12%), or self-cleaning their seat area (16%).

Way Forward

This clearly shows the ways that travel has changed permanently, and airlines need to adapt to this new reality. At Honeywell, we have been cognizant of these emerging trends and have introduced new, innovative products to meet the demands of travelers.

In less than a year, we have launched a ThermoRebellion temperature monitoring solution, which can be rapidly deployed at the entryway of an airport or factory or any other commercial building. This allows airport staff or building managers to quickly and efficiently identify whether personnel exhibit an elevated facial temperature.

Additionally, to restore passengers' confidence in travel, we launched an array of PPE products that protect airport and airline workers and passengers. Currently, we offer two versions of our Honeywell Safety Packs for air travel: one for passengers and one for the flight crew. The passenger version is designed for single use and contains latex-free gloves, a safety mask and hand wipes. Kits for crews and airline employees are available for single or longer-term use. Beyond use for air travel, the kits will also be available for use in office buildings, warehouses, retail stores, sports arenas, schools and other public spaces.

Another first for the industry was our partnership with Dimer LLC to develop an ultraviolet treatment (UVC) system for airlines that, when properly applied, significantly reduces certain viruses and bacteria on airplane cabin surfaces. The Honeywell UV Treatment System can treat an aircraft cabin in less than 10 minutes for just a few dollars per flight for midsize to large airline fleets.

We are optimistic that once all the mass vaccinations across the world are complete, the aviation industry will finally start to show early signs of growth. The road to recovery will be difficult and we may not see pre-pandemic passenger levels for some time, but eventually the passenger traffic will return.

Honeywell

Feature: Future proofing capabilities for new resilience

By Vikrant Trilokekar, Managing Director - India, Smiths Detection

TSA deploys latest checkpoint security innovation to enhance operations and secure future enhancements in light of ever evolving threats.

This year, we have seen the sweeping effects of COVID-19 on international movement, restricting travel via land, sea, and air. This is a watershed moment for aviation hubs – airports around the world have realized the imperative to embrace innovation to anticipate and manage threats. Many airports aim to accelerate aviation security to future proof their capabilities to counter threats, maximize efficiencies, and regain the trust of travelers in the COVID-normal world.

Smiths Detection has worked with globally renowned aviation hubs from Gatwick to Melbourne, Singapore and to Milan airports to help them succeed in this new era of travels. For our Indian airports, many have been anxiously preparing for the return of passengers. Now is the time to future proof security systems, starting from checkpoint solutions.

The Transport Security Administration (TSA) of United States (U.S.) has been our long-term partner. The collaboration between Smiths Detection, Inc (SDI) and TSA provides an example for airports in India.

Delivering the Highest Standard

Responsible for ensuring travelers' security in the U.S., the TSA is constantly seeking to boost their threat detection capabilities with solutions while ensuring they can be easily upgraded and integrated with future procurements.

Under its Advanced Technology X-ray Program, TSA awarded a multi-year contract to Smiths Detection to supply 300 units of our advanced CT checkpoint HI-SCAN 6040 CTiX systems across U.S. airports. The roll-out of these systems began in 2019 and has continued throughout 2020. This has allowed the deployment to happen at a time when it would lower the impact on travelers and also prepares airports for the return of high-volume travel. Already over 200 HI-SCAN 6040 CTiX have been deployed, with the remaining machines being deployed in the new year.

Fulfilling a vision for The Future

Advanced technology such as the HI-SCAN 6040 CTiX can improve efficiency, augment security capabilities at checkpoints, enhance passenger experience, and future-proof airports for enhanced detection of threats.

The HI-SCAN 6040 CTiX, compliant with ECAC EDS CB C3, and TSA AT-2 TIER II and TSA CPSS certified, can automatically detect threats and scan baggage contents from every angle, generating precise, high-quality 3D images. This helps security officers expedite the evaluation process and allow passengers to move through with greater speed.

More importantly, the CT technology also eliminates the need for passengers to remove electronics and liquids from their cabin baggage, which not only is more convenient but also reduces hygiene concerns due to fewer surface contacts — an additional peace of mind for passengers traveling during this unprecedented time.

In addition, the CTiX is also designed to be compatible with upgrades in future, which supports TSA's vision for always embracing innovation, from tapping on advanced algorithm development to integration with screening lanes.

Now is the time to become future-ready by leveraging technologies to become more resilient, and better prepare ourselves for the demands and challenges that may arise following the COVID crisis.

smiths detection

Future of Civil Aviation

By Rahul Singh, Mohit Khemka and S. Vasudevan, KPMG

Global aviation was thrown out of gear in the Covid-19 aftermath. Most airspaces were completely shut down resulting in significant drop in revenues, incomes and jobs. On the flip side, it also paved way for innovation and re-engineering of business models by owners and stakeholders. Every crisis presents an opportunity and aviation is no exception. The industry showed courage and resilience in reimagining the business and innovating relentlessly to protect value and regain customer confidence. Many of these initiatives have resulted in optimization of costs for airports, enhanced revenue streams for operators, better travel experience for passengers, safety & hygiene of travelers, and a 'connected' airport eco-system for all stakeholders. Other policy and regulatory changes will be required to build more momentum in recovery, accrete strategic gains and create a better future.

Here are the top trends we are likely to see in the civil aviation sector over the next five years:

1. Rationalization of operating expenses

Airlines and Airports are striving to reshape their business strategy in order to survive and regrow from the crisis. Cost cutting through mere reduction in manpower will alone not suffice. Technology when used intelligently can help businesses optimize costs, enhance efficiency and increase margins from aero and non-aero businesses. It can help deliver more bang for the buck and cushion the pressure on both affordability and profitability. Solar powered airports, electric bussing, green buildings and recycling can engender significant savings in operating costs and could become the norm for the best performing airports. Airports can also look at reduction in operating expenditure through increased efficiency and enhanced performance. Airport owners will work on sweating their existing assets better to become more productive and create more value for shareholders

2. Non-aero business for airports and airlines

Food and retail constitute a high percentage of total revenues for aviation businesses. Airports and airlines are likely to devise new offerings to upsell. Passengers will encounter promotions even before they arrive at the terminals. E-commerce and online integration of airport duty free and retail will help increase market penetration, help monetize a wider clientele and provide a seamless and contact free shopping experience for passengers with better convenience. Operators may also look at ways of reimagining the passenger journey through the airport in terms of layout, spread and space management. Enhancing revenue per sqm while achieving higher customer satisfaction will be the focus of airport businesses.

3. Airports turning into multi-modal transit hubs

Major airports of the future are already served by public and private transit modes. Airport connectivity from crowded and expanding cities will see increased

integration through other modes like Monorail, BRTS, shared mobility, Hyperloop, and air taxi services. Airport real estate will also become local business and commercial hubs with a vibrant ecosystem supporting a variety of businesses, recreational and residential uses and creating new jobs and incomes in its wake. Most large cities of the world would have multiple airports catering to different purposes. Intra-city personalized air transport for last-mile connectivity may become a norm for major airport hubs.

4. Widespread usage of flying machines (read drones and UAVs)

Drones and UAS (unmanned aerial systems) would attain maturity and become mainstream. They would enhance mobility and access to goods, people and places that remained largely disconnected because of lack of good connectivity & roads. Drones would serve multiple clients and customers in industries like logistics, agriculture, defense & surveillance, disaster management, rural medicine, etc. New policies, mature regulatory environment and strong governance would catalyze this transformation.

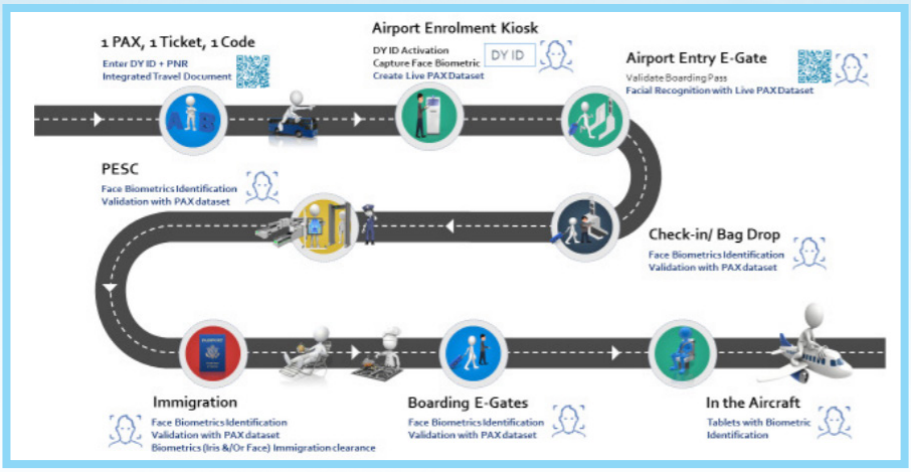


Figure: Digiyatra journey concept (Source: MoCA)

5. Digital passports to become a norm

Passenger data on health, vaccinations and identity metrics would all be digitized and accessible through a mobile app. Blockchain-enabled tech could help dispel fears related to data privacy and data security. Health-related parameters & standards for allowing overseas travel may get redefined. Pre-boarding processes and terminal operations will undergo large and permanent changes to accommodate health screening and certain minimum rapid testing at airports, especially for long-term international travel. The government's digiyatra initiative will see a major facelift with major advances in technology and increased use of digital records and robotics. The digital passport can be a repository of passenger information which can then be fed to the digiyatra system to ease passenger movement and convenience. For instance, a passenger who has been vaccinated can be allowed to skip / pre - process health screening leading to efficient operations and faster movement. Bahrain, for instance, has been quick to launch a digital Covid-19 passport, with countries like Denmark & Sweden to follow suit. Advent of technologies in healthcare sector such as AI and blockchain is likely pave its way to the airports and will be useful to implement new processes such as health passport, digital passport, disease testing at airports, etc.

