INTERNATIONAL
Airport REVIEW

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Are we ready to put our trust in **biometric technology?**

Unveiling SESAR's new framework to manage 400,000 drones by 2050

More passengers equals more traffic: Handling kerbside congestion

Preventing cyber-intrusion and disruption with artificial intelligence

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INTERVIEW SPOTLIGHT

Daniel Jones, Client Director, Infrastructure UK and Europe, Engineering, Design and Project Management, Atkins, details the concept of aviation by design, emphasising how digital technologies will play a pivotal role in the future of airports.

Is new airport infrastructure soon to become digital?

A lot of airport infrastructure already is. Our thinking, working and doing is increasingly 'digital' in nature.

Design and delivery of airport infrastructure is increasingly influenced by digital technologies and ways of working. For example, Design for Manufacture and Assembly (DfMA) is the design of assets where the asset data created through the design process efficiently supports the manufacturing to the manufacturing process, through to onsite delivery and assembly. The digital asset supports rehearsals for logistics, and construction sequencing. The asset information flows in and out of client or supplier-managed platforms for storing, managing, presenting and repurposing the content in order to support decision making through the asset refresh cycle.

Digital technologies such as biometric deployments support process optimisation and in some instances a step change in the operating model for airports. These changes can provide a reduction in infrastructure requirements (we build less) and/or dramatically increase throughput and provide a significant investment return for airlines, handlers and asset owners/operators.

Increasingly cost effective IoT solutions and platforms which provide predictive maintenance capabilities and analytics can help asset owners and operators gain better insight into the performance of airport infrastructure.

How do you help airports face the future in a responsible and sustainable way?

A priority for Atkins is helping our aviation clients reduce the environmental impact of their infrastructure projects.

For example, river corridors and road bridges have been designed to enhance and improve biodiversity; landscaping around new terminal and runway assets can sequester carbon into the soil to avoid it being released into the atmosphere. Carbon sink meadows absorb carbon dioxide and release oxygen into the environment.

Mobility-as-a-Service and modern technology solutions promote more sustainable surface access strategies from a diversity and inclusion perspective. This can be seen in our TOC Ability pilot. TOC Ability is designed to be an adaptable and intuitive intelligent mobility solution, capable of better managing accessibility needs through enhancing the accessibility and inclusivity of services for vulnerable users, by using an innovative digital platform to share their journey requirements with the asset operator.

How can airports get the most out of investments and more from their assets?

Investment is required to understand and manage asset condition and establish robust asset investment planning. This is where true savings lie, through a professional and informed team, using up-to-date asset performance data and taking a leading role by interfacing productively with finance and treasury teams and optimising investment plans to deliver enhanced value rather than managed reductions in annual budgets by a few per cent or a few heads each year.

How will airport design in the future be different from today?

Our design and delivery approach will evolve and we will become ever more collaborative and digitally connected.

The work of the Integrated Design Team (IDT) on Heathrow's Expansion Programme is a great example of forward thinking; the IDT model meant that Heathrow could invest in and develop British talent and technology, and hone this collaborative approach, setting a model for future infrastructure projects.

In terms of airport design, safeguarding flexibility will become a dominant theme. Spaces will be re-imagined and redesigned according to technological advancement and innovation.

DANIEL JONES looks after Atkins' technology and consulting work in the aviation sector, leading a team who cover everything from organisational strategies and business change to biometrics and the automation of the passenger journey.

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Coming face to face with the future

TARA NOLAN
EDITOR
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AS THE DIGITAL world continues to develop, the aviation industry must adapt to survive. The advent of technologies is increasingly encroaching on all aspects of airport operations, including passenger identification. As Engr. Badr Al Meer from Hamad International Airport said in our first issue of 2019: "Passengers are continuously seeking out the most efficient, convenient and personalised airports to travel through." How can an airport ensure they fit the bill? Many believe the answer lies in biometric technology.

In a bid to relieve a common pressure point within the airport journey, biometric technology is being deployed to eliminate the need for the passenger to repeatedly show their boarding pass and passport. The demise of the passport could be fast approaching as the use of facial recognition, iris scanning and fingerprints become habitual – but how will passengers respond?

Members of the public are a lot more wary of data-sharing and protecting their personal information. The idea of using your eye to gain access to a plane is a little too Sci-Fi for many: Regulations and ethical rules need to be cemented before biometrics are accepted by all. This issue's Guide to Biometrics explores this further on page 23.

I really hope you enjoy this issue of *International Airport Review*. I have recently taken over as Editor of this industry-leading brand and look forward to supplying you with more content in the future. If you have any feedback or are interested in contributing to the magazine or website, please contact me via the email address above, and remember to visit our social media channels to keep up to date with industry news and expert opinions.

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INTERNATIONAL AIRPORT REVIEW
LEADERS' SERIES 2019

Infrastructure and sustainability: Two sides of the coin for the future of aviation

Alexandre de Juniac, Director General and CEO of IATA, discusses how improvement and investment in two integral areas of the aviation sector is essential if the industry is to remain successful in the future.

AVIATION is a powerful force in our world. The extent of our current role can be summed up in three numbers: 22,000, 64 million and 4.3 billion.

Firstly, 22,000 is the number of city-pairs the industry now services worldwide, connecting communities on every continent. Secondly, 64 million is the tonnage of freight which is transported around the world each year – equivalent to one third of the value of all global trade, and 4.3 billion is the number of passengers carried by airlines last year.

Aviation provides people with the ability to connect and build communities in ways that were not possible before. It underpins the success of businesses by giving them freedom to sell their goods in global markets. It is a driver of an even more inclusive globalisation that will make our world more prosperous.

By 2037, we estimate passenger numbers could be double what they are today. Serving that demand will mean overcoming a number of major challenges. Two of our biggest concerns are infrastructure and sustainability.

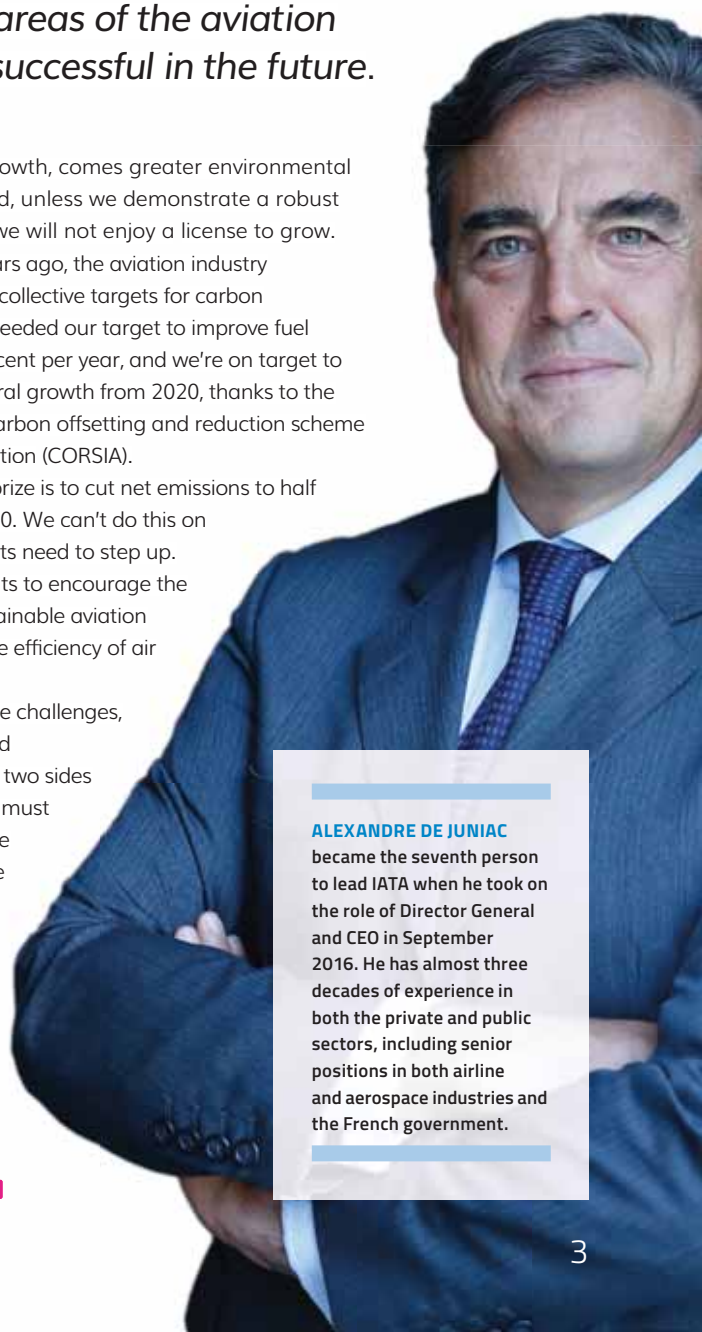
Demand can only be serviced by airlines if they have sufficient infrastructure capacity. Frankly, the world faces an aviation infrastructure crisis that threatens to severely curtail the benefits of the business of freedom.

Nowhere is that crisis more acute than in Europe. EUROCONTROL estimates 1.5 million flights won't be accommodated in 2040 on present trends, and air traffic control delays doubled in 2018. Addressing infrastructure concerns will enable air connectivity to grow. But with growth, comes greater environmental responsibility. Indeed, unless we demonstrate a robust sustainability plan, we will not enjoy a license to grow.

That is why, 10 years ago, the aviation industry committed to tough collective targets for carbon emissions. We've exceeded our target to improve fuel efficiency by 1.5 per cent per year, and we're on target to achieve carbon-neutral growth from 2020, thanks to the introduction of the carbon offsetting and reduction scheme for international aviation (CORSIA).

However, the big prize is to cut net emissions to half of 2005 levels by 2050. We can't do this on our own; governments need to step up. We need governments to encourage the development of sustainable aviation fuels and improve the efficiency of air traffic management

Aviation faces huge challenges, but infrastructure and sustainability are the two sides of the coin which we must invest in for the future air connectivity of the world. Together we must work to convince governments to help us deliver that future and overcome the challenges of growth and sustainability.



ALEXANDRE DE JUNIAC became the seventh person to lead IATA when he took on the role of Director General and CEO in September 2016. He has almost three decades of experience in both the private and public sectors, including senior positions in both airline and aerospace industries and the French government.

How to enhance non-aeronautical revenue

Non-aeronautical revenues are essential to the financial health of airports. As such, in *International Airport Review's* first-ever column, we spoke to some leading industry experts who told us how they ensure they reap the benefits of airport incomes.

PATRICK LUCAS & DIMITRI COLL
Head of Airport Business Analytics, **ACI**, and Director of ACI's **ASQ programme**

The rise in the number of global travellers alongside the increased use of mobile and digital technology, more competition and new e-commerce options has illustrated the crucial importance for non-aeronautical revenue for airports.

With technology at their fingertips, today's passengers are seeking a seamless, secure and efficient journey that is highly personalised.

Retail facilities and food and beverage outlets represent, on average, more than one third of commercial revenue. However, disruptive technologies such as online retail and e-commerce platforms, and increased competition off-airport, has limited the growth prospects regarding airports' non-aeronautical revenues.

Based on ACI's Airport Economics Survey, non-aeronautical revenue share, which was estimated at 43.1 per cent in 2005, was recorded at 39.9 per cent in 2017.

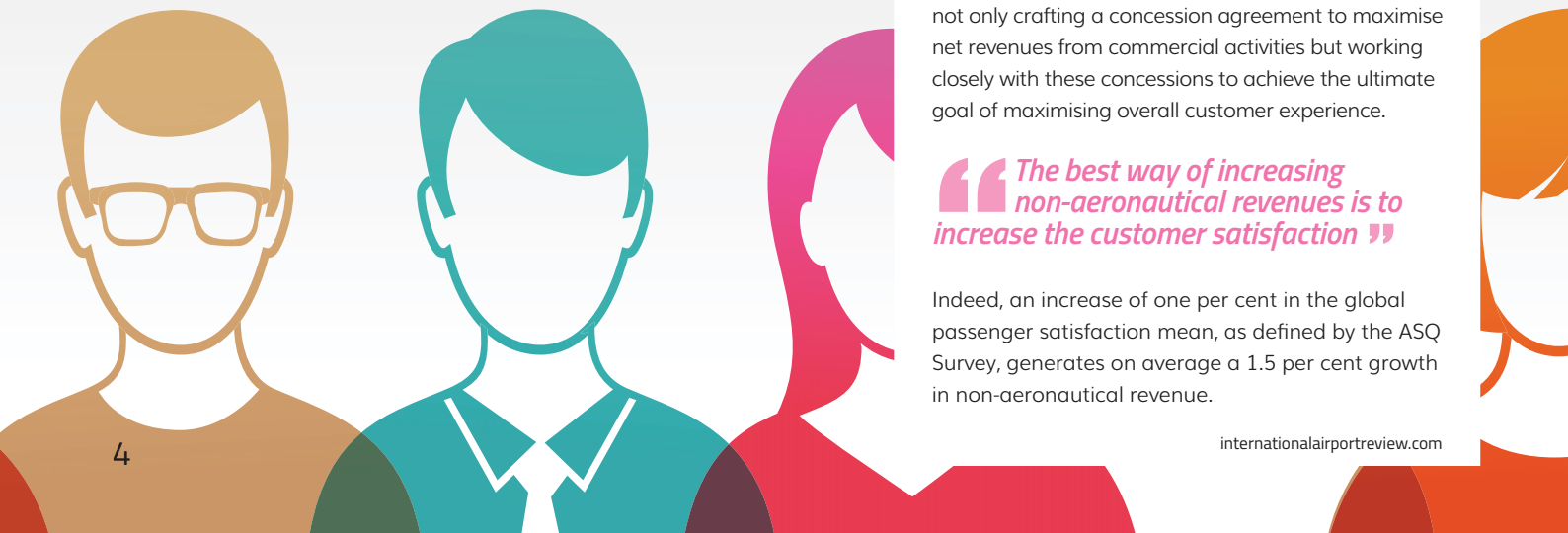
The modern airport operator is a complex business, recognising the value of harnessing data to grasp the tastes and preferences of passengers to deliver a return on customer experience.

ACI's ASQ programme provides a key source for this data as it is the globally established benchmarking programme measuring passenger satisfaction whilst travelling through an airport and provides a detailed view of the passenger experience.

It is crucial that airport operators use this data to attract the right blend of retailers and concessions by not only crafting a concession agreement to maximise net revenues from commercial activities but working closely with these concessions to achieve the ultimate goal of maximising overall customer experience.

> *"The best way of increasing non-aeronautical revenues is to increase the customer satisfaction"*

Indeed, an increase of one per cent in the global passenger satisfaction mean, as defined by the ASQ Survey, generates on average a 1.5 per cent growth in non-aeronautical revenue.



TOMASZ LENART
Passenger Services Manager,
Wroclaw Airport

I strongly believe the best way to improve non-aeronautical revenue is to focus on passenger experience.

To achieve this at Wroclaw Airport we focus on data collection, measurement and analysis in our own self-learning airport IT system, meaning we know who our passenger is and can predict their behaviour. We want to be one step ahead of both expectations and any problems that may occur during daily airport operations. We found that by sharing this information with all parties involved in airport processes, it became a revolutionary factor in daily passenger service – we adapted our systems to be available on their mobile devices. As a result, we beat the queues in areas that cause negative emotions (check-in, security control, immigration and baggage claim).

"Passengers saved time and began to be more satisfied, which led to more time and money spent in the commercial areas of Wroclaw Airport"

Alongside this is real-time information. We publish all flight details not only on screens in the terminal but on a chatbot application via Facebook Messenger. Once passengers have real-time information they feel safe and can plan their time more efficiently in available commercial areas before departure or after arrival.

By giving our passengers time, we witnessed a 10 per cent increase in non–aeronautical revenue above 20 per cent of passenger traffic growth last year.

AUDE FERRAND
Chief Retail Officer,
Groupe ADP

Groupe ADP claims a positioning around the 'ultimate Parisian shopping and dining experience' which is based on a strategy to drive a sustainable growth for revenues from shops, bars and restaurants. Our ambition is to be the only place in Paris with excellence across four drivers: Interior design and space management; brand portfolio; quality of service; and price positioning.

"After the infrastructure projects are delivered we aim to achieve revenues per departing passenger of €25.50"

Therefore, we are focused on standardising the 58,000 square metres of commercial space before 2021, by terminal staging, refurbishment or creation of new retail and food and beverage spaces. Regarding the brand's portfolio we developed the right balance between French and international brands, with an emphasis on French art of living, fragrances and cosmetics, luxury fashion and wines, which are attractive for a lot of international tourists. In Paris Airport, food and beverage has been strongly developed with many French bakeries and a restaurant managed by a Michelin-starred chef.

To be able to maintain our sustainable strategy on a long-term period we have built a robust business model with four joint ventures: Core and fashion, advertising, convenience, and food and beverage.

Last but not least, to stimulate the demand of frequent flyers and international customers, we have passenger-centric schemes in place, such as our loyalty programme and tailored services for VIPs.

JOSEPH HUBER
Director Contract & Procurement Administration, **Cincinnati / Northern Kentucky International Airport (CVG)**

Disruptors are only disruptive when airports are reactive. What if airports sought innovations and helped develop them to improve the airport while improving the bottom line?

CVG engages start-ups, partners with local universities and incubators, and attends demonstrations. After finding a fit, next is determining the relationship. Innovations can generate revenue through improved customer experience and CVG looks to monetise the innovation directly, which generally falls into one of three categories (and one hybrid):

1. An innovation is available and CVG purchases it following standard processes
2. An innovation is available but not focused on airports – the innovator agrees not to market the airport innovation to CVG's competitors and CVG may receive the innovation at no charge or the best price
3. CVG may negotiate a revenue-sharing arrangement based on the intellectual property (IP) CVG contributes (the hybrid)
4. CVG identifies a need and engages industry to develop the innovation. CVG retains all IP rights and generates revenue when the developer or third-party licensee sells it.

A government entity may be restricted from directly investing or selling these innovations, and procurement regulations based on the cost and type of service must be considered.

Innovations do not have to be disruptive.

"Through engagement, airports can embrace innovation to improve the airport and generate much needed non-aeronautical revenue"

TANJA DIK
Director of Consumer Products & Services,
Amsterdam Airport Schiphol

The world is changing faster than ever before, and travellers' expectations have shifted. Our aim is to guide, relieve and excite travellers and make their time valuable at each of the 360 customer-journey touchpoints.

"It all starts with understanding our customers' desires through the entire travel and shopping journey"

Current traveller needs, as well as the generation of travellers to come, drive the way we think, operate and innovate. It involves trends such as the growing importance of information transparency and accessibility, personalisation, 'experience over assets', sense of place, a mix of tailored propositions and offers, as well as sustainability as a 'hygiene factor'.

We see that travel retail has become much more than shopping at the airport, but rather part of people's everyday lives. That means global visibility is very important. Partner collaboration is key in order to innovate and offer the right value propositions. We strongly believe that integrated solutions and co-creation are the best way to realise the correct value propositions.

Our partnership with WeChat is one example. WeChat is a multifunctional app which offers features such as chat, social media and WeChat Pay, a mobile payment option. As WeChat Pay's first flagship smart airport in Europe we are able to provide Chinese travellers with seamless travel services and a tailor-made shopping experience.

Using the app they can, for example, browse the range of virtually all of Schiphol's retail outlets and place an order. The products will be readied by the retail outlets, and can be collected by the traveller before they depart. Passengers can also find specific information about their trip, such as flight information, and utilise 24/7 customer service.

Using **artificial intelligence** to mitigate **cyber-risks**

Artificial intelligence, alongside proper training and education, can manage even the worst of security breaches into a positive outcome for airports and their users, says *Kristina Dores*, Chief, Aerodromes & Ground Aids at Namibia Civil Aviation Authority, and *Brad Hayes*, CTO at Circadence Corporation. However, the key question is when (not if) will organisations take the steps to prepare for the coming wave of digitisation?

HIGHLY-INTERCONNECTED and increasingly-digitised systems are a necessary part of modern airport infrastructure. However, alongside the need for greater data-sharing, both within and across airports, this results in an increase in cyber-threats. Furthermore, vulnerabilities at these interfaces – through personnel and digital systems alike – lead to an increased threat of intrusion and potentially catastrophic disruption.

This problem is not one that we can simply train and hire our way out of as these systems and their attack surfaces do not scale linearly in complexity. Not only can artificial intelligence (AI) be utilised to mitigate these risks while enabling better situational awareness, threat detection and response at scale, but it may quickly become the best economical solution.

The challenge

To maintain situational awareness within an airport, there is generally a requirement to fuse information from multiple data sources. Suspicious behaviours are most often characterised by a series of actions rather than a single observation. Without tighter integration, a system might not find anything anomalous about someone trying to buy a last-minute ticket and being turned away. This same situation could be interpreted very differently if from every ticket counter staff were sharing information within the airport environment, enabling recognition that the same person might be attempting to buy last-minute tickets at multiple counters – a far more suspicious behaviour. Understandably, airline ticketing data sources operating with proprietary formats on proprietary

systems aren't shared even at a local level. Facilitating the connection of these data sources would logically lead to increased situational awareness; empowering security and other personnel to make more informed decisions. Legalities aside, the cost of this facilitation could pose greater risk to the system itself. Each interface between systems, with every individual granted access, would increase the potential attack surface, providing new endpoints for potential compromise.

AI can help balance this objective by providing airport stakeholders and staff with the ability to understand what's happening at each site, while offering status updates and maintaining data privacy. These same techniques can be used to create situational awareness at a more macroscopic level, enabling federal agencies to piece together 'big picture' details and share relevant information to the local level.

The need

Compromised systems persist largely due to a myopic view of their activities, as detection often requires a more complete view of the entire topology of interconnections to best understand and characterise their behaviour. Airport operators, as a result, need to embrace integration.

In 2018, a study conducted by the Ponemon Institute found that organisations were compromised an average of 197 days before identifying that they had been breached, and it generally took more than two additional months to contain the incident once identified[1].

Furthermore, costs of a single cyber-breach, rising at a rate of over 10 per cent from 2017 through 2018, showed an average cost of $4.25 million per incident, while an organisation's ability to identify and contain threats within 30 days averages savings of nearly $1.2 million per incident. With the EASA estimating over 12,000 cyber-attacks per year targeting aviation systems alone, unprepared organisations are at an ever higher risk of substantial financial and operational losses[2].

More concerningly, airport cyber-threats span both digital and physical access paths, and can likely be targets for political or military action, commercial espionage, disruption and cyber-crime. As airports increasingly incorporate connected operational technologies for convenience and efficiency, the size of a cyber-attack surface scales rapidly, placing an increased burden on its cyber-security personnel. These threats are amplified by the increasing prevalence of sophisticated attack software available online.

With increasing digitisation in the air traffic control environments, the threat of false messaging and malicious instruction broadcasts increase exponentially. The difficulty in human verification of invalid ATC messages is mitigated by 'read back' requirements. ATC tower vulnerabilities to digital and physical attacks rely on near-instantaneous recognition of data interruptions. Mapping AI to recognise and warn of these conditions could rapidly improve situational awareness and prevent disastrous outcomes.

A scalable solution

Enabling multi-source data fusion can enable and strengthen autonomous techniques for decision support and situational awareness. Achieving international-scale collaboration whilst managing the increased cyber-security risks is possible through techniques that can scale better than current state-of-the-art methods.

Creating more international standards and regulations to better safeguard against security vulnerabilities as new communication channels are set up will require regular compliance verification and organisational vigilance to be operationally relevant. Meanwhile, individual airports presently siloed within their own technological backbones could employ AI-enhanced communication and security protocols, and provide training to its user population.

An AI-augmented aviation workforce

AI system requirements for mission critical tasks are strict to maintain high confidence and low latency. Human-AI teaming is a powerful solution that addresses this requirement, creating collaborations where AI-powered systems provide decision support and situational awareness to empower human operators to better perform.

The NIST *Framework for Improving Critical Infrastructure Cybersecurity* outlines five key steps for organisations to take, and AI-powered solutions have the capability to greatly improve organisational ability in each of these areas:

Identify

Models of tradecraft built from shared data can be used to link malicious behaviour across multiple sources separated in time and space back to particular actors, and help to infer motive, intent and target – well before a human expert.

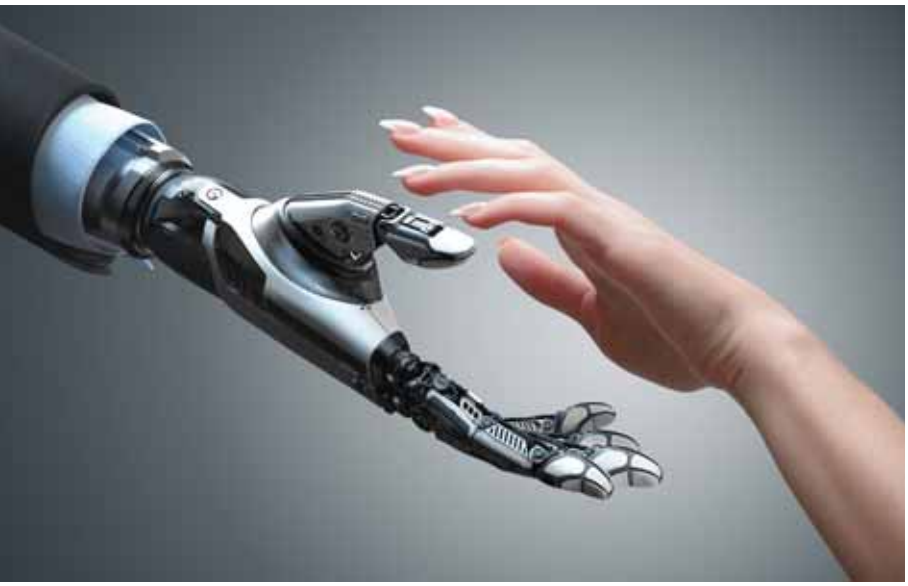
Protect

Autonomous countermeasures can be deployed through AI-powered agents trained for anomaly detection and system configuration repair, providing a critical window for human operators to respond should a threat manifest. With proper procedures and policy enforcement, intelligent, autonomous countermeasures constitute a necessary component of any effective framework for efficient and rapid threat response.

Detect

Automated analyses of system behaviour, network traffic and human behaviour can be leveraged to

KRISTINA DORES, Chief, Aerodromes & Ground Aids at Namibia Civil Aviation Authority, and VP Strategic Development, TranSecure Inc, has over 30 years expertise in aviation management, security and safety. Dores leads industry programmes on behalf of governments, commercial and private enterprise efforts. Recently returning to TranSecure from a three-year secondment as (ICAO) Chief Aerodromes – Namibia Civil Aviation Authority, she advises on AVSEC and airport management standards and recommended practices.



ABOVE: Human-AI teams must achieve collaboration and integration for the value of AI as an investment in cyber-security to be reinforced

create a holistic view of daily operations – without the overhead of human labour and explicit communication to manually fuse data sources. Statistical models can be used to simulate outcomes of various failure modes and attacks, providing informed impact assessments without the overhead of live exercises on premise.

Respond and Recover

The introduction of autonomous agents for cyber-security tasks provides the opportunity for rapid response, buying time through automated triage for airport personnel to devise a response strategy to contain, remove and recover from adverse events. Utilising models derived from events simulated in cyber-ranges on virtual airport infrastructure, it will be possible to create AI-powered solutions that work alongside airport cyber-security teams to act as force multipliers, automate tasks and improve real-time situational awareness.

Training and educating the airport workforce

AI is also poised to revolutionise workforce education. This includes both initial training and continuing education, enabling cyber-security educators to create a dynamic, adaptive, personalised curriculum for each user to enable rapid remedy generation. AI-enhanced training will ease the vulnerabilities associated with understaffing by developing a more familiarised airport staff stakeholder workforce.