6. More electric and alternative fuels to power aircrafts

Development of electric aircrafts may see a steeper growth curve

Figure: Hydrogen powered zero emission concept aircraft (Source: Airbus)

than electric cars. Sustainable Alternative Jet Fuel (SAJF) and Hydrogen to power aircrafts are already gaining traction in many countries with governments and climate change crusaders forcing the pace of reform and redefining the contours of aviation financing and regulation to facilitate greener and cleaner travel. Reduction of carbon emissions, achieving net-zero and curbing the impact on climate change would be the next big challenge that governments, regulators, industry bodies, airports and airlines would strive to address.

7. "Uberisation" of skies

More executives are using private jets than ever before. This preference is likely to grow and will refashion the manufacturing and supply chain of smaller jets. The General Aviation and private aircraft segments are likely to experience new entrants such as air cab operators and flight aggregators, which will result in more mobility options and offer flexibility to travelers with more intense competition amongst service providers. Chartered jets and time shares on fractionally owned aircraft will also increasingly serve the travel and mobility needs of corporates, HNIs and ultra HNIs in the near future. The NetJets model could soon be seen in large aviation markets like China and India in the coming decade.

8. Cargo & E-commerce boom

E-commerce is penetrating the user base very rapidly across the globe and will be given more wings by increased mobile penetration, higher bandwidths, cheaper data -storage and wider choices for consumers. Technology is also simultaneously allowing vendors and marketers to exercise more control over buying behavior, logistics & supply chain management.

For instance, e-commerce giant Amazon Inc. has recently acquired B767 wide body freighters to enhance its logistical capabilities. This trend of large retail conglomerates venturing into cargo as a separate line of business & to cater to its own logistic needs is likely to continue and could become big business drivers in high growth economies with increasing purchasing power.

9. Regional connectivity / UDAN / Krishi UDAN

The Regional Connectivity Scheme (RCS-UDAN) is a flagship program of Government of India for connecting more than 100 airports and aimed at making air travel affordable and accessible for new flyers. Krishi UDAN an offshoot of the UDAN initiative can help transform last mile international and domestic route connectivity for agricultural produce becoming a significant source of value creation. It may also help trigger growth of local MSMEs in several Tier-2 and Tier

3 cities which may become local economic hubs creating skilled jobs and augmenting domestic manufacturing capabilities. A carefully curated Krishi-UDAN implementation plan can transform India's hinterland into vibrant centres of economic activity supported by reliable and efficient air connectivity.

10. 3D printing for aviation supply chain

Aircraft fleet in India is expected to grow from 654 in 2019 to around 2,400 aircrafts in 2040. This expected surge in volume is not possible without enhanced manufacturing and supply chain capabilities. Currently, import of spare parts in India attracts high duties and taxes which makes keeping large inventory of spare parts a challenge for operators & service providers. Can 3D printing cater to these needs in rapidly developing aviation markets such as India? It will perhaps and encourage more manufacturers and service providers to invest in infrastructure to cater to 3D printed components for both domestic and international OEMs and aviation clients.

11. Digital MRO

With growing concerns around the recent safety incidents including the 737 Max and problems encountered with airframes of ageing aircraft and engines, the industry globally is already placing a premium on predictive maintenance capabilities. Real-time performance assessment through sensors, data analytics and modelling along with digital twinning models can become the norm for future MRO businesses and Asia could be one of the big markets in this space given aircraft orders and growth potential for the region. India could become the hub of such businesses and a beneficiary of foreign investments in both infrastructure and cutting-edge technologies.

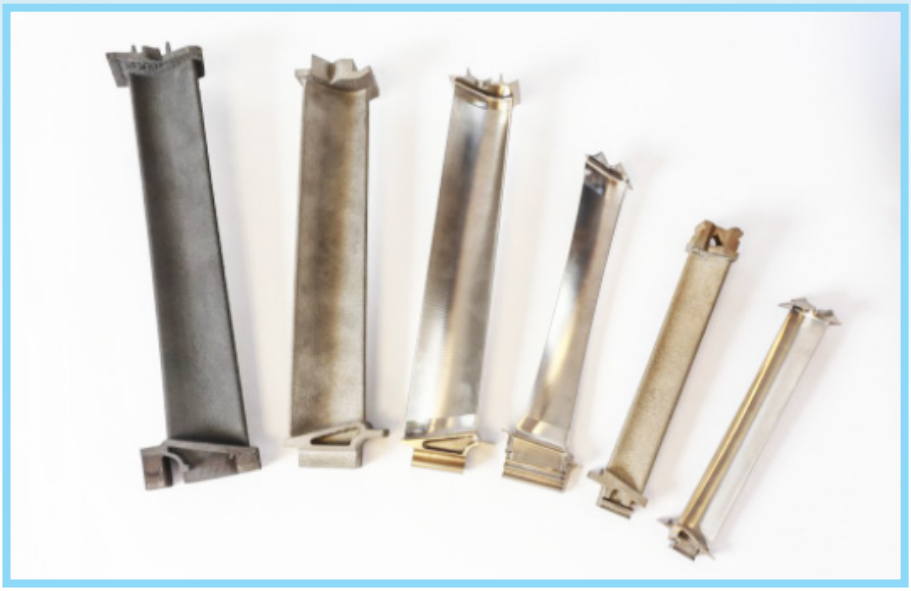


Figure: Boeing 777X blades produced by GE through 3D printing

The global aviation industry is on an exciting and unprecedented trajectory promising a whole new experience for both users and service providers. The current decade will also be a defining period for Indian aviation, with new airports, airlines, products and services taking centre-stage in a market poised to become the third largest and fastest growing aviation market in the world.

KPMG

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.

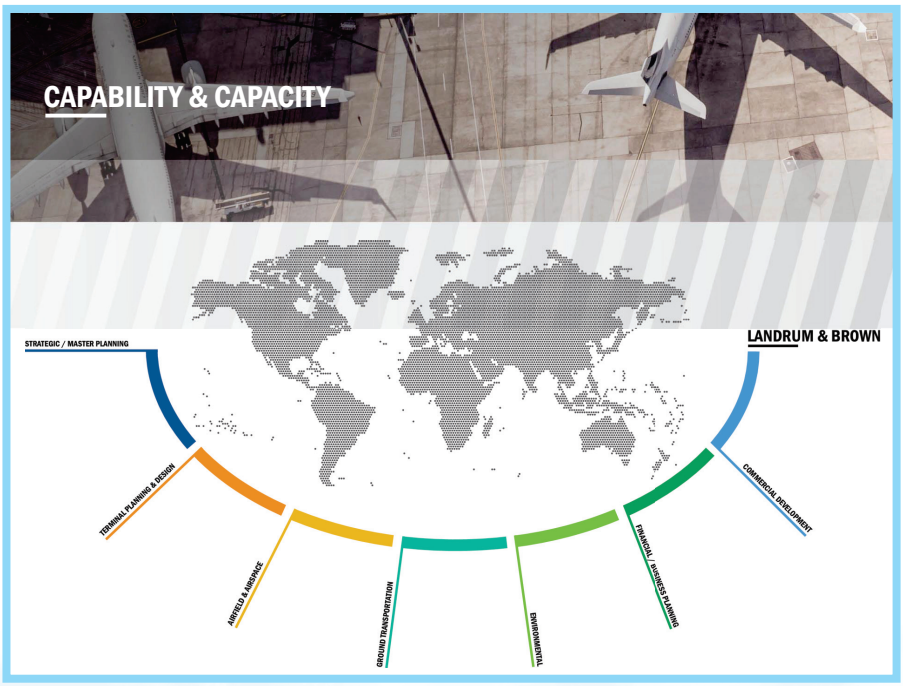
L&B is a global organisation that has worked on projects in every continent. In an industry as international and dynamic as aviation, our clients benefit from our unsurpassed breadth of international experience as well as our local and regional presence. We are proud to saythat we have worked across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

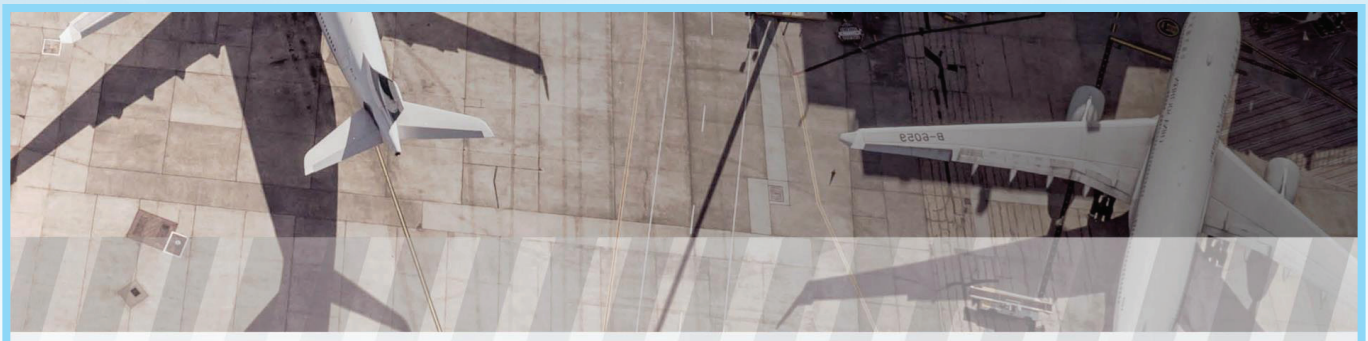
Airport infrastructure and operations are technically complex with multiple stakeholders, different ownership models, business needs, emerging technologies and wide ranging, economic and community impacts. L&B's range of capabilities offers an integrated solutions approach to our clients.

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





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.

FINANCIAL / BUSINESS PLANNING

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.

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 assignmentsfor 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 calledon to provide commentary on policy initiatives and regulatory issues and invited to speak at leading airport conferences and participate intraining 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.

Aviation Planning at the Leading Edge

Lockheed Martin – Expanding its Footprint in India

The S-76D is Sikorsky's latest version of the S-76 family of helicopters, with pedigree that started in 1978 when the S-76A was first civil certified. The S-76 possesses an excellent reputation throughout the world, with superior safety and performance records and a vast array of available optional equipment to address most any unique customer requirement. It is a helicopter that services many various missions including, Head of State, VIP, corporate executive transport, offshore oil and gas, search and rescue including shipboard operation, emergency medical service, utility, law enforcement, aerial surveillance, sightseeing/ leisure travel, television news, and highway patrol. The S-76 family has accumulated over 7.5 million flight hours and is among the safest in the world. Superior reliability results in a best in class availability, with fleet availability of 95%.

The S-76C++ variant has been utilized in India for several years in support of VIP/executive transportation as well as support of the offshore oil industry and is soon expected to be joined by the S-76D, for which FAA certification of 50 degrees C ambient temperature was granted in January 2021 and DGCA approval is expected within Q1 2021. The S-76D brings an integrated all glass cockpit, advanced all composite blades and fuel efficient engines. Aircraft noise and vibration levels allow working meetings in the cabin while being friendly to the neighbors. Sikorsky is very excited to offer the S-76 in a SAR Naval

variant to meet the requirements of the India Navy Utility Helicopter program.

Sharing the stable with the S-76 is the venerable S-92 helicopter, produced by Sikorsky since 2004 and sought globally by Head of State, VIP, utility and search and rescue operators for its formidable safety and performance capabilities as well as its cabin height of 1.83 meters / 6.0 feet, max gross weight of 12,565 kilo / 27,700 pounds, an available lavatory with or without a shower, and comfortable accommodations for 19 airline passenger seats or up to 14 executive seats. The S-92 cabin has been produced in India for several years by TATA Industries at the Hyderabad facility. The S-92 is now DGCA approved and is expected soon to contribute to the growing needs of India's aviation sector, be that for VIP or utility or search and rescue missions.

LOCKHEED MARTIN

ACP's Co-chair (Industry) & Executive Program Director meetings with Member companies/Indian Stakeholders to understand their requirements

Meeting with Hon'ble Minister M.G. Reddy, Andhra Pradesh on March 17, 2021

Meeting with Ashish Rajavanshi, Anil Saradana, Sandeep Mehta and Sr. Leadership of Adani at Ahmedabad on March 9, 2021

Meeting with Meenakshi Malik, COO & Board Member Air India on March 5, 2021

Meeting with Rajiv Bansal, CMD - Air India along with Vinod Hejamadi Director – Finance, Air India on March 4, 2021

Meeting with Salil Gupte, President Boeing India with his team on March 4, 2021

Meeting with Keku Gazder, CEO- AAICLAS on February 24, 2021

ACP's Co-chair (Industry) & Executive Program Director meetings with Member companies/Indian Stakeholders to understand their requirements

Meeting with Suvendu Choudhury, Managing Director – International Operations, FedEx on February 19, 2021

Meeting with Hareendranathan EP, Director – IAA on February 18, 2021

Meeting with Director General - BCAS on February 12, 2021

Meeting with Director General – DGCA on February 12, 2021

Meeting with Secretary Kharola-MOCA on February 11, 2021

Meeting with D. Krishna Mohan, Director – MOOG on February 11, 2021

ACP's Co-chair (Industry) & Executive Program Director meetings with Member companies/Indian Stakeholders to understand their requirements

Meeting with Videh Kr. Jaipuriar, CEO-DIAL on February 2, 2021

Meeting with Sujoy Ghosh, MD-Harris Communication on January 28, 2021

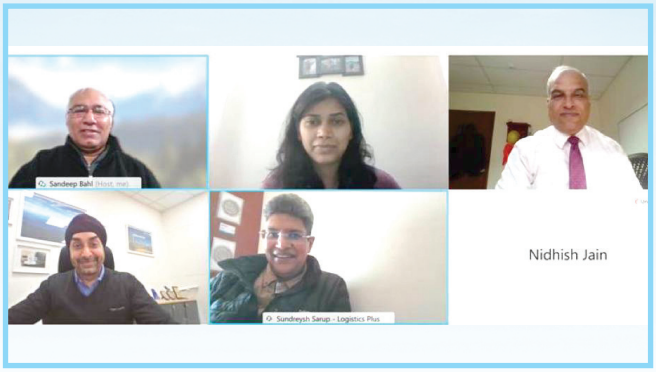
Meeting with Secretary Kharola – MOCA to present ACP Members' priorities on January 22, 2021

Meeting with Mehnaz Ansari, Sr. Regional Representative – South Asia, Indo- Pacific Region, USTDA on January 20, 2021

Meeting with Debayan Sen, Association Director Landrum & Brown on January 20, 2021

ACP's Co-chair (Industry) & Executive Program Director meetings with Member companies/Indian Stakeholders to understand their requirements

Meeting with Honeywell Aerospace Team on January 15, 2021



Meeting with Harvinder Singh, Country Manager - United Airlines India & Director - United Airlines Business Services on January 14, 2021

Meeting with Jodhbir Sachdeva, Associate Director- KPMG on January 13, 2021

Meeting with Maninder Grewal, MD-India Veoci on January 12, 2021

Meeting with Ashmita Sethi, President & Country Head – UTC India on January 8, 2021

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FAST. FORWARD.

ACP's Participation at Aero India 2021, Bengaluru

Meeting with MOOG's team during Aero India 2021

Meeting with L3Harris & USIPF during Aero India 2021

ACP team at Boeing booth during Aero India 2021

ACP team at L3Harris booth during Aero India 2021

Caught up with Amber Dubey, JS - MOCA during Aero India 2021

ACP's Participation at Aero India 2021, Bengaluru

Great thought provoking points from Salil Gupte, President Boeing India on how India can leverage Defence and Civil collaborative programs to make India as Aviation hub during Aero India 2021

ACP team at Raytheon Technologies booth during Aero India 2021

Honeywell team meeting with ACP team during Aero India 2021

United Airlines

By Harvinder Singh, Country Manager - India, United Airlines

United is the only U.S. airline to consistently serve India for well over a decade. Since 2005 United has offered daily, nonstop service between Newark/New York and each of Delhi and Mumbai. In December 2019 United launched nonstop San Francisco – Delhi service, followed by new Chicago O'Hare – Delhi service in October 2020, and new San Francisco – Bengaluru service planned to launch fall 2021. United is proud to be the only U.S. airline to connect India to the East Coast and West Coast of the U.S. Flights from Bengaluru, Delhi and Mumbai are conveniently timed to an extensive network of destinations throughout the Americas via our Newark/New York and San Francisco hubs. United customers in India may book flights by visiting united.com or contacting United reservations on 91-124-4315500 (Delhi), 91-22-40908000 (Mumbai), or via their travel agent.

United's shared purpose is "Connecting People. Uniting the World." We are more focused than ever on our commitment to customers through a series of innovations and improvements designed to help build a great experience: Every customer. Every flight. Every day. United is proud to have the world's most comprehensive route network, including U.S. mainland hubs in Chicago, Denver, Houston, Los Angeles, New York/Newark, San Francisco and Washington, D.C. United operates 788 mainline aircraft and the airline's United Express partners operate 560 regional aircraft. United is a founding member of Star Alliance, which provides service to 193 countries via 27 member airlines.

UNITED AIRLINES

A STAR ALLIANCE MEMBER

Coming together to fight India's COVID-19 Second Wave

By Aniruddho Chakraborty

In early 2021, the Covid-19 situation in India changed dramatically, with the nation battling a devastating second wave. With more than 450K+ cases daily and more than 3500 deaths at one point, the nation's medical infrastructure was under great duress. The pandemic hit home for many of our members too – impacting us, our loved ones, friends and colleagues.

However, when the times were dark, we stepped up to lend a helping hand wherever we could – be it for the country, our organizations, our communities, our teams or our social groups. Despite the tough situation, the aerospace industry surged on, serving on the frontlines by transporting vaccines, oxygen and medicines with urgency.

"The spirit of service displayed and the contributions made to India and our communities, indeed served as a silver lining," **said Sandeep Bahl, Executive Program Director US - India Aviation Cooperation Program (ACP).** "The world, and members of US - India ACP came together to commit and deliver support to India so far of nearly INR 165 crores ($22 million) and the commitment continue to grow. Our member organizations worked with each other, Ministry of Civil Aviation, DGCA and Customs to ensure that the response was rapid and timely."

In this issue, we feature the tremendous impact our member companies have made over the past few months, and will continue to make – as we move on to brighter times, armed and prepared!

BOEING

In early May, 2021, aircraft manufacturer Boeing had announced $10-million emergency aid for India. Boeing's relief initiatives are currently underway across the country in partnership with state governments and local and international relief organizations. In Bengaluru, Boeing is working with the Karnataka government to build a 100 Bed Covid Care facility in Yelahanka, equipped with an oxygen plant. It has also set up a 200 Bed Covid Care Facility in Kanchipuram, and provided two ambulances to the state of Tamil Nadu.

"Boeing stands in solidarity with India during this difficult time. With our over seven decade legacy in the country, we want to be a part of the solution in the fight against COVID. Our relief efforts in association with our partners, are aimed at reaching communities most impacted by the virus and includes providing medical supplies, emergency healthcare and setting up field hospitals for communities and families battling COVID," **said Salil Gupte, President, Boeing India.**

Boeing's Lucknow team received ventilators

A lot of the company's work has focused on bolstering critical oxygen and medical equipment capabilities in India. Boeing has set up oxygen plants in Madurai and Raxaul, Bihar and has sent oxygen concentrators, ventilators and cylinders to Nagpur, Maharashtra as well as Kannauj, Saharanpur, Meerut and Lucknow in Uttar Pradesh. The company will provide CT scan machines to hospitals in Telangana and Bihar – as well as seven ambulances across Uttar Pradesh, Bihar and Telengana. Boeing has also provided manpower support to field hospitals in Chattisgarh and Telengana.