To this end, an AI-enhanced technology transfer approach should include the 'Five E's':

- Explanation and justification of how embracing digital transformation and leveraging technology will help improve airport performance and safety
- Enlightenment on the technologies that airport operators can adopt for their airport to achieve digital readiness
- Environmentally-centric descriptions of the key steps involved in digital transformation peculiar to an airport
- Education on recognising the major challenges, risks and opportunities involved in airport digital transformation
- Edification on best practices relating to digitalisation from design to implementation for airports.

Risk management/incident response

A properly educated and informed workforce is a crucial component of a modern digital airport. Proactive risk management requires a level of awareness that dictates that everyone with system access should be trained to identify and respond to common attack vectors in line with a well-defined cyber-security policy (such as reporting phishing e-mails or other social engineering strategies). A crisis communication policy, for instance, proactively anticipates how best to instruct the public in the event of a cyber-attack.

We know that as systems are increasingly linked together, the attack surface of the airport's infrastructure will grow both in terms of systems and personnel. To achieve broader organisational cyber-literacy, each airport operator should devise an institutional policy promoting cyber-education and periodic refreshment for all employees.

Fortunately, proactive risk management measures can be implemented in a more cost-effective manner with the assistance of AI-powered techniques. These include:

- Pushing warning notifications to users when they are violating (or are on track to violate) the airport's cyber-security policies
- Autonomously notifying the airport's cyber-security team when anomalous behaviour is detected
- Providing rapid mechanisms to sequester potentially compromised systems, isolating them from the airport's network.

AI can also improve how incident response is trained, performed and measured by incorporating and using automated, adaptive methods as part of an incident response strategy.

As mixed human-AI teams achieve greater collaboration and integration into the airport's cyber-security response protocol, the value of AI as an investment in cyber-security is further reinforced. Performance measurements should note dramatic reductions in lost data, time-to-breach detection and time-to-threat containment. Time is money after all.

DR. BRAD HAYES, CTO at Circadence Corporation, has expertise in artificial intelligence and machine learning. Hayes is a Professor at the University of Colorado's Department of Computer Science and serves as the Director of the Collaborative AI and Robotics (CAIRO) Lab with previous academic roles at MIT and Yale.

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1. "Cost of a Data Breach Report", Ponemon Institute, 2018
2. Ibid

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IATA & ACI NEXTT Vision: Industry-wide cost benefits

On 30 April 2019, *International Airport Review* hosted a webinar in association with ACI and IATA which detailed the results of a Preliminary Cost-Benefit Analysis conducted by Atkins for the joint NEXTT initiative. Here, the NEXTT team answer questions from the live webinar to help understand the scale, timeline and distribution of benefits and costs to the aviation industry and consumers.

THE NEXTT team commissioned a cost-benefit analysis to determine a likely scenario for how emerging technologies could be delivered across the globe with a coordinated approach. Keeping each of the NEXTT vision journeys in mind (passenger, baggage, cargo, and aircraft), the exercise focused on three distinct categories for investment which are data processing, automation and off-airport activities. The high-level findings showcased significant benefits for all stakeholders involved, with the key take-away being that improved data processing drove the most benefits for all stakeholders.

How will you measure if NEXTT has been successful?

We plan to measure the benefits of the NEXTT vision similarly to several initiatives that we've completed in the past: Looking at the level of penetration and the level of implementation. We will also start to assess value alongside the level of adoption.

To accurately measure costs and benefits, we need to look at the individual components of NEXTT; projects such as One ID and smart security. These are much more measurable as you can examine the number of players who adopted the programme and measure the tangible benefits in terms of costs, space saving, throughput, staff impacts and passenger experience at each airport.

Did the preliminary CBA assume that everyone has implemented everything?

Definitely not. The NEXTT initiative is focused on putting forth best practice, but we recognise that operational realities, regulatory environment, passenger needs and infrastructure constraints need to be considered in order to establish which solutions are the right solutions. One of the key drivers of NEXTT is to propose solutions that are compatible and interoperable.

We consider that something is fully implemented when it has become standard common practice, not that it happens absolutely everywhere.

What are some of the benefits of data processing for airports and governments?

Data underpins everything. A great example of this comes in the form of using data to manage resources. The more data we have on passengers arriving, the more predictive we can be in our processes. We can better deploy facilities and staff, meaning we better manage passenger flow. The more we know, the better we can use data and more efficient management can become. For governments, digitising identity and being able to know who is travelling in advance will improve security and border control efficiency.

How are you engaging with ICAO and other regulators?

Engagement with ICAO and governments is critical for the success of many of the components within NEXTT. We are fully engaged with ICAO and national regulators. For example, we participate in all ICAO panels – from safety and facilitation to security and economics – and we were fortunate to directly brief the ICAO Council on the NEXTT initiative in May 2019. It is critical for us to be able to demonstrate what the industry is doing and where regulatory support is needed.

Growth in the industry is going to affect everybody, bringing economic benefits, growth of tourism and growth of business. There is a really good case for change and a central, coordinated approach through NEXTT will allow us to realise the full benefits far better than isolated approaches.

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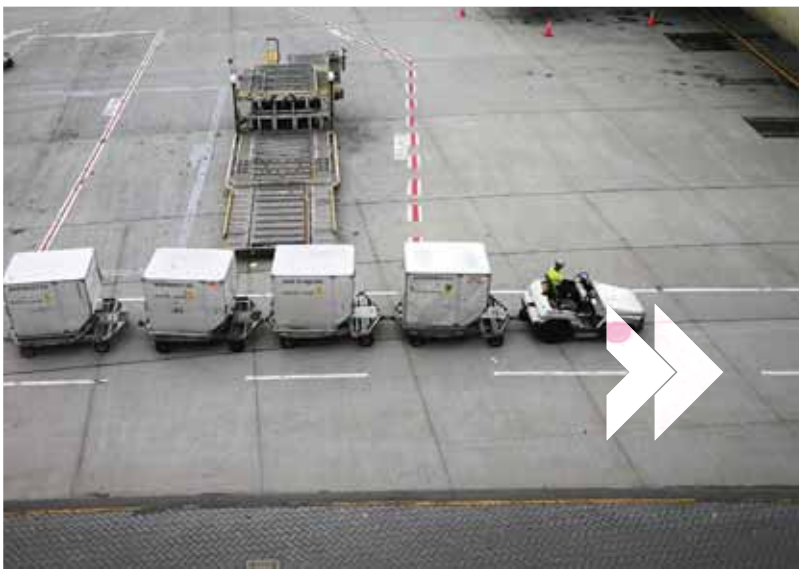
AIRSIDE OPERATIONS

From Scotland to Australia; safety to efficiency; preparing for automation and adapting infrastructure for the world's largest passenger airliner, this In-Depth Focus examines multiple aspects of airside operations



Efficient connections equals an effective national network

Working smarter is allowing airports to facilitate more passengers with the existing facilities. However, as *Caroline Wilkie*, Chief Executive Officer, Australian Airports Association, highlights, with demand for air travel intensifying, infrastructure solutions are necessary to ensure the industry has the capacity to meet passenger needs.

IN AUSTRALIA, the national network has largely facilitated growth in air travel by optimising existing infrastructure. Passenger numbers have more than doubled since 2002 as Australian airports have worked to streamline processes, enhance operational efficiency and deliver a better experience.

However, the next 10 years are expected to see an injection of new capacity in the Australian aviation network to support the continued industry growth. There are four airport runways under construction or planned across the country, in addition to the construction of the new Western Sydney Airport. These projects will bring new capacity to the market and improve the operations of the overall network.

Queensland projects nearing completion

In Queensland, the nation's biggest infrastructure project is well underway, with Brisbane Airport's new runway nearing completion for a mid-2020 opening. The $1.3 billion project includes a 3.3km runway in addition to 12km of taxiways. The project has represented an incredible technical feat, with the new runway's location presenting unique challenges. Site preparation and reclamation works began in 2012, with five years allocated due to the site's required ground improvements.

Construction is now underway and, when complete, the runway will deliver increased capacity to the local market; supporting the city's growth. In addition, it will further strengthen the east coast network with more efficient connections supporting an effective national network. Importantly for the Queensland gateway, the new runway will facilitate more direct international services.

Brisbane Airport expects the project will deliver an additional $5 billion of economic benefit to

the region, while effectively doubling the capacity of the airport. Due to be completed in 2020, it will be supported by the first 100 per cent LED 'Cat 1' lighting system in the Southern Hemisphere: A great example of Australian airports investing in innovation across all aspects of operations.

Further north, the Sunshine Coast Airport runway project is underway; an important development for the tourism hotspot. With the new runway due to be completed by the end of 2020, Sunshine Coast Airport's Chief Executive Officer, Andrew Brodie, believes the project will boost many local industries.

"By enabling this airport as a gateway to Australia and also the Pacific and South-East Asia, it's a fantastic opportunity to get the Sunshine Coast's famed produce front and centre from a freight perspective," Brodie said.

Runway plans provide promise for further growth

Melbourne and Perth airports also have runways planned, in projects which are intrinsically linked to the future economic health of their cities. In Melbourne, a third runway will be essential in supporting the exponential passenger growth over the next 20 years. The airport is expected to welcome more than 38 million passengers this year and has already reached capacity at peak periods. While the airport can facilitate 55 aircraft movements per hour in peak times with its two intersecting runways, a third runway will significantly increase that to more than 90 movements.

Melbourne Airport Chief Executive Officer, Lyell Strambi, has commented on the runway's importance in regard to Victoria's economic growth. He said the third runway is vital to maintaining the growing demand for air travel, while preserving a quality traveller experience. Consequently, the airport is advancing investment programmes aimed at improving operational efficiency and optimising existing infrastructure.

Meanwhile, a new runway in Perth will help keep pace with demand as the city cements its position as the nation's western gateway. The potential for a third runway was first raised in the 1970s, with early planning suggesting the current runway system could meet the needs of up to 145,000 passengers per year. This was surpassed in 2013, and annual passengers are expected to grow to 241,000 by 2045.

Perth Airport estimates a new parallel runway (to be delivered as part of a $2.5 billion, 10-year investment programme) would generate $2.39 billion in income in its first two years of operation. The risk of not keeping pace of demand is stark, with the airport estimating a failure to construct the runway would see $1.72 billion lost in tourism expenditure over 20 years.

As Perth Airport awaits approval for the runway project, it is increasing investment to boost capacity for the western gateway airport. Its new central aviation hub, featuring upgraded international and domestic terminals, is expected to be completed by 2025. The runway project is expected to be completed by 2023-2028.

Improving efficiency of the country's largest airport

While the new Western Sydney Airport, operational by 2026, will deliver new capacity, the city is already home to the country's busiest airport. Sydney Airport has facilitated strong international growth in recent years, driving efficiencies to facilitate more passengers across its operations. Its success in attracting new services from growth markets such as China shows the appeal of direct flights is set to stay.

Sydney Airport is subject to a movement cap and operates under a curfew. While the curfew remains appropriate given the proximity of the airport to the city centre, the restrictive nature of the movement cap – calculated every 15 minutes – has limited the flexibility of the airport's operations. As new runways in other states come online and provide scope for a greater number of services, it will be essential that Sydney Airport does not become a bottleneck in the national network. More flexibility in how the movement cap is calculated would achieve this, without increasing the overall number of aircraft movements facilitated by the airport.

Increased capacity goes hand in hand with innovation

While the additional capacity these projects will deliver is important, it is just one way in which Australian airports will support the growth of the nation's economy and community. Airports are continuing to work closely with airlines and government agencies to drive operational efficiency and a better airport experience. Together, these efforts are ensuring a strong aviation network for years to come.

CAROLINE WILKIE has been CEO of the Australian Airports Association (AAA) since 2011. The AAA represents all major regular passenger transport airports in Australia as well as council airports. The membership spans from councils with grass-strip runways to Australia's major gateways. The AAA also represents a further 140 corporate members and is engaged in research, developing industry publications, education, advocacy and major industry events. Wilkie has a master's in Public Affairs and more than 15 years' experience in Association Management.

BELOW: Brisbane Airport's new runway is the nation's biggest infrastructure project and will deliver an additional $5 billion of economic benefit to the region. Credit: Brisbane Airport Corporation

Ensuring **safety** within ground operations during the age of **automation**

Safety is supposed to be everyone's top priority in the world of airports, airlines and ground service providers. However, as *Wayne Anaka*, President of AVCON, highlights, in reality safety is having to compete with on-time performance and profitability.

AIRPORTS, airlines and ground service providers all have a safety management system (SMS) in place, as well as a health and safety programme, and most are very good. But then why is there no appreciable reduction in ground damage accidents involving aircraft over the last 10 years. The same trend is apparent in vehicle-to-vehicle accidents as well but here the data is not easily obtainable nor is it very comprehensive. We have seen improvement, but on a per 100 aircraft basis the accident figure has been consistent.

The annual estimated cost of such damage, as articulated by IATA, is pegged at $12 billion. Ground handlers peg the direct cost at closer to $4 billion. Either way that is an astronomical sum occurring year after year.

We know what to do but somehow the system is not working. It is not that the accountants ignore the cost. It is not because senior management does not put a focus on costs. It is not that front-line management and workers do not care. So, what is going wrong?

There are a number of contributing factors:

1. Staff shortages leading to overwork, fatigue and accidents
2. Training deficiencies because of the high turn over instructors cannot keep up
3. It is easy to get away with breaking the safety rules: Accidents are the result of cumulative flaunting of the rules that eventually lead to a serious mishap
4. Supervisors are under pressure from senior management and so ignore an unsafe act to achieve on-time performance
5. The necessary focus on the financial bottom leads airlines to cut costs wherever they can and their service providers in turn cut costs through low wages; excerpting pressure on workers.

However, the lack of investment in instilling a culture of safety discipline should itself be a cost driver. Investing in living wage, effective training and safety discipline throughout the company will not only reduce accident costs but lead to improved productivity and on-time performance.

The problem is we have been focusing on the wrong thing and need to examine the root cause of all chaos. This includes poor communication; lack of respect; lack of discipline; and no safety-rule enforcement where SMS procedures are woven throughout standard operating procedures and it takes more time and aggravation to ignore them than to follow them.