Boeing currently employs 3,000 people in India, and more than 7,000 people work with its supply chain partners. Boeing serves communities and citizenship programs to inspire change and make an impact on more than 300,000 lives in India. Boeing's advanced aircraft and services focus plays an important role in mission-readiness for the Indian Air Force and Indian Navy.

COLLINS AEROSPACE, PRATT & WHITNEY AND RAYTHEON TECHNOLOGIES

Raytheon Technologies Corporation (RTX) and its companies in India, Pratt & Whitney and Collins Aerospace have deployed more than $ Four million in immediate aid, to support India's Covid-19 relief efforts. As part of its first tranche – the companies rapidly donated 1,000 oxygen concentrators and unique retrofitted OxyTrucks, which can transport 270,000 liters of oxygen at one time. These OxyTrucks were transported into the country by the Indian Air Force, on Pratt & Whitney powered C-17 Globemaster aircraft.

The much needed oxygen concentrators and the OxyTrucks, which are augmenting hospital oxygen supply lines and are being distributed in collaboration with the Indian government including Niti Ayog and others non-profits.

Local teams from Pratt & Whitney and Collins Aerospace will continue to assess in-country needs of the government, communities and its 5500 employees and their families, while working with hospitals on a broader vaccination program.

"For us India is family. Our employees across RTX and P&W have also donated generously to mitigate the Covid-19 impact. In addition to our larger funding and cross-enterprise efforts, our teams in India are also proud to power and support the fleets of airlines like IndiGo, GoAir, and SpiceJet

OxyTrucks from Collins arriving from Germany, on Indian Air Force's Pratt & Whiney powered Boeing C-17 Globemaster

– and our military customers like the Indian Air Force, who have relentlessly served the nation on the frontlines during these tough times," **said Ashmita Sethi, President & Country Head, Pratt & Whitney.**

The group's employee donations to Covid-19 response are being amplified by matching commitments in amount by RTX. "We are using RTX supply chain capabilities to provide essential medical equipment like OxyTrucks and large scale PPE that India needs, while working with state health organizations to drive vaccination camps" **added Samit Ray, Regional Director, South Asia Government Affairs, Raytheon Technologies.**

With over 1500 engines and APUs in service, Pratt & Whitney has one of the largest installed bases amongst engine OEMs in India; and Collins Aerospace commands one of the largest, high-value aerospace supply chains in-country. Together with Raytheon Intelligence & Space and Raytheon Missiles & Defense, Raytheon Technologies' companies have been investing in India for eight decades.

FEDEX

FedEx Express, a subsidiary of FedEx Corp., and the world's largest express transportation company, has been working with organizations around the world to deliver critical medical supplies and

FedEx delivering critical COVID-19 Aid to India

equipment during this crisis. FedEx supported the transportation of more than 25,000 oxygen concentrators and converters to India, delivering the first shipment of 1,000 concentrators as early as April 30th. FedEx also donated two dedicated FedEx Boeing 777F charter flights to move more than 000 oxygen concentrators, converters and over 2 million KN95 masks for Direct Relief from Newark, New Jersey to Mumbai and New Delhi, India.

"We have been on the frontlines delivering relief since the start of the pandemic, and are responding to the urgent situation in India now. FedEx will continue to deliver lifesaving medicine, personal protective equipment, and other critical supplies until this pandemic is over," **said FedEx President and COO Raj Subramaniam.**

FedEx delivers relief shipments to India

Since the start of the pandemic, FedEx Express has shipped more than 90 kilotons of personal protective equipment, including more than 2.2 billion masks worldwide. The company has also committed $4 million in cash and in-kind transportation support to help nonprofits including Direct Relief and International Medical Corps distribute COVID-19 vaccines to under-resourced communities around the world.

HONEYWELL

With nearly 13,000 people working across 7 cities, with three state-of-the-art manufacturing and engineering operations, and four global centers of excellence for technology development and innovation – Honeywell has a strong commitment to India. As part of its Covid-19 relief response, Honeywell partnered with governments of Maharashtra, Delhi, Haryana, Karnataka, and Uttarakhand to establish COVID care centers and COVID critical care centers.

Speaking on Honeywell's efforts, **Dr Akshay Bellare, President, Honeywell India said,** "Honeywell is committed to helping the country deal with this humanitarian crisis and has pledged $3M since the start of the pandemic for COVID relief. We are partnering with state and local governments to enhance healthcare capacities across multiple states, including setting up COVID care centers and critical care centers. We are also donating essential medical supplies such as

oxygen concentrators, ventilators, N95 respirators, and PPE kits."

The centers will be constructed in a phase-wise manner. While the COVID care centers built in the first phase will be equipped with beds, oxygen supply, PPE kits, and other basic medical infrastructure to treat non-critical patients; the COVID critical care centers set-up in the second phase in Bengaluru and Mumbai will be equipped with critical medical equipment like Fowler beds, class I ventilators, defibrillators, multipara monitors, X-ray machines and bipap machines.

Honeywell also is donating 1,000 oxygen concentrators, 50 ventilators, 10,000 N95 respirators, and 2,500 personal protective equipment (PPE) kits to various government and private hospitals.

L3HARRIS

L3Harris's response to the deadly wave was on-the-clock, around-the-clock! The company created a 24x7 L3 Harris in-house helpdesk to aid employees and their families on medicines, oxygen cylinders, oxygen concentrators and hospital beds. It also procured much needed oxygen concentrators that could be used in cases of emergency by employees and their families. L3Harris worked in sync with Logistics Plus to enable quick deliveries and smooth approvals – so that they could reach in time to the genuinely needy.

The company also partnered with COVID care agencies to facilitate home-care and holding centers to ensure adequate care for critical cases until hospitalization was available. The company will be organizing a vaccination camp for its employees and their families in early June. L3Harris also had larger CSR initiatives running in parallel, in partnership with global organizations like the Red Cross and UNICEF.

LOGISTICS PLUS

Logistics Plus Covid-19 efforts have focused not only on assisting its employees and their families during the second wave, but also on aiding communities that have been impacted due to Covid19 pandemic. Given the urgent need for oxygen concentrators for critical patients, the company established a pan-India Oxygen Concentrator Bank.

"The Oxygen Concentrator Bank currently has 15 such concentrators in store, which are free to use and return. We will be expanding the bank further in the coming days." **said Sundreysh Sarup, Managing Director, Logistics Plus India, and Co-Chair US India Aviation Cooperation Program (ACP).**

Logistics Plus has expanded its relief outreach to rural areas as well – donating surgical masks and essential medicines to Dwarson & Dwarahaii villages in Uttarakhand.

These are currently being stored at a Government Girls College, for further distribution as needs arise. In a great example of cooperation between members of US-ACP during these times, Logistics Plus also assisted L3Harris relief efforts. The company helped L3Harris with import, customs clearance, and delivery of their oxygen concentrators to India.

SMITHS DETECTION

These are unprecedented times that require every section of the society to rise up to the challenge. All our efforts during the pandemic have been targeted towards ensuring that the relief material reaches those who need it the most.

For the year 2021, we joined efforts with Give India for initiating a donation drive and the proceeds from the same will be used to procure oxygen cylinders, oxygen concentrators, medical kits

Oxygen Generation Plant (ref. image)

and life-saving equipment like ventilators. We are also setting up an oxygen generating plant, with a shelf-life of 20 years, in Bengaluru, which will cater to a hospital's oxygen requirement for almost 50 patients, at any given day. We also joined government's campaign #PehnoSahi to spread awareness on the right way to wear a face mask and on proper disposal of single-use masks.

Smiths India is always committed to support the needs of the country in the fight against this global pandemic. Our thoughts and prayers are with the families of all who have lost their lives, and the many more who continue to battle Covid-19..

UNITED AIRLINES

United Airlines is the only U.S. passenger airline to have served India for over a decade. During the second wave of the Covid-19 pandemic, airlines in India and across the world played a critical role on the frontlines,

carrying essential relief supplies, PPE, oxygen and much needed equipment from across the world to India. United Airlines was a critical part of this global effort.

"United is proud to have shipped over 2.0 million pounds of medical and other COVID-19 relief supplies to India, and has raised via corporate matching $330K for India relief efforts," **said Dan Weiss, Managing Director, Global Government and Regulatory Affairs, United Airlines.**

United continues to provide a critical transportation link between India and the U.S. for air travelers and shippers with service from Delhi to Newark/New York and San Francisco, and from Mumbai to Newark/New York. United plans to return to five daily flights from India to the U.S. including the reinstatement of Delhi – Chicago service and launching Bengaluru – San Francisco service as relief efforts take hold and market dynamics return to normal.

VEOCI – Digital 2.0: The New Paradigm

By Maninder Singh Grewal, Managing Director, Iprime Services Pvt. Ltd. / VEOCI

Light, Low on Infrastructure, Agile, Rapidly Deployable at Scale, Secure. A NOCODE Product

The Re-Think in Aviation

Aviation is a dynamic industry. Innovation and rethinks are the norm. On the other hand, Covid 19 has threatened the very survival of Aviation. The warning signs preceded the pandemic. In India, Kingfisher Airlines and Jet Airways went bust and Government run Air India has been looking for buyers. Losses in the industry mount to billions of dollars and Airlines and airport operators have needed healthy doses of government support to remain functional. With plunging revenues, airport and airline operators have had to think out of the box and come up with innovative ideas that translate into cost saving and survival. This Re-Think now extends to every employee and needs to be a part of a daily calendar across all levels.

The re-think is centred on cutting cost, being nimble and innovative without compromising any safety concerns. In rapidly changing circumstances, the inability to reposition resources and assets in double quick time can be disastrous.

Hence Digital 2.0 and Digital Transformation. This means adopting platforms to rationalise and consolidate software applications and moving from legacy high-cost silos and standalone systems to platform based agile nocode models that allow for rapid deployment and meet the challenges of the continuous disruptions resulting from Covid 19. The Future is Digital and Covid has accelerated digital adoption more than any research or consultant advice. In retrospect, the 2020s will be synonymous with business rethinking and digital transformation.

Going Digital moves thousands of users to systems that can be designed and launched at scale to quickly leverage business insights from the most experienced business resources. Digital does away with the need for on-premise company owned infrastructure or expensive licenses and expensive contracts to teams of IT consultants and coders. The NOCODE platform facilitates this.

One example of going Digital would be Work From Home. WFH is now a way of life and companies successfully met the challenges of moving infrastructure and security systems from offices to homes of employees. The office models of the future will make this a default and hybrid models will include continued WFH.

An Aviation Industry example of a Digital 2.0 paradigm are Veoci Airport Runway Solutions. Keeping runways operational and compliant with FAA Part 139/Annex 14 regulations is an

integral part of Airport Operations. Non-Functional Runways and Connectors immediately lead to an immediate financial loss to the Airport Operator. By using a comprehensive Veoci module on Airside Inspections, the Airport management gets a clear real time view of each inspection and the status of the maintenance follow-up ,saving valuable downtime and scheduling repairs to low traffic periods.

While digital was "a nice to have "concept pre Covid every company now needs to have a focussed digital strategy to meet business goals.

Platforms : The Aviation Industry has a long history of pioneering technology and has the most mature systems in place and a great safety record. However, with time, many peripheral but critical software solutions have come up and the application suite now resembles a patchwork that is becoming increasingly more difficult to manage and may be in imminent danger of becoming obsolete.

Many of these applications are hosted on premise and in silos and data is difficult to share. A simple example would be the many Covid response and contact tracing applications deployed over the last 18 months. They are mostly standalone and import data from Excel downloads from flight manifests and crew roster software with many manual data entries still being done. A platform led approach would place most systems on one platform and this would interface with aviation specific applications forming clusters for cross application data sharing, reducing cycle time, and improving productivity.

The emergence of new digital operations platforms has led the change, reducing cost and time to deployment, allowing a rethink on the many dated concepts that Aviation had to carry as part of a legacy application. The digital shift will boost operational excellence and lean and agile are now the new mantra to survival.

New Products: There is a need to re-invent and deliver digital products and services to meet the challenges of the new models that businesses are adopting to meet the disruption. Google continues to redefine search. Social media platforms like Twitter, Facebook, Instagram etc need the attention and involvement of any public facing industry. Applications now have to be synced with such platforms to provide management an early view on breaking events or trends.

Delivery models are also changing, and Airport Operators will try to squeeze that one extra flight, that one last extra arrival and adapt to sudden surges, like the surge Porto Airport in Portugal faced when the UK temporarily relaxed its quarantine and travel restrictions.

Airlines will want to win back business customers in the depleted Business Traveller segment which was the most profitable segment for Aviation. One can already see models where fully vaccinated travellers are being given discounts and incentives to start flying again. Customer patterns need to be spotted early so that changes can be made to meet the new model.

Patterns and Models and Customer behaviour: It is everybody's dream to be able to accurately predict customer behaviour and while AI is the new buzzword, simulation and modelling are the underlying foundation of any AI application. Tools and the computational ability of new CPUs and Computer systems have become more powerful and are able to sift through petabytes of data and are increasingly able to accurately predict individual customer behaviour. There is probably no major airline in the world that does not employ large number of data scientists whose only job is predictive analytics.

Digital Transformation: Veoci offer a full digital transformation

solution for Aviation. This combines infrastructure transformation and application transformation and that comes from understanding customer business and organisational problems and applying technology to provide appropriate solutions.

Using Veoci we can digitize business processes examining every process and application to see how they can be rationalized, consolidated, and reprioritized.

With software being critical to survival, most CEOs will transform legacy IT departments to a Digital Division that will be part of the core enterprise. This new digital business integrated command centre would conceive and launch disruptive products that will redefine the organisation across the full ecosystem adopting agile practices that range from planning, operations, and technology to building a new generation of mission critical business applications.

Safety Management Systems for Aviation

A Safety Management System (SMS) is a framework based on FAA/ICAO recommendations to anticipate and address safety issues before they lead to an accident. It measures risk across the enterprise and applies rules based on previous and predicted behaviour to improve

safety and efficiency.

It is built on hazard reporting and risk assessment. A suitable SMS program will have 3 objectives.

a. Gives all stakeholders a way to report hazards.

b. Ensure that every hazard goes through a risk assessment and mitigation process.

c. Provides a decision support matrix to help managers decide on launching suitable SOPs based on the probable severity and the risk assessment.

This approach delivers a systematic and standardized process for hazard assessment and underlying change management. And when this is applied across an airport, it means that critical decisions are made after evaluating and considering all potential risk. A Safety Management System is a critical central piece of the risk assessment and mitigation process.

Tomorrow's Safety Management System

As an example, let's look at the long tarmac delay ruling the U.S. Department of Transportation enacted a few years ago. Given technology's foreseeable path, the following scenario will be possible soon:

A plane is on the tarmac waiting for an open gate. Since an arriving/ departing plane cannot stay on the tarmac for more than three hours per the regulation, airports develop plans to beat this window and avoid the fall-out. Given data and the appropriate model, AI can recognised this pattern setting off

an action plan when it receives a Long Tarmac Delay signal (LTD) at the two-hour mark. When this happens, the appropriate departments can use that plan to move the plane and prevent the associated fines.

Technology will play a much more assistive role especially when stakeholders must make large, complex, and or long-term decisions.

Decision Engines and Change Management

Technology can be shaped to do a lot of proactive SMS work while also supporting stellar risk assessment. Professionals and stakeholders need to consider every kind of risk before moving to actionable models.