In other words, change the corporate and airport community culture where safety and productivity go hand-in-hand with optimum staffing levels, well-paid, well-trained, exceptionally hard-working employees at all levels.

This transformation is not going to be easy and it is going to be expensive. It is however an investment not a cost and the cost of the investment has a pool of $4 to $12 billion to work with. Failing to take this type of action will ensure the status quo and I do not believe this is sustainable long term.

What will the future look like if we take the right action today combined with the rapidly emerging AI and robotics technology?

Everything we should be doing today should focus on what it will bring tomorrow. How can we drive vastly improved environmental sustainability cost effectively? How do we eliminate staff shortages and create the high-tech savvy worker that will be needed to run our ramp of tomorrow?

Electric equipment will replace our current fuel-driven equipment, starting at large airports which will be fully transformed around the year 2035, and then the small- and medium-sized airports will follow by 2050. This means airport planning and infrastructure needs to anticipate the requirements and funding that must be secured.

It won't stop with electric; autonomous, self-driving equipment will become the norm within the same timeframes. Robots will transport bags and cargo to and from warehouses, homes, offices and hotels straight to the aircraft.

Humans will still be required for safety control, operations and maintenance planning, and financial engineering to optimise the AI needed to deliver the most effective schedule. To ensure the supply of skilled humans we will need to invest in retraining current workers to provide the direction and planning necessary to make the most effective use of AI resources.

Safety management will be as critical as ever in the future and we need to be prepared. Self-driving machines can be inherently productive but pose a number of risks if not programmed correctly. What are the new rules of apron and maneuvering areas going to look like? How can technology be programmed to always prioritise safety? The SMS at airports will need to go through many transitional phases. We will be continuously transitioning over the next 30 years as we introduce the cultural advances needed to drive revenue growth, improve safety and productivity, and marry these with the AI advances we see happening. Rest assured these disruptors will also create additional wonders and challenges we have not even contemplated yet.

During the transition when you have both autonomous- and human-driven vehicles operating in the same environment the focus on safety will become harder and far more complex. Human resources will become more challenging as we retrain and/or phase out many current employees. This process must be handled with dignity and care for all involved. Intercompany and agency cooperation will be needed as never before.

Our work is cut out for us but the brain power, enthusiasm and hard work that has always been the driving force behind this industry is fully capable of ensuring a bright, profitable and most importantly, safe, future.

> *"What will the future look like if we take the right action today combined with the rapidly emerging AI and robotics technology?"*

WAYNE ANAKA, CEO and President, AVCON, was the principal Founding Partner of NavStar Aviation Group, an aviation ground handling company based at three airports in Canada and three in Florida. Prior to founding NavStar, Anaka spent 39 years in various management positions focusing on ground handling, winter operations, environmental storm water management, aircraft deicing and airline operations and customer service. Anaka is a Certified Member of the International Association Airport Executives (IAAE) Canada, and a Past Member of the Georgian College Aviation Advisory Committee, serving two three-year terms.

Safety must be the top priority airside

Adapting airside operations for the **world's largest passenger airliner**

Following the successful arrival of the A380 at Glasgow Airport, *International Airport Review*, spoke to *Mark Johnston*, the airport's Managing Director, to discuss how airside operations and infrastructure had to be adapted to host the world's largest passenger airliner.

"We invested more than £8 million upgrading our infrastructure ahead of the A380's arrival, including the installation of Scotland's only triple airbridge"

IN APRIL 2014, Glasgow Airport was the first Scottish airport to welcome an Airbus A380, which stands over 24m high with a wingspan of nearly 80m. To host such an aircraft, however, required structural adaptations and a review of airside operations.

What significance does Glasgow have as a destination to warrant use of the A380 for the direct route to Dubai?

Glasgow Airport's daily Emirates service to Dubai is Scotland's busiest long-haul route, by some distance. When launched in 2004, it was Scotland's only direct service to the Middle East and in the ensuing 15 years we've celebrated many milestone moments, from the introduction of the double-daily service in 2012 to the opening of the Emirates' Lounge in 2014.

Since 2004, the route has carried more than 4.5 million passengers between Scotland and Dubai. Dubai is not only a very popular visitor destination, but provides vital business connectivity to key markets in India, China, Hong Kong, Singapore and Australia.

In terms of high-quality customer experience, the A380's arrival was the final piece of the jigsaw.

How did the airport's infrastructure have to change to be able to accommodate the A380?

We invested more than £8 million upgrading our infrastructure ahead of the A380's arrival, including the installation of Scotland's only triple airbridge.

The installation of the airbridge was critical to the success of the project. Given the A380 can carry over 600 people, we had to ensure we continued to meet the turnaround performance requirements while factoring in the challenges associated with boarding and disembarking an even greater number of passengers. Modifications were also made to the adjacent aircraft stands either side of the one serving the A380 to support the aircraft's huge wingspan.

Given the sheer size and scale that comes with operating the world's largest commercial passenger aircraft, we had to make significant changes to the airfield including widening our runway entry and exit points.

Modifications were also made to the runway hold points for low-visibility operations and a traffic light signal system was installed across the airfield road network to ensure the safe passage of the A380 between stand and runway.

Although we welcomed the A380 in 2014 to mark Emirates' 10-year anniversary, the airport wasn't Code F-certified at that time. Operations were essentially suspended due to the restrictions that were put in place to allow the aircraft to land and depart that day. Now, the A380 has been integrated into our live operations daily, which was a big step change, however the aircraft is settling in well.

What were the challenges in terms of adapting the airside equipment?

There were a number of challenges. The A380 project started five years ago, not long after the 2014 anniversary visit. We wanted to ensure the infrastructure – in particular the gate where the aircraft would operate – could support multiple carriers and aircraft types. To do this, we had to re-examine and adapt our terminal and airside infrastructure with support from our airline partners to develop a gate environment that could handle the arrivals and departure requirements of one aircraft with over 600 passengers, or three aircraft with an even greater number of people combined going through the same gate space. This improved our operating capability as previously we could only handle two aircrafts through this one gate area simultaneously.

The most significant challenge was ensuring construction was complete for the date of the first flight. Given this was the first time the A380 had been brought into regular operation on a Scottish route, we knew passengers would book on to the ›

MARK JOHNSTON, Managing Director, Glasgow Airport, joined Glasgow Airport as Continuous Improvement Project Manager in 2000. He then went on to hold a number of different roles within the airport, including Head of Terminal and Security, Head of Infrastructure and Technical services and latterly Operations Director, before being appointed Managing Director in May 2018. Johnston has a BA Honours in Electrical and Electronic Engineering from Heriot-Watt University and also an MBA from Glasgow University.

ABOVE: Glasgow Airport endeavours to keep airside operations as sustainable as possible with a fleet of plug-in hybrid vehicles

inaugural service to be part of Scottish aviation history. It was also critical to ensure the stand and gate area were back in service for our busy summer schedule. From the date Emirates confirmed the introduction of the A380, we had a short window to appoint the construction partners and build the facilities. This fixed end date of the first flight was tough to meet from the start, however, the Capital Projects team worked night and day with the builders to ensure we met it.

The airside construction work was phased to ensure there was no impact to operations, with much of it carried out during a scheduled night closure window during winter and thankfully the weather was kind to us. This allowed the electrical lighting changes and new extended runway links to be installed without delay.

During this project we took the opportunity to replace and refresh all of the stand equipment including lighting, fixed electrical ground power and passenger boarding bridges. These were sourced from multiple organisations and all required detailed installation, commissioning and training.

Glasgow has a fantastic 'one-campus' culture and our partners across the airport were very supportive of the project and their help instrumental when it came to tackling the challenges encountered.

Why is the A380 service limited to a short amount of time? How did you justify this in terms of cost?

As well as to accommodate the A380 aircraft, the £8 million investment was part of a wider improvement programme in the West Pier gate area.

Many of our international flights board and disembark in this area and the A380 project presented us with the perfect opportunity to expand and future-proof the infrastructure to allow us to better utilise our resources and improve operational performance.

The stand used by the A380 is a Multi-Apron Ramp System (MARS) stand, so it supports a wide variety of aircraft types including other long-haul aircraft – both Virgin's 747 and Air Transat's A330 aircraft have used it – and can offer separate business and economy boarding and disembarking.

It was also designed to allow us to board two Code C aircraft at the same time (something we do frequently) and this in turn helps to reduce ground time, improve on-time performance and increase passenger experience.

Does the use of the A380 contradict Glasgow Airport's sustainability strategy?

Not at all. In fact, the A380 is a great example of a cleaner, greener, modern aircraft. We have a robust sustainability strategy in place which covers a wide range of areas such as noise, waste, carbon, water and pollution prevention and we are committed to achieving our sustainability targets.

We appreciate the importance of being both a good neighbour locally and playing our part on a global scale. Glasgow Airport is a founding member of Sustainable Aviation and we firmly believe that growth in the industry can, and must, go hand-in-hand with action on the environment.

The positive improvements range in size and scope, but it's absolutely vital that everyone – whether on a professional or personal level – continues to take action. Our airlines continue to invest heavily in modern aircraft such as the cleaner A320 Neo, which we are seeing more frequently in operation at Glasgow.

From our own perspective, we've made significant progress such as the recent investment in a nine-strong fleet of plug-in hybrid vehicles for our airfield operations and the pending introduction of Scotland's first ever fully-electric buses later this year.

Glasgow Airport's electricity grid supply is also now 100 per cent sourced from renewable energy and we continue to work with our retailers and tenants to improve our waste performance. In fact, in the last year we've increased recycling across the entire campus by a further 10 per cent.

We achieved this through a number of local campaigns such as providing more than 5,000 reusable water bottles to staff.

Industry debates 'what's next for aviation?' at annual ACI conference

AIRPORTS COUNCIL INTERNATIONAL

The 29th ACI Asia-Pacific/World Annual General Assembly, Conference and Exhibition held in Hong Kong from 2-4 April brought together over 900 delegates and 60 exhibitors from across the world under the theme: "What's next for aviation? The future starts now."

2-4 APRIL, 2019

HONG KONG

THE CONFERENCE is a product of the aviation industry's commitment to forging partnerships across the world and working together towards a sustainable future. It was an opportunity to think critically and creatively about key topics including accommodating growth, major developments in aircraft operations, resilience and adaptation to climate change, the customer experience revolution, new experiences in travel technologies, and innovations in security.

The first day of the conference brought together aviation leaders to discuss and explore the global challenges of meeting the demand for air services. According to ACI forecasts, global passenger traffic is expected to exceed 20 billion by 2039 with a long-term growth rate of 4.1 per cent per year. Considering this robust traffic growth, it has become clear that many airports are exceeding, or are at great risk of exceeding, capacity and are currently facing a capacity crunch.

As the industry grapples with this challenge, it was evident that airports recognise that focusing on customer experience is crucial to success. This was complemented by the launch of two unique ACI programmes designed to help airports improve customer service.

One of the keys to increasing capacity while improving the passenger journey involves the industry "thinking outside of the box" when it comes to innovations.

Indeed, the discussion on major developments that are underway in the fields of commercial space transport, urban air mobility and drones certainly illustrates outside-the-box thinking becoming a reality.

A clear message emerged from the conference; passengers want a good deal, but they also want personalisation. With personalisation and a good experience comes brand loyalty. Moreover, there is a need to balance personalisation with intrusiveness; defining what's helpful versus what is too much, considering demographics and privacy restrictions.

"The future does not exist, but rather, it will be a product of the decisions that aviation stakeholders make today"

ACI and IATA's NEXTT vision encapsulates this perfectly, and provides a plan for the future of air travel. The panel addressed growing capacity issues and the need to maximise the use of infrastructure while ensuring the industry becomes more efficient in processes.

A key part of the conference was the ACI World Annual Assembly which elected ACI World's new Chair, Martin Eurnekian, President of Aeropuertos Argentina 2000 and CEO of Corporación América Airports, and new Vice-Chair, Aimen bin Ahmed Al Hosni, CEO of Oman Airports Management Company.

Every year, the Assembly is presented with resolutions on key subjects for airport operators that reflect the concerns and interests of members. This year, the Assembly unanimously expressed its position on airport facilities for passengers with disabilities; unwanted drone incursions; enhanced industry engagement with ICAO; the need to re-set ambitions on reducing carbon emissions; and the role of airports in emergency humanitarian response and disaster recovery.

It was announced that Aeropuertos Argentina 2000 would be the host of next year's conference in November 2020 in Buenos Aires, which is expected to attract global airport and industry leaders.

It was perhaps the words of futurist Dr. Amy Zalman, CEO, Prescient that encapsulated the challenges facing the industry. Dr. Zalman suggested in her keynote address that the future does not exist, but rather, it will be a product of the decisions that aviation stakeholders make today. ■

aci-waga2019.com

Solving kerbside **traffic congestion**

To manage increased levels of kerbside traffic, achieve a higher level of customer service and prepare for the potential future of autonomy, Tampa International Airport is deploying a unique express kerbside solution. *Al Illustrato*, Executive Vice President of Facilities at Tampa International Airport, and *Thomas Rossbach*, member of both AIA and ACI, explain more.

THOMAS ROSSBACH, AIA, ACI, is a National Aviation Practice Consultant for HNTB Corp. Rossbach has worked with major aviation clients in cities including San Diego, Chicago and Atlanta, who have benefited from his experience in airport planning, terminal planning and design.

LIKE MOST major airports, Tampa International Airport (TPA) faces growing passenger traffic and congestion issues. With 58 gates, three runways and 23,000 parking spaces, the 3,300-acre facility boasts about 500 daily operations, making it one of the top 30 busiest airports in the U.S. in 2018, according to ACI.

In 2018, capacity hit an all-time high, with 21 million passengers passing through TPA, and 2019 is expected to see nearly 21.7 million passengers. Passenger numbers will see a steady increase of 2.8 per cent annually, to 28.7 million by the year 2031.

As passenger numbers grow, one of the most affected areas has been vehicle traffic, including kerbside drop-off areas, where an influx of transit network company (TNC) vehicles have added to congestion. Year-on-year, this traffic has seen an eight to 10 per cent increase.