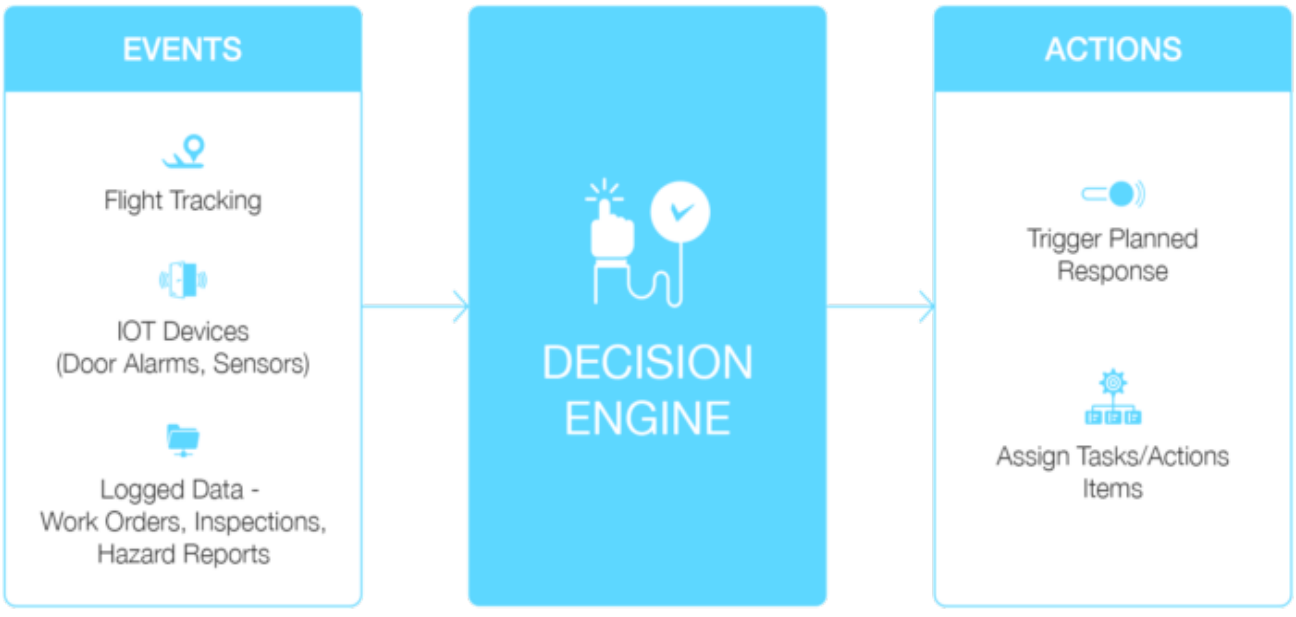
Preparing for the Future SMS

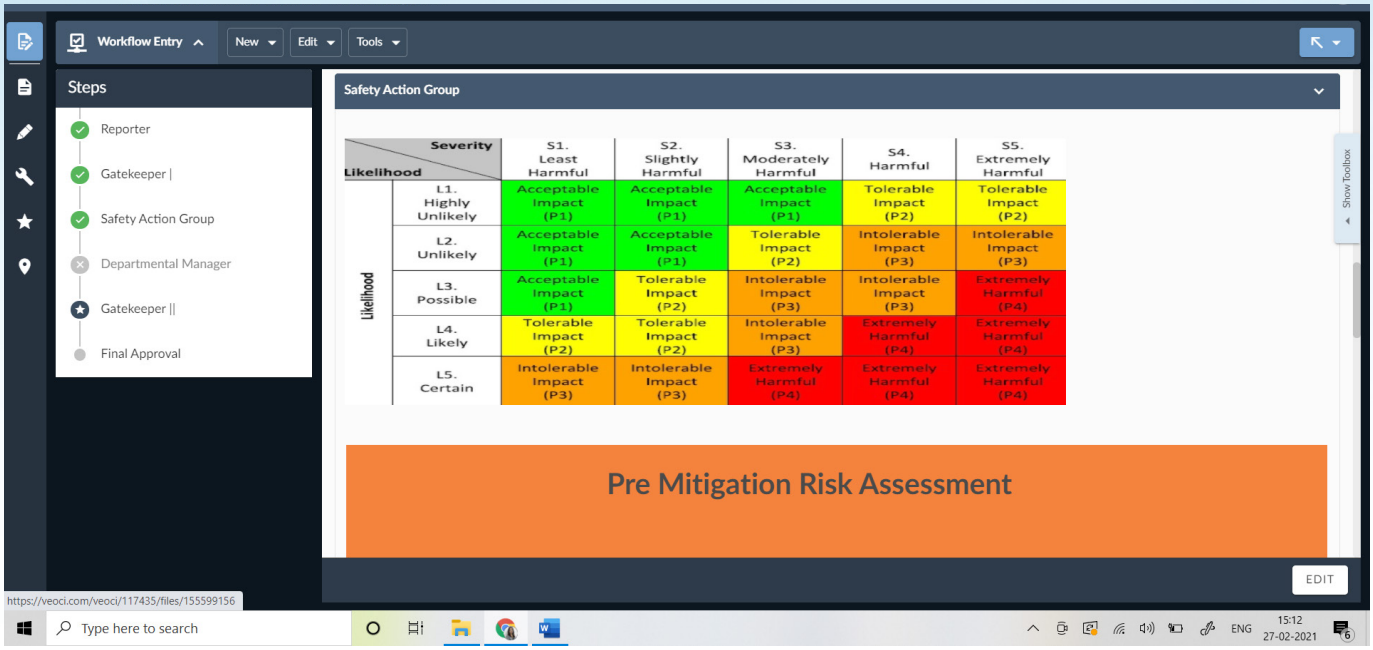
The future safety management system will be scripted to run decision support engines and handle change management.

An open system capable of integration is a key requirement. Databases should not in silos and communication between systems facilitates better decision making. The best case is a fully integrated software platform that bridges the full software application set.

The safety management system is now a standard application for Aviation. An example would be a recent UA Engine Failure which triggered a large Risk Assessment exercise across airlines and engine manufacturers. The risk assessment programs needed to be flexible, agile, and rapidly deployable at scale. Veoci gives you a way to assess, add and mitigate risk and hazards by making the information quickly available in real time across the airline or airport or a group of airports under one operational management.

Veoci is a no-code cloud hosted platform with a full featured mobile app. The building blocks of the platform allow customers to easily create complex workflows and dashboards from managing emergency and crisis response to full operational Part 139/Annex 14 compliance reporting.





This in turn leads to Safety Management and BCP/DR strategy. BCP/DR is a start for application resilience and the Veoci platform with its feature set of forms, workflows and dashboards can also provide critical application workarounds when a crisis disables primary inhouse applications like in a case of a cyber attack.

Expertise: We bring the experience of building and running a platform for collaboration for over 100000+ employees of a Fortune 10 company. Over the years we have developed domain expertise across diverse verticals from Aviation, Government, Healthcare, Fortune 10 enterprises etc.

Customer orientation: Veoci puts the control of the application in the hands of the actual user. From an emergency / hurricane response system in a tiny island in the Pacific to Fortune 50 companies, the unique platform provide a scalable and rapidly deployed solution.

No-Code: This is only possible as a NO-CODE platform pushes deep technology to the background and provides the user a clean interface which adapts to the way he works without having to hire technical consultants or coders. In a disruptive environment this enables organisations to be agile and adapt quickly to changing needs and requirements.

With a NO-CODE platform, actual users can create and configure process-based GIS integrated applications with a minimal amount of training.

Cloud hosted Platform: The platform is a self-contained multi featured suite for operations, collaboration, and digitisation. With a platform which can handle all exhaustive and diverse business needs, a NOCODE Cloud Hosted platform brings standardization across all applications. This will also consolidate and reduce training needs that were needed when using applications built on different technologies. These can be rationalized and consolidated on a single Veoci platform. Such platforms are also scalable on demand, allowing a quick ramp up to meet any real time demands of changing business needs/goals.

Mobility and Android/iOS: This is a mobile world and everyone in on the move and the Veoci Mobile app brings powerful features and alerts to all users anywhere anytime. The Head of Flight Safety can launch a response to any crisis which just one authenticated click on his smartphone. This is available to him on Mobile 24x7 wherever there is connectivity. The audit trails can also be configured to include the GIS coordinates of the persons using the platform.

Cost effective solution:

- Platform as a Service
- NOCODE and ON Cloud
- Fully Mobile
- Secure
- Scalable on demand
- Full Inbuilt communication suite: Which can insulate the application from any company infrastructure specific issues like a cyber-attack.
- Business Resiliency: Hosted away from any local infrastructure a platform like Veoci can be configured to make a company business resilient with the ability to launch SOPs configured on communications, call trees, email alternatives and other business processes critical for businesses to keep operational.

  This can be the difference between a minor loss and company survival. Veoci has effective training programs to ensure that users can design and configure their processes themselves.

Examples

- **Customer: Large Airport Operator operating multiple airports :** With Veoci as a platform, we have configured a full airside application portfolio for Airports. These covers Emergency Management, Airside Operations and Compliance as well as a Safety Management System. This has been operational now for over 2 years.

  The Cloud Platform is ideal for airside management of multiple airports under one operator as Users across the organisation, based in different cities and responsible for different functions, can see real time data and collaborate to take quick and effective decisions.

  The industry is also highly regulated and real time validated data enables the organization to meet the highest compliance and regulatory standards. This will transform the operational profile of the organisation and lead to significant benefits in compliance, response, and cost. Availability of data also reduces the time for any Regulatory inspections to a matter of days rather than the couple of weeks.

- **A leading Asian Airline:** An Emergency and Crisis response Solutions across 50+stations and 20+ countries for a large APAC based airline. SOPs for a list of crisis / emergencies are now digital and the Airline can launch effective response to multiple crisis situations sending out a stream of tasks and forms for real time data that aggregates into a virtual cockpit, giving them the ability to make on the spot decisions. These are communicated using the In-app Communication suite which, without to leave or using another application, allows SMS, Email and Voice alerts and communications to be relayed across the airline and its many stations.

- **A leading US Bank :** We have configured a solution built on the Veoci platform to deliver a risk assessment and management framework that covers the full range of crisis and emergencies. The Risk Assessment covers 5 areas of risk: Data, Human capital, Infrastructure, Technology and Third Party/Supply chain.

Summary

Veoci is a fast-growing Software as a Service Platform in the aviation space – both at Airlines and Airports.

It is a Gartner MQ product for 2019 for Business Continuity Management Response Solutions.

Veoci is a product for choice for its rapid implementation, ease of use, integration with GIS and a full communication suite to use where external communications are disrupted. It is a highly secure flexible platform designed to deliver enterprise class solutions to meet corporate goals quickly and is effectively being used by a customer base ranging from Govt to Airports, Airlines and even small single runway strips. With a team in Noida working with the US team to give 24x7 support, Veoci delivers the software and support that is needed to meet the disruptive challenges of the post pandemic world.

In the pandemic, we have delivered solutions to existing and new customers that enhanced their ability to adapt to the changing industry and economy models. We have been able to deliver solutions leveraging our delivery and development centre in NOIDA and a remote delivery model that serves customers from New Zealand and Hong Kong to Brazil.

Maninder Grewal, MD at iPrime Services – Sole Representative for Veoci dba. India/ Africa/Asia - Maninder graduated from IIT Kharagpur with a degree in Mechanical Engineering and has 30+ years of experience in the information technology sector He has been active member of Nasscom and anchored the Nasscom National Annual Tech. Conference. His work at the C level has given him an acute understanding of the levers that drive the C Suite and that are critical to enterprise growth and sustenance. He is able to bring technology to business across Aviation, Health, Financial Institutions. One major passion: Bridge.

veoci

Let's Make Airport Water Positive

By Hrushikesh Sandhe PE LEED AP, Head- Civil/ Water, Walter P Moore

INTRODUCTION

Water conservation is important worldwide due to acute shortage of potable water in many of our most populated areas. The increasing impervious cover due to urbanization has impacted infiltration of rainwater into sub-soil and recharging of groundwater. Hence artificial storage or recharging of groundwater is required to restore our natural groundwater supply. Rainwater harvesting is one of the artificial recharge applications that can help to either store for beneficial use or recharge groundwater back into the aquifer.

Airports have one of the highest water demands (potable and non-potable) in the country. The typical categories that require water are irrigation, flushing, domestic drinking etc. In addition, airports typically have large areas for safety zones that can provide water collection and storage. Hence airports are a good place where rainwater harvesting application can be very useful. It is estimated that if rainwater harvesting is planned and implemented as per design, 100% airport potable water demand can be provided for an average rainfall year. This will help reduce airport capital expenditures in the long term and make airports water self-sustainable. In addition, the rainwater harvesting techniques can help reduce flash floods both at the airports and in the surrounding areas.

Walter P Moore has been associated with airport related civil/water infrastructure design globally. Recently we have started supporting Indian airports using global standards and expertise to provide a sustainable solution to water conservation. The interconnected rainwater harvesting network on airport property can help maximize storage on-site helping to reduce flood risk and help to provide water for beneficial use during dry months.

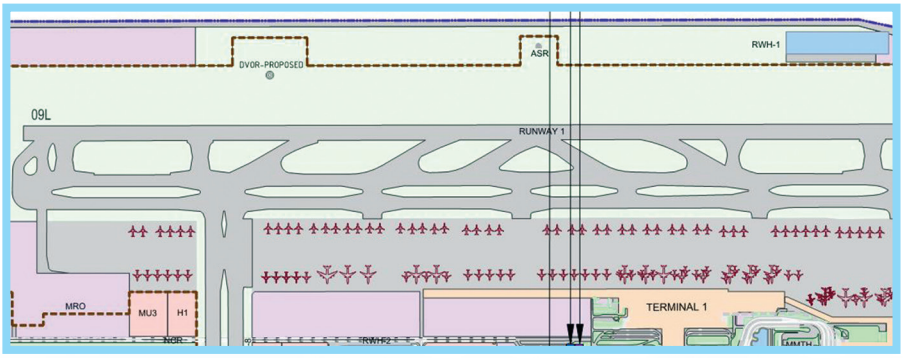


Figure 1: Typical Airport Runway

APPROACH

The approach to developing a sustainable water supply begins with a review of the on-site drainage areas to make sure maximum storage is captured by storage tanks or ponds. Also, existing infrastructure for non-greenfield airports should be reviewed to understand site outfalls to determine how best to capture rainfall runoff. The rainfall data from Indian Meteorological Department (IMD) gaging station near airport can be analyzed to understand trends for the site of interest. The recent trend in most parts of the country has shown increase in average annual rainfall and reduction of recurrence of dry year due to change in monsoon patterns. See Figure 2 below showing rainfall pattern for one of the airports in India.

The surface excess runoff that occurs post rainfall event is

collected via the airport drainage network. The drainage network discharges this runoff to storage areas, either an open pond or underground tank. The water from the storage areas is then distributed to an on-site water treatment plant. The treated water is then distributed to provide for the airport water demands. The waste water generated from airport is also treated through on-site sewage treatment plant (STP) and recycled water is used for irrigation and flushing purposes.

The Indian sub-continent does not receive consistent rainfall throughout year. Hence a water management plan should be developed in such a way that excess runoff during the monsoon season can be captured to supply water during deficits in dry months.

To support the water harvesting process, the water balance calculations need to account for the rainfall refill volume that gets added to the pond during the rainy months.

The simultaneous removal of water to meet the airport's water demand and the addition of water from runoff during monsoon is analyzed using water balance equation. The inflow to the pond is added and the outflows are subtracted to estimate the monthly available volume stored at the site. Figure 3 below showcases rainfall volume pattern for a year. The pond or underground tank operation rule should be setup in such a way that the storage is empty before monsoon season starts. The empty storage tank ensures maximum storage of runoff during the monsoon season. It is important that the operation of the system be aligned with the Meteorology Department forecast for the year.

It is recommended that the latest available tools and technology be used to model this setup and analyze various scenarios. The system can be modelled using various water resources software such as US Corps of Engineer's developed HEC-HMS, US EPA SWMM, and others. The hydrologic modeling helps replicate the storm event volume as it passes the site and routes the runoff through rainwater harvesting ponds. Also, the models can represent interconnectivity between pond and get more realistic information on how the transfer of volume will work. Using historical rainfall data, models can be set up using several years of data to help predict how best to design and operate the system. The modeling helps in designing the network and determining the maintenance protocols. The design goal is to provide solutions to store rainfall runoff to the most practical capacity possible in all the catchments and optimize the supply capacity of the storage system. In order to improve the system, the enhancements in the storage capacity, pond size and outflow structure parameters are always required. The interconnectivity can be achieved by using gravity pipe or a pumped distribution system. To conserve energy, the pump system is activated only during the dry periods to transfer water to the treatment facility. The pump

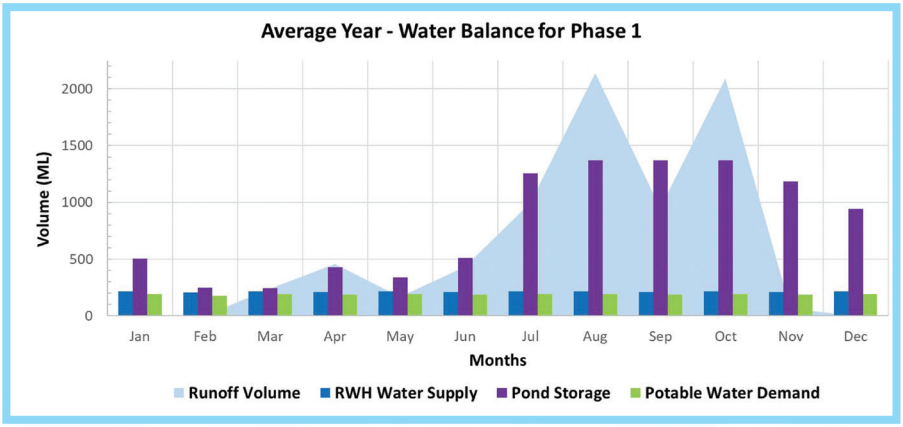


Figure 2: Rainfall Volume Month wise

Figure 3: Tank/Pond Interconnectivity

system can either be manual or automated.

The interconnectivity between ponds can be monitored using sensor or metering applications. The data collected through this application is used to optimize storage and usage for future years. It is recommended that active rain gages be installed at the airport and be integrated into the system operations. The gages will collect airport rainfall information data which can help forecast the impact of any rain event.

As per design standards, the airport drainage network should be designed for 100-yr or 1% chance of exceedance return interval storm event. Hence the rainwater harvesting storage provides benefit of detention and controlling floods and erosion offsite downstream of the airport. This approach is cost effective, environmentally friendly over the life cycle of the facility while integrating well with the existing infrastructure.

CONCLUSION

The water supply at the airport depends on various on-site and public sources. The water is mostly used for domestic activities. Hence conservation approaches such as rainwater harvesting have multiple benefits such as water supply, groundwater recharge, flood control and energy conservation. Assessing and managing rainfall on-site can help provide a long-term sustainable solution and help airports become water positive.

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 complex structural and infrastructure challenges. Providing structural, diagnostics, civil, water resources, traffic, parking, transportation, enclosure and construction engineering services. We design solutions that are cos- and resource-efficient, forward-thinking, and help support and shape communities worldwide. Founded in 1931 and headquartered in Houston, Texas. Our 700+ professional work across US offices and five international locations. Walter P Moore established office in India in 2011. The office enhances the firm's ability to serve clients and projects throughout India for a wide variety of project types, including aviation, commercial, residential, healthcare, hospitality, sports, entertainment and government facilities. We are currently working with Bangalore International Airport providing Sustainable Water management solutions to make the airport water positive.

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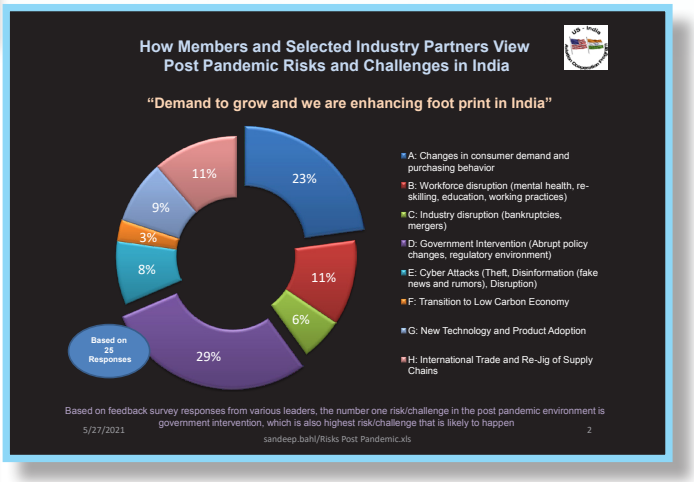
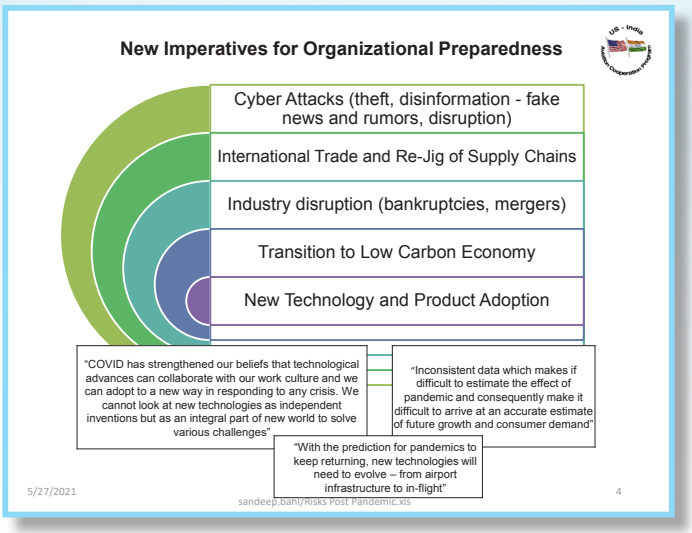
ACP'S Feedback result: Post Pandemic - What are your Risks in India for 2021-2022