To find a solution to airport congestion issues, officials at TPA in late 2011 began updating the airport's master plan. The final three-phase plan allows the airport to accommodate up to 34 million passengers each year.

The first phase, completed in 2018, helped decongest kerbsides, roads and the main terminal, and included a 2.6 million-square-foot rental car centre, a 1.4-mile automated people mover and an expansion of the main terminal.

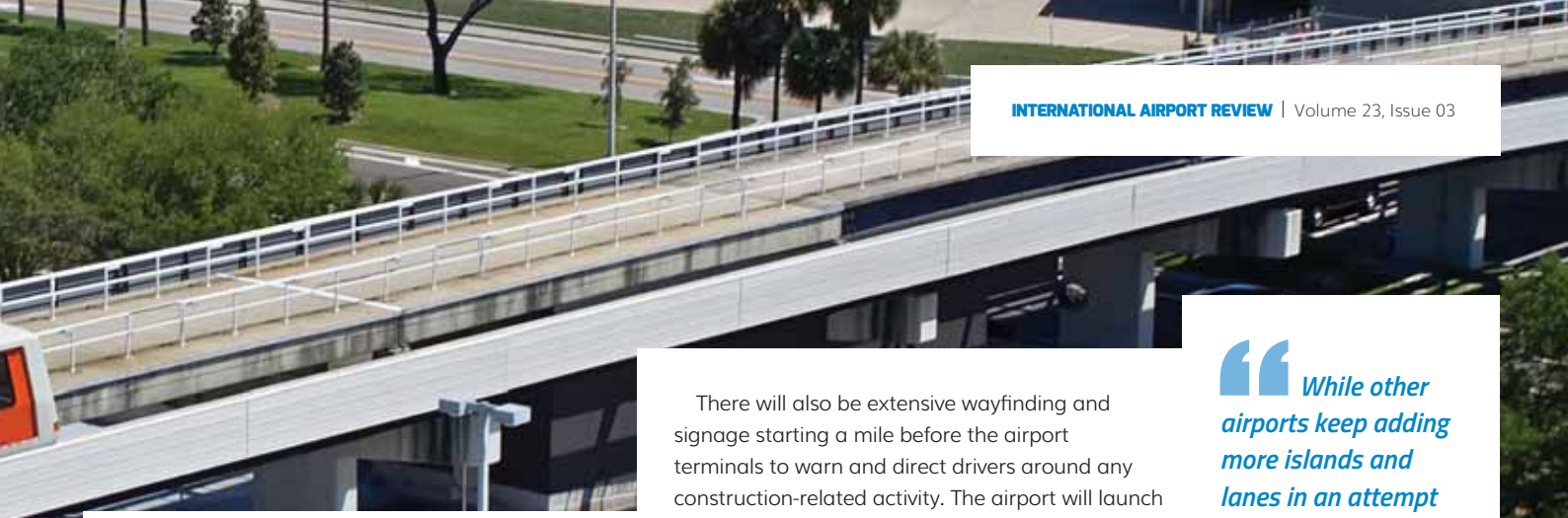
Phase 2 includes a kerbside expansion and 17-acre commercial development around the rental car centre. The commercial development area will feature an office building, convenience store with a petrol station, a hotel, a commercial kerb to accommodate transit and other ground transportation, and connections to regional transit networks. The expansion will include new express lanes for passengers without checked luggage.

Phase 3 includes the construction of a new Airside D with 16 gates capable of handling both domestic and international flights.

Express kerbside solution

Phase 2 is where TPA, in collaboration with HNTB, is developing a unique express kerbside design solution to manage the increased traffic. A survey indicated that more than 53 per cent of passengers at TPA do not check their bags. The airport's existing kerbsides are reaching maximum capacity and more kerbside length and lanes are necessary to handle current and future peak-hour demand.

This plan creates an innovative express kerbside roadway that allows departing passengers with



carry-on only baggage to choose an express kerbside; providing access directly to security screening and gates. This would be the first of its kind at any airport.

Reversing the arrival process, this innovation allows arriving passengers who did not check bags to by-pass the baggage claim lobby congestion and go directly to the express kerb for an expedited pick-up. This creative concept provides additional landside-kerb-and-road capacity for the airport while offering travellers an expedited process that will result in achieving a higher level of customer service to the airport's passengers.

The plan would add 16 additional express lanes with direct connection to and from the terminal to decongest kerbs and meet levels of service requirements for the 20-year period and beyond.

While other airports keep adding more islands and lanes in an attempt to address increasing kerbside congestion, data has shown this method slows down both vehicle traffic and cross passenger access.

"Safety is a top priority and risk of pedestrian injury is a concern," said Jeff Siddle, TPA's Vice President of Planning and Development. "Traffic modelling at airport kerbs proves that throughput of the kerb lanes and kerb congestion decreases significantly with the cross traffic of pedestrians.

"Tampa International chose to create higher throughput kerbside roads, no pedestrian conflicts and an enhanced level of passenger service."

The HNTB-led express kerb concept was established in the airport master planning process, and by conducting a subsequent, detailed planning study of the terminal area.

During the master plan and the detailed terminal plan, vehicle counts were taken at peak hours and forecasted based on future passenger projections. Working with other airport consultants, TPA modelled the roadway and kerbside traffic with VISSIM traffic modelling software. Both exercises and additional re-calibration of the models took months to study.

Overcoming challenges

Working around a busy, fully operational airport can be a challenge. To minimise disruption to passengers and terminal activity, TPA is planning to build the express kerbsides outside current operations, while maintaining 100 per cent access throughout construction. A series of temporary barriers will be built to separate all construction from landside operations.

There will also be extensive wayfinding and signage starting a mile before the airport terminals to warn and direct drivers around any construction-related activity. The airport will launch a public outreach campaign prior to the start of construction to explain and advise passengers of the construction conditions at each phase of the work.

TPA employed innovative phasing plans to keep access open to the existing roadways, kerbs and the terminal all through construction. The airport will also be merging new roadways, and building elevated bridges over active roadways. This will involve night-time work and require shifting lanes of traffic to allow room to add the new roadway segments.

Innovation on display

Innovation is nothing new at TPA. The airport welcomed the world's first people mover in 1971 and now it will usher in the aviation industry's first express kerb.

"Tampa prides itself on being an airport innovator," said Siddle. "We've done it in the past with the people mover, and looking forward, we will continue to seek new, innovative ways to improve airport efficiency and the overall passenger experience."

The expanded kerbsides also position the airport well for autonomous and connected vehicles.

"We studied forecasts by various industry sources and HNTB's autonomous vehicle experts to predict the saturation of autonomous vehicles in the future market," explained Siddle. "These forecasts are hard to predict as our society and technologies are rapidly changing in this field of innovation. But the ultimate implementation of autonomous vehicles is realistically projected to take longer than some overly optimistic predictions. Whatever the future holds, we'll be ready."

In order to add additional express lanes, phase 2 express kerbside projects will demolish two existing pedestrian bridges that link the long-term parking garage to the main terminal. The first pedestrian bridge will be demolished to allow the first half of the new blue side vertical circulation building (VCB) and roadway to be built.

TPA will then route passengers through a new VCB centre pedestrian bridge through a partially completed VCB building to allow the remaining existing pedestrian bridge to be demolished. This enables the last section of the VCB to be completed. This is necessary to maintain both pedestrian and vehicle flows and customer service throughout the construction process.

Phase 2 projects will start in July 2019, with final completion anticipated for July 2021.

> *"While other airports keep adding more islands and lanes in an attempt to address increasing kerbside congestion, data has shown this method slows down both vehicle traffic and cross passenger access"*

AL ILLUSTRATO, Executive Vice President of Facilities at Tampa International Airport manages one of the airport's largest teams, including Maintenance, and Planning and Development, and is one of the longest-serving members of the Hillsborough County Aviation Authority staff. Over the years he has played a significant role on major projects including Airside C, the in-line explosive detection baggage system and Economy parking garages. Illustrato was also responsible for TPA's successful billion-dollar Master Plan Phase 1 programme. Prior to joining the Aviation Authority, he worked for the Amercian Bureau of Shipping and the Long Island Rail Road.

IATA prioritises RFID for baggage tracking across the industry

Despite upward trends in the performance of baggage operations in recent years, mishandled baggage costs the aviation industry billions of dollars annually. Additionally, passengers are increasingly expecting to have access to baggage tracking information during their journey. This has created a demand for a given technology that provides airlines, airports and ground handlers with information that improves decisions, efficiency and service quality.

How will radio frequency identification (RFID) help airlines and airports make baggage handling processes more efficient?

There are growing efforts to improve baggage handling operations across the industry, driven mainly by the introduction of IATA's Resolution 753 that came into effect in June 2018. Airports and airlines have started to implement systems to enable bag tracking throughout the handling process. IATA Resolution 753 has also enabled a positive step towards providing greater visibility of baggage throughout processing. While 80 per cent of airlines have an implementation plan for the resolution, much remains to be done for full implementation to be achieved.

Momentum is building towards RFID based on the following:

- The perception of baggage operations by end users has been changing: 84 per cent of passengers now expect to know where their bags are at all times, according to the 2018 IATA Global Passenger Survey
- RFID is an efficient and proven technology that facilitates 753 implementation and helps the industry improve end-to-end baggage tracking
- RFID brings benefits to all industry stakeholders such as airlines, airports, ground handlers and passengers. RFID combines reliability, maturity, worldwide usage, reduced deployment cost compared with barcode technology, scalability and gives a rich and accurate amount of data to exchange.

Why is it important for the aviation industry to improve baggage handling operations?

In 2018, 24.8 million bags were mishandled, a rate of 5.69 bags per 1,000 passengers, that costed the airline industry $2.4 billion according to the 2019 SITA baggage IT insights. Improving baggage handling operations is paramount to ensuring that the industry is ready to cope with the doubling in passenger demand over the next two decades as this will add more strain to the existing baggage handling systems. The RFID technology enables many bags to be identified and tracked without the need for human intervention. There are concerns that without such technology, millions of bags a year will continue to be mishandled, particularly during the transfer process when passengers connect through an airport from one flight to another. Some 46 per cent of misplaced bags were mishandled during connections in 2018 according to the SITA report. This is where RFID can help to significantly improve baggage operations by efficiently tracking and locating each bag.

What else can we expect to learn during the webinar?

IATA will provide an overview of the activities it will undertake over the next four years to push RFID adoption as per a comprehensive RFID roadmap. The activities are driven by four main pillars that include general awareness and education on RFID tailored to baggage operations; engaging and aligning all key stakeholders involved; developing tools and materials to support the global roll out; and monitoring deployment over the long term.

The webinar will also highlight the RFID specifications for interline baggage as per IATA Recommended Practice 1740c that offers operational flexibility, ease of deployment and interoperability with other existing technologies.

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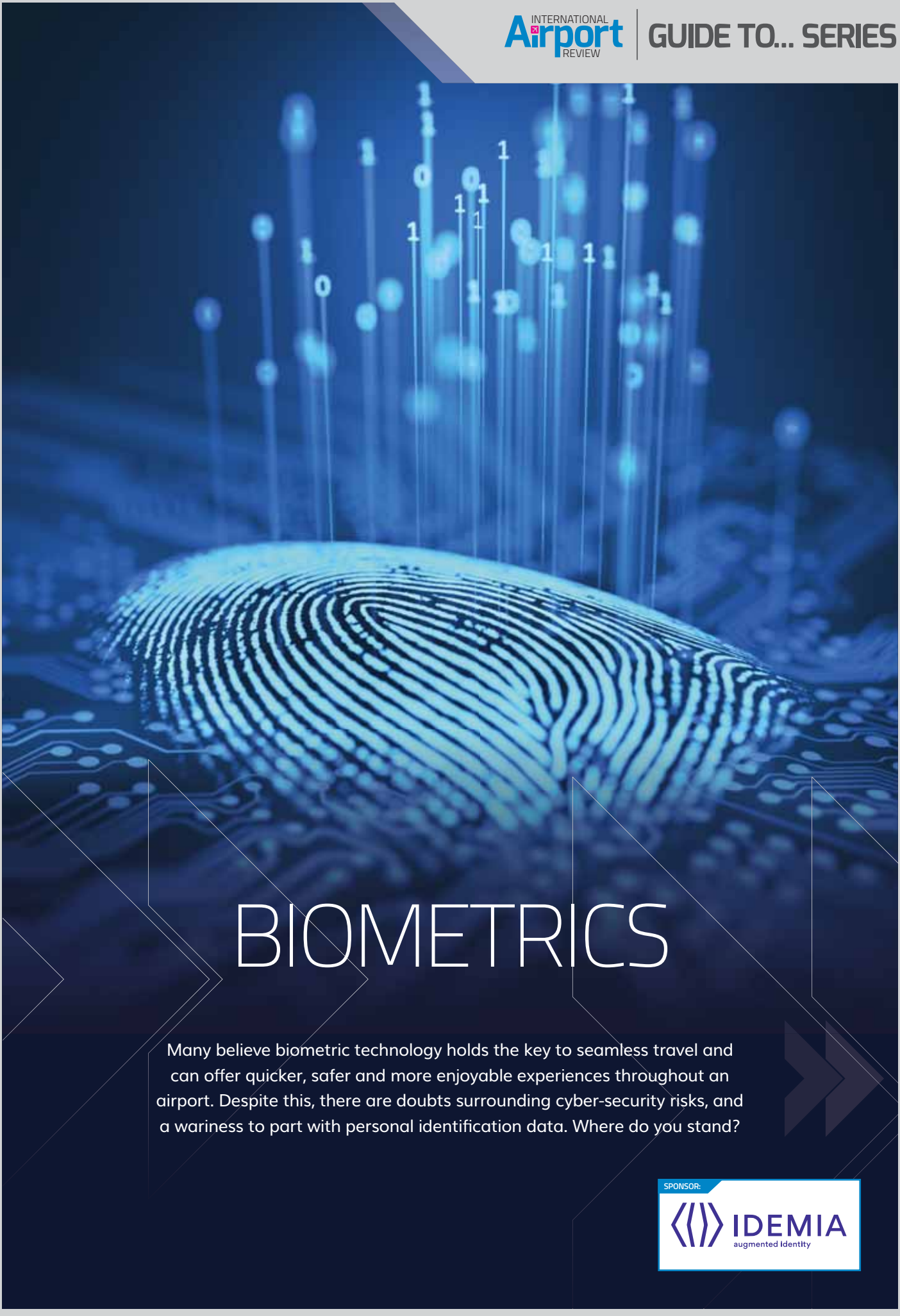

BIOMETRICS

Many believe biometric technology holds the key to seamless travel and can offer quicker, safer and more enjoyable experiences throughout an airport. Despite this, there are doubts surrounding cyber-security risks, and a wariness to part with personal identification data. Where do you stand?