By Sandeep Bahl, Executive Program Director, US-India ACP




New Imperatives for Organizational Preparedness
Cyber Attacks (theft, disinformation - fake news and rumors, disruption)
International Trade and Re-Jig of Supply Chains
Industry disruption (bankruptcies, mergers)
Transition to Low Carbon Economy
New Technology and Product Adoption
"COVID has strengthened our beliefs that technological advances can collaborate with our work culture and we can adopt to a new way in responding to any crisis. We cannot look at new technologies as independent inventions but as an integral part of new world to solve various challenges"
"Inconsistent data which makes if difficult to estimate the effect of pandemic and consequently make it difficult to arrive at an accurate estimate of future growth and consumer demand"
"With the prediction for pandemics to keep returning, new technologies will need to evolve – from airport infrastructure to in-flight"
5/27/2021
sandeep.bahl/Risks Post Pandemic.xls
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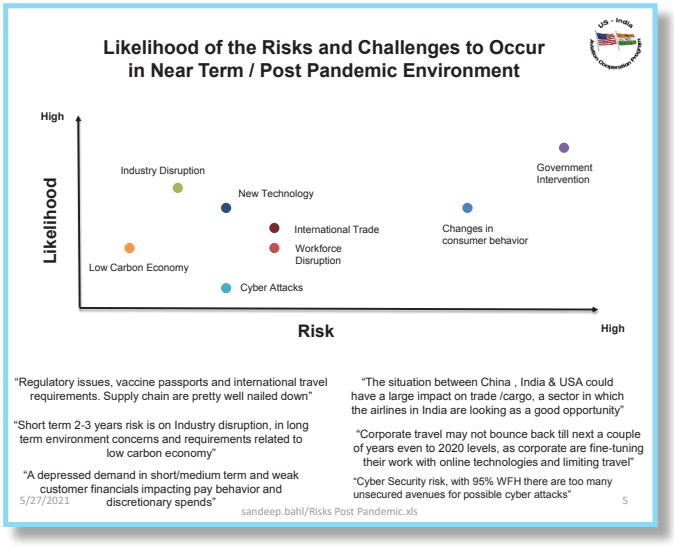
Likelihood of the Risks and Challenges to Occur in Near Term / Post Pandemic Environment
High
Likelihood
Industry Disruption
New Technology
International Trade
Workforce Disruption
Low Carbon Economy
Cyber Attacks
Changes in consumer behavior
Government Intervention
Risk
High
"Regulatory issues, vaccine passports and international travel requirements. Supply chain are pretty well nailed down"
"Short term 2-3 years risk is on Industry disruption, in long term environment concerns and requirements related to low carbon economy"
"A depressed demand in short/medium term and weak customer financials impacting pay behavior and discretionary spends"
"The situation between China , India & USA could have a large impact on trade /cargo, a sector in which the airlines in India are looking as a good opportunity"
"Corporate travel may not bounce back till next a couple of years even to 2020 levels, as corporate are fine-tuning their work with online technologies and limiting travel"
"Cyber Security risk, with 95% WFH there are too many unsecured avenues for possible cyber attacks"
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Bell 505 Jet Ranger X receives certification for High-Altitude operations

By David Sale, Managing Director - Asia Pacific, Bell

Tth 505 is a 5-seater, short cabin, light single turbine engine helicopter. Loaded with the latest technology from Garmin G1000H NXi avionics to a Safran dual channel FADEC (Full Authority Digital Engine Control), the 505 is Bell's entry level offering seeking to recapture a market once owned by the Bell 206 Jet Ranger. The powerful 505 SHP engine, 2,295-pound external load capability, and open, high visibility cabin have opened the 505 up to compete with traditionally larger aircraft markets such as public safety, HEMS, and long lining.

The 505 was unveiled in 2013, at the Paris Air Show, and formally introduced in 2014 at the HAI Expo in Anaheim, California. The Bell 505 Jet Ranger X was designed to fill a gap in product offering left by the Bell 206B Jet Ranger when it was discontinued in 2010. The 505 continues the Jet Ranger legacy, utilizing the rotor and drive system from the venerable 206 Long Ranger, with a modernized cockpit, improved engine power, and versatile open cabin.

There are over 260 505s operating in 46 countries. The 505 fleet has flown over 45,000 hours in less than 3 years. The 505 is put to work every day in a wide variety of mission from private individuals flying for fun, long lining operators taking supplies and crew high into the mountains, militaries training their future pilots, or police agencies keeping their cities safe.

Here in Asia Pacific, PT Whitesky relies on their two Bell 505s for air taxi/charter and medical evacuation for their HeliCity project in Jakarta, Indonesia. When asked what features and benefits attracted him to the Bell 505, PT Whitesky CEO Denon Prawiraatmadia explained:

"I have to be honest with you, the first time I saw the 505 in Dallas I knew it was the perfect helicopter for Jakarta and our project, HeliCity. With our experience working in these types of operations, it can be difficult to learn to operate several different machines at once. The 505 is easy for pilots to learn, with its advanced avionics and FADEC computer systems. The FADEC is a safety feature that's nice for us. Instead of needing a twin-engine helicopter, we have the 3 levels of redundancy in a single engine helicopter."

The 505 is the most advanced short light single helicopter on the market today. The Garmin G1000H NXi avionics and dual channel FADEC provide enhanced

situational awareness and reduced pilot workload to help pilots and operators ensure every mission is a success. The Garmin G1000H NXi provides flight and engine parameters in an easy to read, color coded, display that combines with aural headset alerts to ensure the pilot has a complete picture of the aircraft's current status. This primary flight display includes the Bell unique Power Situation Indicator (PSI) that combines five traditional engine and rotor displays into two easy to read gauges that provide color coded engine parameters.

Embedded sensors around the aircraft provide critical information to the cockpit helping the pilot more quickly identify, solved, and react to any potential problems. The dual channel FADEC utilizes a redundant channel control system to maintain the turbine engine at peak performance. This FADEC allows the 505 to eliminate any mechanical throttle linkage and provide single switch automated starting that eliminates the chance for a pilot induced hot start. Digital engine control provides smooth and consistent rotor speed as well as better fuel economy by setting fuel flow to the optimized limit based on the required power setting. The engine control system also includes a 3rd backup channel that, in the unlikely event of a FADEC failure, would keep fuel flowing to the engine to allow the pilot to bring the aircraft to the ground safely.

The 505's open cabin, easily removeable seats, and integrated tie downs provides the ultimate in versatility for operators around the world. The 505 is quickly able to convert from moving passengers or crew to cargo and goods with tool free removal of seats. The 505's cabin boasts best in class 99 cubic feet of usable volume and an 18 cubic foot cargo bay providing ample space for passenger baggage or important cargo. The Bell 505 includes a 2000-pound cargo hook capability providing additional uses for operators to serve the community or add revenue streams to their business.

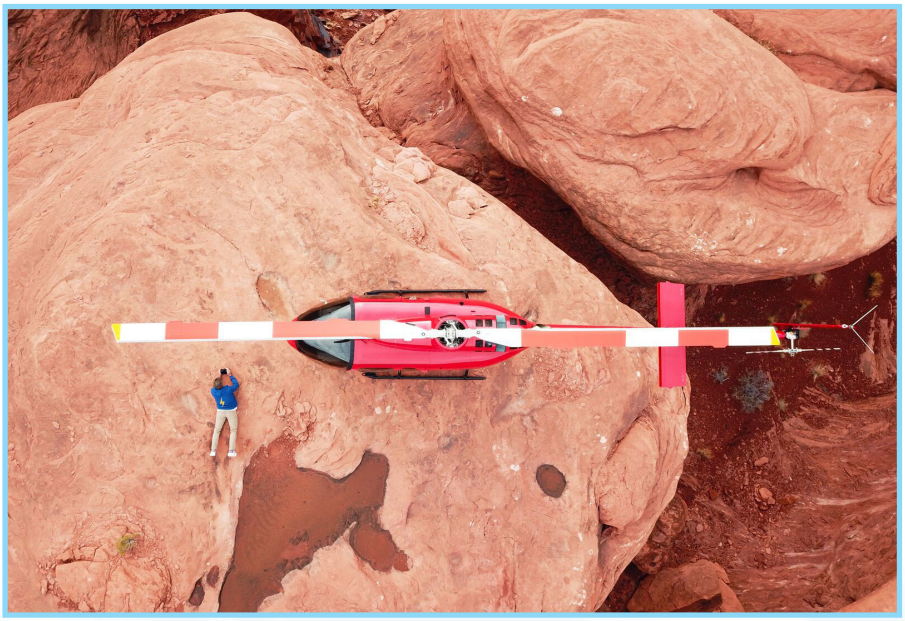
While new to the market, the 505's rotor and drive system have millions of combined flight hours. The 505 utilizes the same high inertia rotor system from the 206 Long Ranger. A high inertia rotor system provides the pilot more time to react to an engine failure and enter an auto rotation without the rotor slowing down too much, providing a better cushion and a safer landing. The millions of flight hours on these systems provide operators the assurance of reliability knowing that they can not only trust the operating cost numbers, but they can also rely on the aircraft to be ready to go each and every day for their needs.

The Bell 505 utilizes the 505 SHP Safran Arrius 2R. This is the first Safran engine product to be used by Bell. The Arrius 2R is the newest offering in the Arrius family of engines that has accumulated millions of successful flight hours

through multiple OEMs products all over the world. The Arrius 2R provides a variety of features that add to the reliability and safety of the 505 from the dual channel FADEC to the Flame Out Protection System (FOPS). The FOPS provides a preference flame tube that has its own fuel line and bypass valve. In the event of a fuel blockage, the preference flame tube would re-light the engine maintaining thrust and safety of flight. The Arrius 2R provides best in class power to the 505 giving the aircraft the ability to hover at over 10,000 feet out of ground effect and have a service ceiling of up to 22,500 ft density altitude. The Arrius 2R is comprised of 2 modular sections to ease overhauls and replacements, a hot section and a gear box section.

Elicompany, based in Italy, performs a variety of missions with their aircraft spanning from tourism/charter flights to pipeline and powerline inspection. When asked what attracted the to the Bell 505, Cristian Forghieri, Co-Owner of Elicompany, Pilot, and Flight Operations Director, stated the following:

"To be competitive, you don't need to offer the best tool, what we're looking for is right tool for the job. You don't need the best helicopter, you need the right helicopter for the job, or else you're going to be too expensive. The more expensive the tool becomes, the less it becomes the right tool. What we've found is that the Bell 505 is the best in this class, there's no comparison to any other helicopter. For our application, flying 120-130 hours per month, the 505 offers the lowest operating cost in the industry for what we do. All the pilots that have flown the 505 have been very happy. For work, the 505 is the winner hands down because of its power."



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BELL 505

SEE WHY BELL 505 OPERATORS CALL IT A TIME MACHINE

"A lot of people call it a time machine and I'll have to completely agree. To hop off the airplane and into the helicopter and 15 minutes later be in a location that would that would typically take you a day to reach – it's a pretty awesome experience."

- RUSTY ROBINSON, BELL 505 OPERATOR

Helicopter owners know landing directly on their property creates more time for friends, family, and fun. Take your first step to joining the Bell 505 family at:

bell.co/505-testimonials

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