Changing the face of travel

Colleen Manaher, Executive Director – Planning, Programme Analysis and Evaluation at U.S. Customs and Border Protection, discusses how biometrics hold the key to the future regarding the air travel industry's development, and what this means for the millions of passengers that travel each year.

THE WAY WE travel is transforming. With 'wanderlust' travel being the new norm of the 21st century, facial comparison is the technology breakthrough that we need. Whether flying occasionally for leisure or travelling frequently for business, we all experience stress-inducing elements of the journey – particularly the checking and re-checking of passports and boarding passes. To keep up with the increasing demand for travel and evolving threat levels, innovation and reinvention is the constant to ensure passengers have a safe and efficient travel experience. U.S. Customs and Border Protection (CBP) believes this can be achieved through facial comparison.

Security and facilitation are not seen as a choice – both can be enhanced. Facial comparison allows security and identity mandates to be met in a way that is easy and simple for the traveller. With CBP working together with airports and airlines, existing inefficiencies in the air travel process can be addressed, making the "kerb-to-gate" journey as seamless and consistent as possible.

The current environment

World air traffic is growing at 4.9 per cent annually. The latest IATA forecast expects 7.8 billion passengers to travel in 2036, nearly doubling the four billion air travellers in 2017. Current processes will not be able to sustain this. Merely expanding facilities, or building new ones, is not viewed as a viable solution. The last major U.S. airport was built in Denver in 1996; 23 years ago.

Time-conscious passengers are expecting an ever-more seamless, frictionless and secure experience when travelling internationally. With the predicted growth of international journeys, biometrics, cloud and mobile technology offer tremendous potential to alleviate passenger congestion and strengthen security screening.

Security

As travel volumes are increasing, CBP still needs to ensure that all immigration, customs and agriculture laws are observed. Every day, CBP processes more than one million travellers as they enter and exit the United States at air, land and sea ports. The ability to accurately match a traveller to his or her passport, visa or previous entries is critical to prevent terrorism, enhance national security and enforce immigration laws.

CBP's solution as a government entity

CBP has a clear mission requirement to confirm the identity and citizenship of all arriving and departing travellers. Today, CBP manually compares identity documents to the traveller by physically handling the document. Face comparison automates that manual process in a secure, efficient way with over 98 per cent accuracy. This technology is intuitive and expedient, streamlining the traveller inspection process, enabling CBP officers to focus on passenger intent and less on administrative functions. With the adoption of biometrics and facial comparison software, CBP provides the travel industry a secure platform for biometrically comparing travellers to documents.

The process

CBP designed a biometric matching service that creates an ecosystem for airport and

airline partners to select and invest in the biometric collection technology that fits their needs and operations. The service leverages existing passenger information to create a pre-positioned gallery of travellers exiting from and arriving into the U.S. The photographs are from U.S. passports, visitor visas or previous interactions with CBP. CBP's Traveller Verification Service (TVS) is the cloud-based matching service that automates the comparison of a person's photo to their document. TVS was built to use face biometrics to enhance security and increase traveller facilitation in partnership with airlines and airports. The system was built using privacy by design and is continuously monitored to improve system performance.

CBP's facial comparison process is simple and seamless for travellers. By integrating facial comparison software into the existing arrival and departure procedures, travellers experience minimal changes while airlines and airports are benefiting from greater efficiency in overall passenger processing. TVS is designed to facilitate ease of integration for CBP's airline travel partners, eliminating the need for individual airlines or airports to establish their own biometric processing systems.

Privacy

CBP is committed to exceeding compliance with privacy laws and regulations, alongside protecting travellers' information and confidentiality. CBP IT systems use two-factor authentication and strong encryption to transfer the data between the camera, the TVS and DHS systems. CBP creates biometric templates of historical photos and new photos for matching and storage; discarding the photos of U.S. citizens no more than 12 hours after their identities have been verified. CBP's approved partners are not permitted to retain any photos taken through this process for their own business purposes.

It is not required for U.S. citizens to have their pictures taken when entering or exiting the country. Those travellers who request not to participate in the facial comparison process may notify a CBP Officer or an airline or airport representative in order to seek alternative means of verifying their identities and documents.

Why it works

Uses existing traveller biometrics

A facial biometrics entry-exit system minimises the burden on existing processes and systems. Unlike fingerprint or other biometric data, all travellers provide to the U.S. government, as a condition for international travel, a photo of their face. There is no traveller enrollment required.

Matches one-to-few in the cloud

CBP builds a gallery of expected travellers at a particular airport using existing traveller biometrics from data from the specific flight manifest.

Enables token-less processing

Travellers step up to a camera at the airline gate with no need to show their passport or boarding pass. The facial recognition verification process takes less than two seconds with a 99 per cent matching rate.

Integrates into airport infrastructure

A facial biometric capture device (camera) can be installed at an airline departure gate without any necessary changes to existing airport infrastructure. The biometric matching service is inter-changeable with any camera so airline and airport partners have flexibility when selecting and purchasing cameras to capture traveller photos to ensure the matching service aligns with their business model and customer service experience.

Colleen M. Manaher is Executive Director – Planning, Programme Analysis and Evaluation at U.S. Customs and Border Protection, and one of her main priorities is to advance a biometric exit and entry system across the nation. Before assuming her position as Executive Director, Manaher served as the Director of the Land Border Integration Programme Management Office, and has also worked at the Department of Homeland Security (DHS), the Department of Justice (DOJ), and CBP with distinction. She has held a number of key positions since beginning her career with the former Immigration and Naturalization Service (INS).

The path forward

In order to support continued growth at U.S. and international airports, increasing infrastructure cannot be the only answer. Instead, there must be safer and more expedient processes. Face comparison automates the process of identifying a traveller with over 98 per cent accuracy, saving time while increasing security. As we continue to improve the traveller experience, CBP looks forward to partnering with airlines and airports to share the benefits of an ecosystem to invest in facial comparison technology. A biometric system will create new ways for future innovation including smart queuing to help passengers get to the right place, integrating facial comparison into new devices and expanding the service throughout the air travel continuum. ■

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Biometrics: The safest and fastest means of identification

Increasing safety, reducing queues and enhancing customer satisfaction: Biometric technology seemingly has it all. Here, *Emmanuel Wang*, VP Border Control Market and Product Offer at IDEMIA, details how it believes the technology will further develop, and the security risks that must be considered.

What are the main advantages of using biometrics for passenger processing?

Biometrics are the only way of guaranteeing that a traveller is the person they claim to be without interrupting the continuous flow of passengers in and out of airports.

According to ICAO, in 2018 alone, 4.3 billion travellers were transported. This number has been steadily increasing for years and is set to double by 2030. This means that instead of trying to expand infrastructure and resources, we need to change the way we process passengers. Biometrics and passenger identity management address this need. The advantages are manifold:

For passengers, biometrics:

- Support a faster passenger-processing experience, which makes the airport journey more pleasant and stress-free
- Reduce bottlenecks and minimise queuing, leaving more time to enjoy a cup of coffee, duty-free or the airline lounge.

For airlines/airlines alliances/ airports, biometrics:

- Offer a quick and secure identification of passengers
- Improve the use of existing infrastructure to improve on-time performance (OTP)
- Improve customer satisfaction and quality rank (ASQ ranking or Skytrax).

Above all, it is the safest and fastest means of identification. Whether it be fingerprints, iris or biometric facial recognition, only you can be you!

How do you believe biometric technology will develop in the future?

Overall, biometric technology is reliable, but there is still a development focus on facial recognition. Accuracy levels regarding fingerprints and iris are very high for large populations, however, facial recognition performance has not yet been optimised. Having said that, IDEMIA's False Acceptance Rate (FAR) is currently one of the lowest.

Airports also need biometric systems which are fully gender, age, diversity and spoof proof, especially as we can now start the check-in process from home.

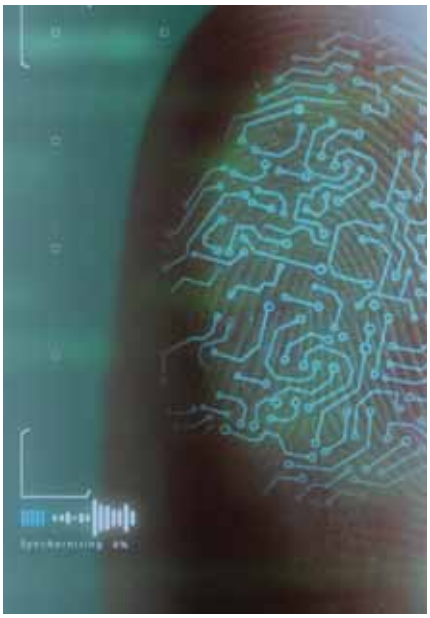
We even have a full range of walkthrough capture devices that deliver the best non-invasive experience for both travellers and our customers.

Are there security risks that have to be considered when implementing biometric technology?

Biometrics is the basis of our identity. It is physically who we are. Therefore, the data and the surrounding process have to be treated with the utmost care and attention.

At IDEMIA, our solution for biometric passenger processing is fully GDPR compliant. The core privacy-by-design principles are based on encryption. We regularly help our customers with privacy impact assessments, which is key for any project to address the risks and the legal framework for processing personal data.

Airports and airlines have gone beyond the traditional approach, by developing



a Passenger ID platform to manage single-token processes through touchpoints. This is a solution where your face is your boarding pass, ensuring the passenger remains in control of their own data at all times.

As long as the framework and the rules, which are set up to protect citizens, are followed, the use of biometrics can only provide a better and smoother airport experience. ■

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Using biometrics in multiple stages of the passenger's journey

For our Guide to Biometrics, *International Airport Review* spoke to *Simon Wilcox*, Programme Manager for Automation at Heathrow Airport, to find out how biometrics are capable of providing a more efficient and secure journey.

What challenges does Heathrow face in terms of passenger processing?

One of the main challenges when it comes to passenger processing can be the bottlenecks that form in different stages of the passenger journey, i.e. at check in, bag drop and when boarding a flight. Our self-service bag drops have helped to alleviate the queues at these points, giving more confident passengers the choice to check their bags in themselves, and freeing up colleagues so that they're better able to provide assistance to the passengers who need it the most.

How will the rollout of biometric technology help?

An end-to-end biometric rollout is the natural next step of this process. Now that passengers have the choice to be able to check themselves in, drop their bags and board at the gate, we're exploring ways that these processes can be streamlined. Facial biometrics are key to doing that.

At Heathrow, we've been using infrared facial biometrics for approximately 10 years for passengers departing on domestic flights. We have installed eGates at the border which use biometrics and the technology performs very well with a number of stakeholders: The government is in the process of making eGates accessible for more countries.

Facial recognition is preferred because of the relative ease with which it fits into existing systems, behaviours and processes while removing the potential for human error. Biometrics allow us to provide a more efficient and secure journey and Heathrow is working collaboratively with airlines and other stakeholders as part of our MoU with IATA; playing a significant role in the development of facial biometrics internationally.

Can you talk us through the trial thus far?

Heathrow has long been working towards a goal of having a seamless passenger identification system, from check-in, through security, boarding and back to immigration on return, and our plan to have biometrics used in more stages of the departing passenger's journey from this summer is significant

Facial recognition fits into existing systems, behaviours and processes while removing the potential for human error

progress towards that. Our airport is incredibly busy handling over 80 million passengers annually and this number is set to grow significantly with expansion in the coming years. We need to make sure that we're future proofing our airport and providing a frictionless passenger experience.

Heathrow Airport is made up of many moving parts and introducing any new technology to this can be challenging. We need to consider passenger experience, regulation and business value before making large changes to our operation. With that said, we believe facial biometrics can achieve benefits for Heathrow, airlines and most importantly the passengers, by enabling our people to process large numbers of passengers quickly and securely.

The end-to-end trial taking place this summer will mean that passengers can biometrically enrol whilst completing self-service bag drop and then use their face to enter security and board the flight. This will significantly reduce the number of times that passengers need to show their passports and boarding passes throughout their journey, allowing them to travel through the airport more quickly. ■

Simon Wilcox leads Heathrow Airport's Automation of the Passenger Journey programme which is focused on the development of an end-to-end passenger journey which is personal, simple and reliable. He is an experienced airport operator with over 15 years in the aviation industry and has an MSc in Air Transport Management. Wilcox started his career at a flight training centre whilst studying for his commercial pilots licence. He later moved to work for BAA at both Southampton and Heathrow and took on senior roles in airside ops, terminal management, security, operational readiness and ultimately running the day-to-day operation at Heathrow. Having worked in the Middle East with Qatar Airways in 2010 and 2011, Wilcox returned to Heathrow and has spent the last five years involved in the running of Heathrow's £3 billion Capital Portfolio.

Just because we can, should we?

With a mission to promote the responsible and ethical use of biometrics, *Isabelle Moeller*, Chief Executive of the Biometrics Institute, questions whether the industry is waiting for one main player to discover how to manage biometrics at the border, and offers advice on how to get there quicker.

BIOMETRICS have changed the face of air travel. With passenger traffic expected to double in the next 20 years and existing infrastructure and resources being tested to their limits, the industry has high hopes for what biometrics can do for them. However, with the exponential growth of new biometric technology coupled with global terrorism challenges and privacy rising up the public agenda, it's never been more important for the industry to come together in order to move forward responsibly.

Biometric technology has the potential to play a big role in easing the pressures all stakeholders in the aviation industry face. Biometrics give airports the chance to accurately verify and move passengers more quickly through limited spaces. The potential of biometrics to calm pressure points of security and border control; maximising time spent in restaurants and shops, is very attractive.

Technology offers the opportunities to transition to an account-based model – rather than a transactional one. Greeting customers by name and automatically implementing preferences will generate satisfaction and loyalty. Authorities can feel secure knowing they are keeping everyone safe, with robust systems and positive IDs on who is entering and exiting. The passenger will find the end-to-end journey smoother and will be more likely to want to do it again.

The wild west

Airlines tell us they need standardisation on how to connect all the components they need to make the seamless traveller vision work – standards and hardware for e-gates, kiosks and cameras (provided by one of five or six providers) – with their departure control and partner IT systems. One of our members described the current picture as the "wild west" when it comes to bringing together and understanding all the different considerations for a biometric process in the absence of common standards, changing community perceptions and adequate guidance.

U.S. Customs and Border Protection services now make the ID process slightly easier for airlines. Operating in the U.S.,

airlines and airports can send captured biometrics directly to the government for a thorough biometric identity verification against trusted information sources. The U.S. model takes the responsibility, and risk, of validating the passenger trying to board a flight to the required degree.

Airports who manage their own methods of identity verification take on the risk and consequences of getting it right. Border officers need to balance their responsibilities under the 2017 UN resolution 2396 mandate to share data to detect foreign terrorist fighters, with their responsibilities under privacy legislation.

Biometrics in counter terrorism

Since 2017, all UN member states have been required to collect biometric data to combat terrorism. The Biometrics Institute was asked by the United Nations to collaborate on a compendium for recommended practices in the responsible use and sharing of biometric data in counter terrorism. Recently, we've been working with the UN to promote this compendium and raise awareness of its practical use to member states.

Governments have a big role to play in this changing landscape. There is huge potential for countries to cooperate with each other to create a safer world, using biometrics. One country's departure gate becomes another country's arrival gate. Biometric data can be checked against watchlists to enable countries to better manage risks away from their borders.

However, while many governments find it difficult to share information amongst their own agencies, sharing with others, including the private sector, is another challenge.

Confidence and consent

SITA's 2019 passenger survey revealed the number of passengers opting for automated passport control has more than doubled, from 21 per cent in 2017 to 44 per cent in 2018. Overall, passengers using self service technology were found to be more satisfied with the self-service option at critical stages of the journey compared to those who weren't able to access self service.

But we know public confidence in companies who ask for and store their data has been damaged in the last few years. As far as facial recognition is concerned, every day seems to bring a new headline that creates confusion. People are no longer blindly welcoming of new technology: More effort now needs to be put into earning their trust. A tweet from traveller MacKenzie Fegan in April received 4,500 shares when she questioned whether she ever gave consent for facial recognition to be used on a flight out of the U.S. Fear, uncertainty and doubt over mass surveillance and the impact of the possible uses of that data will get in the way of progress if allowed to take root. People are uncomfortable sharing their most personal information if they are not advised about what it is being used for and how long it will be stored.

Awareness of privacy requirements has improved since the introduction of GDPR,

Isabelle Moeller, Chief Executive, Biometrics Institute, has been at the helm of the Biometrics Institute for 17 years. In that time the organisation has grown into the most respected independent, multi-stakeholder forum for the biometrics community in the world.

although some countries do not yet meet the new bar set by the regulation. It will probably not be a universal model until penalties become real and a business-challenging part of the landscape – and customers voting with their wallets – for all stakeholders to take the issue seriously. Achieving the right balance between convenience, security and privacy is an ongoing challenge but not an insurmountable one. We have released a range of good

It must be remembered that people will be uncomfortable sharing their personal information if they are not told what it is being used for – or by whom

So long as privacy challenges are managed appropriately, biometrics have a role in achieving the seamless customer journey in an airport

"If a competitor implements different technology to yours which halves the time it takes to board passengers, where might that leave you?"

practice guidelines to help organisations assess and implement a responsible and ethical use of biometrics, which we are urging anyone operating in this space to consult. These include our updated privacy guidelines which we believe are the most comprehensive, universal privacy guidelines anywhere in the world. This year's upgrade fills in the gaps often left by GDPR and will help organisations – no matter which field of biometrics they operate in – to develop good practice in collecting, storing and processing data.

Transparency surrounding trials and their results as well as the collection, use, storage and processing of biometric data is essential. This needs to happen before implementation, not after.

Gaining and retaining public confidence, if the algorithms of a biometric gate struggle with diversity, will be hard. The onus is on providers to make this work so no one is disadvantaged by the technology – defying its very purpose.

As we have already seen, if technology is applied without properly addressing potential flaws, then regulators may opt to restrict usage until they, and the industry, can ensure proper privacy protections.

Is the future biometric?

Biometric technology is not the silver bullet. Even with the rapid performance enhancements we've seen recently, the focus now must be on re-shaping policies and processes to allow technology to be an enabler.

So long as privacy challenges are managed appropriately, biometrics have a role in achieving the seamless customer journey. By consenting to the use of biometrics on their end-to-end journey, passengers can be identified by different biometric sensors at several touch points through the airport. Their personalised departure details could be displayed on screens as they approach. Passengers with reduced mobility could be guided to their gates on automated wheelchairs without the hassle of waiting for airport staff to push them. Airlines could reduce delays by knowing where passengers are, if they will be on time for their flight or if their luggage needs unloading.

However, we must be mindful to not forget those challenges and throw the looming Entry/Exit System deadline and the work Brexit will bring to European borders into the mix.

More ethical and robust privacy practices will lead to greater customer buy in, allowing airlines and airports to get to know their customers better – and provide them with a better service.

The advance of biometrics can be a high risk space. As a competitor implements different technology to yours which halves the time it takes to board passengers, where might that leave you? Pay attention – change is happening now.

We know there are lots of conversations waiting to happen and the industry needs to tackle them together. Where do privacy impact assessments need to be carried out? What kind of legislation would help? Once concepts are accepted, answers can be found. ■

The Biometrics Institute is an impartial, international forum where these conversations take place with some of the key privacy advocates, vendors, academics and governments from around the world. Following a debate with Microsoft in June about the ethical use of biometrics, the conversation will continue with a multi-stakeholder community at the Biometrics Institute Congress in London in October.

BIOMETRICS WEEK 2019 – INCLUDING THE BIOMETRICS INSTITUTE CONGRESS

- 28-31 October 2019
- More than 40 speakers
- Up to 300 international delegates
- **biometricsinstitute.org/event/biometrics-congress-2019/**

P3 Airport Summit

The P3 Airport Summit returns to San Diego on 22-23 July and invites airport representatives, public leaders, project managers, industry executives and P3 development experts for P3 education, project development and networking opportunities.

22-23 JULY, 2019

SAN DIEGO, U.S.

THE 2019 P3 AIRPORT SUMMIT will host more than 1,000 airport, industry and stakeholder representatives in San Diego for two important days, focusing on the latest modes of airport infrastructure delivery. Attendees will hear from owners, developers and capital providers who have used partnerships and other alternative delivery models to make significant improvements to their airports.

This year's programme explores many examples of P3 airport transactions in the U.S., airport infrastructure issues faced nationwide, and how innovations in project delivery, procurement, life-cycle asset management and technology can be used as solutions for pressing issues. The 2019 programme will address the best practices and lessons learned from active P3 projects in both the construction and operation phases. Airports will discuss how to drive innovation and value for money, how to find the right risk transfer balance, and expectations for the next 20-30 years.

The Honorable Joe Hockey, Ambassador of Australia to the United States, has been confirmed as the keynote speaker for the P3 Airport Summit. Taking his post in January 2016, Hockey first entered Parliament in 1996 and spent more than 17 years on the front bench. Additionally, his previous experience as Treasurer of the Commonwealth; Minister of Financial Services, Small Business and Tourism, Human Services and Employment and Workplace Relations; and Chair of the G20 Finance Ministers will provide a unique perspective to the Summit's discussions.

With over 125 speakers addressing the critical principles behind successful public-private partnerships, the programme will serve as a guide through the current trends, challenges and opportunities in the P3 aviation market. Specifically, the programme will highlight the P3 arrangements employed by airports to successfully develop and construct a variety of assets including terminals, parking structures, people movers, cargo facilities and many more.

The P3 Airport Summit is one of the largest gatherings of airport and industry development professionals in the country. Attendees include senior management from firms in the construction, engineering, architecture, legal, investment and consulting industries as well as senior business and facility administrators from airports across the nation.

Attendees with little experience in the development and operation of the P3 model will benefit from industry experts presenting their knowledge and valuable insights into market trends crucial for business decisions.

More seasoned professionals will benefit from the incredible networking opportunities with over 1,000 participating delegates, cultivate relationships with project owners, and learn new methods to address complex project delivery goals. ■

"The P3 Airport Summit is an information-driven, networking-focused forum dedicated to attendees understanding the application of alternative project delivery for airport project development"

p3airportsummit.com

AZANS: Delivering safety through efficiency

Azerbaijan Air Navigation Services details the challenges of traffic growth in regard to managing Azerbaijani airspace, and highlights how this has been tackled.

IN THE FIRST decade of the 21st century, Azerbaijan witnessed an increase in interest from both international businesses and international tourists', leading to a significant rise in passenger traffic to Heydar Aliyev International Airport, which is considered one of the best airports in the CIS countries.

At the same time, hosting global sporting events such as the First European Games, the Formula 1 Azerbaijan Grand Prix and the UEFA Europa League final has become a challenge for the structures responsible for the provision of flights, safety and airspace usage efficiency.

Considering the strategic position of the Azerbaijan Republic at a cross point between Europe and Asia, the development of civil aviation in Azerbaijan, and the rapid growth of the national fleet thanks to the country's economic growth, sharp growth in internal, transit and overflight air traffic is expected in Azerbaijan in the coming years. Azerbaijan is expected to play a significant role in the region's air traffic flow management.

Since 1996, Azerbaijani ANSP AZANS has been providing air traffic services within the airspace of the Azerbaijan Republic, covering 165,400 square kilometres of land and sea. The length of air corridors serviced by Azeraeronavigation Air Traffic Department (AZANS) exceeds 11,200km. Today, AZANS uses the latest ATC systems and serves more than 150,000 flights a year, more than 95,000 of which are transit flights over the territory of the Azerbaijan Republic between Europe and Asia.

The over 20-year development path traversed by Azerbaijan Air Navigation seems incredible.

ABOVE: Azerbaijani ANSP AZANS provides air traffic services covering 165,400 square kilometres of land and sea

Current AZANS projects impress with their ambition, focusing on the most advanced solutions for air traffic management. AZANS is moving towards cutting-edge digital technologies and plans to introduce traffic services by applying artificial intelligence as well as developing the national ATM Artificial Intelligence Center. The centre will be a concentration of all modern achievements in the field of ATM, including a UTM control centre fully integrated with ATM, a remote tower, integrated 3D-TWR and radar simulators, and digital data centres. The concept of a new UAV and flight control centres will ensure flight safety when using the UAV and has been successfully presented at the World ATM Congress 2019 in Madrid.

AZANS is also planning to become the first ANSP in the region to use modern digital technologies such as D-ATIS, D-VOLMET, DCL, and CPDLC; allowing efficient communication between the pilot and air traffic controller, transfer of meteorological data and digital transmission of air navigation information for Azerbaijan's airspace users.

Obviously, the development would not have been so successful without the President of Azerbaijan Republic, Ilham Aliyev's continued support to the civil aviation of Azerbaijan. Ilham Aliyev is leading the country to a successful integration of international transport structures and an implementation of the latest European safety standards.

The successful and dynamic development of air navigation in Azerbaijan has since seen us chosen as the host of the annual CANSO Global ATM Summit in 2020 in Baku. AZANS was also nominated for Jane's ATC Award 2019 in the field of flight safety and efficiency.

An important component of a modern ANSP is close cooperation with all aviation stakeholders. As a national air navigation service provider, we understand that our common goal is to ensure safety and regularity of air traffic. Therefore, our primary objective is enhancing collaborations with national providers such as DFS, Hungarocontrol, DHMI, "Kazaeronavigatsia", SENASA and international organisations like ICAO, IATA, CANSO, and EUROCONTROL.

The implementation of the Airspace Efficiency Strategy and Development Center (ASEC) has been the most ambitious AZANS' project in recent years. Due to the intensive development of transport corridors, flexible routes and the air navigation infrastructure, Azerbaijani airspace has become a junction between Europe and Asia, as well as a route between Russia and the Middle East by using innovative experience and state-of-the-art technologies in the field of aeronautical data exchange proving harmonisation of air traffic flows. Consequently, the overflight traffic in Azerbaijani airspace increased by 250 per cent between 2000-2018.

ABOVE: Heydar Aliyev International Airport's state-of-the-art air traffic control tower

At the same time, traffic in neighbouring countries like Turkey and Iran increased dramatically, up to 40-50 per cent, and EUROCONTROL expects that Turkey, for instance, will face an increase of 2.5 times in the number of flights by 2040. The Azerbaijani ANSP understands the increasing demands of airspace users due to the rapidly changing political and economic situations in Azerbaijan, and internationally. Such changes create the need for innovative solutions that keep safety a priority while reducing costs and improving the network-based and environmentally-oriented approach to ATM. AZANS has to be ready to react and respond to those rapid changes and uncertainty while being sure that they can be handled safely and efficiently.

The main philosophy in creating ASEC was to respond efficiently and smoothly to growth challenges as well as to disruption or crisis in the region – by using innovative ATFM and airspace design tools, by bringing together the right experts and decision makers and sharing information with all relevant stakeholders. AZANS put together a variety of expert skills and created a dedicated team of highly qualified and motivated professionals with relevant experience in the fields of airspace design, capacity planning, operations, safety management, research and development, and training. Close coordination with EUROCONTROL through integration into IFPS in 2016 and a connection to PENS in 2019 was also established.

ASEC in the future is a promising regional contingency coordination centre, working in close cooperation with EUROCONTROL and Asian ATFMs to plan air traffic flows in unforeseen circumstances. The timelines of such a contingency centre beyond the overloaded European and Asian airspace became more crucial after closing Pakistani airspace, resulting in the disruption of world air traffic flows.

> *"AZANS is planning to become the first ANSP in the region to use modern digital technologies such as D-ATIS, D-VOLMET, DCL and CPDLC"*

From digital tower to digital airport: How technology is transforming air traffic services

On the 18 April 2019, *International Airport Review* hosted a webinar with NATS and Searidge Technologies, which discussed how digital tower technology can be applied within existing towers to solve real operational challenges. Here, *Andy Taylor* of NATS and *Alex Sauriol* of Searidge Technologies answer some questions from the webinar.

How does combining camera and machine learning technology work with airfield and ATM data?

In system terms, video cameras are providing digital sensor data which is constantly updating in real time. Airfield and ATM data can be provided by systems such as surface movement radar, multilateration, airfield lighting and even meteorological data. The images from video cameras are another validated data source which can be integrated with other operational information.

Machine learning, or more specifically neural networks, can be applied to the individual or integrated data sources. Neural networks provide a conceptual framework for solving problems based on training and learning. In the first instance, the neural networks analyse the datasets in order to "train" and create an understanding of what normal operations look like. Once a period of training has taken place, the next stage is for outlier or marginal data to be highlighted in what is referred to as "anomaly detection." This ability to detect operational events which are outside of the nominal parameters is a key differentiator between machine learning and the traditional system development and coding.

The time between development and operational deployment can be shortened by adaptive machine learning, potentially from years to months, changing the ATM project lifecycle.

How is artificial intelligence used to benefit different aspects of airport operations?

Searidge began considering the ATM applications of AI over two years ago, building on technical expertise which had been developed using neural networks to enhance tracking and detection capability in image processing.

This experience led to exploring how AI could be applied to other aspects of ATM operations. Our focus on AI is to support decision making, simultaneously monitor multiple areas of interest and reduce variation in performance; reducing impacts from external factors, such as weather and providing a more predictable operation in terms of spacing and throughput.

This focus on decision making does not reduce the importance of people, but supports an optimisation of human performance, leading to more consistency in operations combined with greater efficiency. The previous compromise between consistent operational performance and optimal peak performance can be mitigated, bringing a host of benefits to airport operations in areas as diverse as ATC, gate management and planning, queue management, sequencing, contingency and resilience.

Are you exploring using AI to monitor controller performance?

No. The applications of machine learning in ATM are geared towards improvements in service delivery and reduced complexity and workload for controllers. The benefits include consistency in airport operations and a stable and efficient service delivery. Measuring the performance of individuals does not specifically lead to these improvements whereas providing support and automated tools does. AI has the capability to not only support and improve human performance but reduce the impact on operations of variable human performance.

Are there any risks that need to be considered when implementing camera and machine learning technology?

One of the greatest challenges of ATM modernisation is that the system is in continual 24/7 operation – there is never an opportunity to "switch it off".

Machine learning and the ability to rapidly develop and deploy new technology creates a challenge for aviation regulators. Previously, the

implementation of new ATM systems followed a cycle of development and testing, then further development and operational validation. Regulators were able to follow typical project methodology. AI has the potential to reduce the operational project lifecycle, which has been previously measured in years, to months with adaptive machine learning.

Can you provide some real-world examples where this technology has been implemented successfully?

Searidge first developed technical expertise in the use of machine learning for image processing. Neural networks were developed to enhance the tracking and detection capabilities provided by video camera sensor data. This technology was initially implemented at Fort Lauderdale Hollywood International Airport in the U.S., and the new Hamad International Airport in Doha, Qatar. In both these deployments, neural networks were implemented to optimise the tracking and detection of aircraft and vehicles in apron and taxiway areas and to provide automated advisory updates to human controllers, delivering safety and efficiency benefits in each operation.

The experience of these implementations has led to the development of AI and a focus on track data (current and future) as an area for optimisation. For airport operations, this could mean detecting traffic patterns to optimise departure and arrival sequences, or real-time prediction of anomalies such as go-arounds, or applications to enhance runway safety and resilience. A real-world example of this in current development is with NATS air traffic controllers at London Heathrow Airport.

Due to the height of the visual control room (VCR) in the ATC tower at Heathrow, there are several days each year when low cloud places the VCR in a condition known as "VIS 2", when the controllers are unable to fully observe the runways but visibility at ground level is unaffected. In VIS 2, controllers use the A-SMGCS system to provide confirmation that landing traffic has vacated and that the runway is clear. In doing so, extra spacing is applied to arrivals on final approach, which reduces capacity during VIS 2.

Using video camera systems and neural networks, the Searidge AI system Aimee provides ultra-high-resolution updates up to 25 times faster than radar data alone, enabling controllers to more accurately determine when the runway is safely vacated. A detection zone is monitored by cameras and machine learning determines when an aircraft or vehicle enters or leaves the detection zone and provides updates to air traffic controllers. The benefit of successful implementation will be added resilience to Heathrow operations and the ability to maintain full operational capacity during these weather conditions.

How do you predict the air traffic management industry will evolve in the years to come?

Technology will play a key part in future ATM, enabling controllers to be free of routine tasks while concentrating on decision making. Currently, the ATM system is under pressure to not only change but to accelerate the rate of change at which new systems and technologies can be introduced safely. Controlling the flow more indirectly, by manipulation of the machine interface – more like controlling the throttle and direction of a race car, while the engine management system reacts to this input and runs the vehicle in the most optimal way as a result. Physical control towers will be a thing of the past, as the digital transformation of airport operations empowers stakeholders. Digital/remote tower operations will become the norm as benefits are realised and the applications of AI in the ATM industry will become widespread.

Decreasing the risk of drone activity

Research and innovation is underway in SESAR – the technological pillar of the Single European Sky – to ensure that increasing drone traffic in Europe's skies can be managed safely, in particular in relation to commercial air transport. *Florian Guillermet*, Executive Director of the SESAR Joint Undertaking, tells us more.

> *"Drones could represent new revenue streams for airports"*

DRONES ARE rapidly becoming part of daily life: They provide effective infrastructure inspection and maintenance tools; they carry out photographic and survey functions; and they support emergency services. The European Drones Outlook Study[1] estimates as many as 400,000 drones will be providing services in low-level airspace by 2050, and a total market value in excess of €10 billion annually by 2035. A robust framework that supports commercial and leisure operations will be essential to support the investment already underway by industry and operators. Airports in particular will need to invest in equipment to protect against rogue drones, whilst ensuring commercial operations.

The European Commission recognised the need to provide a safe and secure environment for drone operations when it launched its U-space initiative in the 'Warsaw Declaration' of November 2016. U-space is a set of services and procedures relying on a high level of digitalisation and automation of functions to support safe, efficient and secure access to low-level airspace for a large number of drones. It provides an enabling framework to support routine drone operations below 120m and addresses missions including operations in and around airports. Ultimately, U-space will enable complex drone operations with a high degree of automation to take place in all types of operational environments.

U-space building blocks

The launch of U-space set in motion a series of activities across Europe directed towards the development of appropriate rules and regulations, technical and operational requirements capable of supporting future autonomous operations. The SESAR Joint Undertaking (SESAR JU) is very much part of this pan-European effort, having received the mandate from the European Commission to coordinate all research and development activities related to U-space and drone integration.

In 2017, we released the U-space Blueprint[2], setting out the vision and steps for the progressive deployment of U-space services from foundation services, such as flight planning, flight approval and tracking, to more complex operations in dense airspace requiring greater levels of automation and connectivity. Building on this, we created

a roadmap for the safe integration of drones into all classes of airspace[3] which outlines the steps needed for a coordinated implementation of solutions to enable larger drones alongside commercial airspace. The roadmap will be included in the next edition of the European ATM Master Plan[4], to be published this year.

We then launched a series of exploratory projects with funding from the EU's Horizon 2020 budget, addressing the concept of drone operations, critical communications, surveillance and tracking, information management, aircraft systems, ground-based technologies, cyber-resilience and geo-fencing. These capabilities enable the progressive deployment of services over time, starting in 2019 with U-space foundation services. The projects bring together an unprecedented number and range of actors from traditional aviation, but also new entrants, including start-ups, SMEs, research institutes, universities, drone operators as well as service providers, airports, local/city authorities, law enforcement agencies and civil aviation authorities.

Full speed ahead

In 2018 we launched a series of demonstration projects, co-funded by the European Commission's Connecting Europe Facility in order to show the maturity of the services and capabilities emerging from our research projects. New players with knowledge of autonomous operations and mobile communications participate alongside SESAR JU, EASA, industry players and standards agencies. Running until the end of 2019, this enlarged SESAR family of stakeholders have programmed a series of demonstrations in several cities and rural locations in Belgium, Estonia, Finland, France, Greece, Italy, the Netherlands and Spain.

Together these demonstrations aim to show the readiness of U-space services to manage a broad range of drone operations and related applications, and their interaction with manned aviation. These range from parcel deliveries between two dense urban locations, medical emergencies and police interventions, as well as air taxi trials between airports and nearby cities. The leisure user is also catered for, with projects demonstrating how private drone operators can benefit from U-space services.

Demonstrators are also taking place outside SESAR. To bring in this broader pool of activities and speed up the deployment of drone services, the European Commission launched the European

FLORIAN GUILLERMET was appointed as Executive Director of SESAR Joint Undertaking in April 2014 and is responsible for leading the public-private partnership, which is modernising Europe's air traffic management system. Guillermet has worked in the civil aviation field for 20 years. He is an engineer and graduate of the École polytechnique and Civil Aviation Engineering School in France and has a Master's degree in Aeronautics and Airport Management.

Network of Demonstrators in October 2018. The network establishes important links with regulatory bodies, such as EASA, tasked by the Commission with drafting rules to govern the safe integration of drones into manned airspace. The SESAR JU research and demonstration help identify the operational requirements needed for this regulatory framework. We also work closely with the European standards agency, EUROCAE, and support wider standardisation work by ICAO, in particular ICAO's Standards and Recommended Practices (SARPS) for drones operating in manned airspace due for implementation in 2023.

EASA regulation will be critical for the expansion of the drone service market since it will create a common EU market for drones by harmonising operations across Europe. The European Commission adopted EASA's proposed regulations in March 2019, and new rules are due to come into force in 2020, subject to approval by the European Parliament. These classify drones into several main categories based on performance and capability, allowing EASA to conduct specific operation risk assessment (SORA) for the different categories, and develop guidance material that helps drone operators comply with regulations.

What does this mean for airports?

Airports are taking short-term measures to mitigate drone intrusions, from grounding aircraft when drones are detected to reducing speed of aircraft on approach in order to limit damage in the event of a collision. Drones therefore have significant impact on the punctuality and the overall capacity of the airport. In the long term, dealing with drones requires airports to look at systems that will help them to detect, survey, identify drones or enforce trajectories as well as enable the geo-fencing of the airspace around the airport.

SESAR research is delivering solutions which address these challenges. For instance, partners in the CLear Air Situation for uaS (CLASS) project are looking at a combination of technologies to merge data coming from both cooperative and non-cooperative surveillance sources to enable conflict detection and resolution, and protection of restricted areas like airports. The CLASS project tested drone detection and tracking technologies during live demonstrations, which took place at the Deenethorpe Airfield (UK) in late 2018. The project performed 40 flights and six scenarios in total, which showed how the CLASS system can track and display in real time both cooperative and non-cooperative drones. The resulting system will provide the basis with which to develop U-space services tailored to end-users, including airports. Advanced services include tactical geo-fencing (where the drone pilot is warned automatically if he trespasses into an unauthorised zone), geo-caging (where the drone pilot is warned that he is leaving a pre-defined zone), conflict detection and resolution.

Another project is the PODIUM demonstration, which is performing 18 operational scenarios, for beyond visual line of sight (BVLOS) and VLOS flights, across five sites including Groningen Airport Eelde, Hans Christian Andersen Airport Odense, Rodez-Aveyron Airport and the Drones Paris Region cluster in the vicinity of the Orly CTR. Drone operators and air traffic controllers are actively using U-space services for both the flight preparation and flight execution phases. Thanks to these live demonstrations, the PODIUM project is gaining valuable feedback, as well as recommendations for future improvements.

Seamless integration

At the same time, drones could represent new revenue streams for airports, especially drones transporting freight. Recognising this potential, the SESAR VUTURA demonstration in the Netherlands is trialling the delivery of packages to and from Twente Airport, while partners in the EuroDrone demonstration will show the feasibility of small express parcel delivery between an airport and the post office in a nearby city. The transport of passengers also holds potential, which partners in the Gulf of Finland demonstration will put to the test with trials taking place later this year.

In addition to small drones, airports need to consider large certified remotely-piloted aerial systems (RPAS) and their integration with manned aircraft, especially in the approach segment around airports. SESAR is testing cargo RPAS vehicles inserted into the airspace alongside commercial traffic to assess how controllers manage the traffic mix and deal with particular RPAS requirements. This work is done closely with the European Defence Agency (EDA) to ensure RPAS can be accommodated in non-segregated airspace despite being equipped differently and often operating at lower speeds than manned aircraft. RPAS also need access to the airport surface where they are subject to the same rules, procedures and performance requirements as any other airport user. They must be able to interface with ground-based airport systems and demonstrate their ability to act and respond to air traffic control.

On the horizon

Looking to the future, the U-space framework will accommodate all types of aerial systems, from manned aircraft to RPAS and drones, within one transparent system. With the appropriate services, regulations and procedures, U-space will allow the airspace management environment to evolve together in a safe and secure way. Successful and timely roll-out will need sustained commitment of all stakeholders in the aviation and drone communities, especially airports.

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PRM demographics are changing: The next generation of PRMs will be a tech-savvy, well-educated generation that values independence over everything else

ACCESSIBILITY

It is the aim of an airport to ease the journey and ensure it is a positive experience for all passengers, including those with reduced mobility or additional needs. Although the intention is the same, how airports are approaching this varies...

It will be the promotion of a consistent level of service across the passenger journey that will drive meaningful change, and not a singular fixation on easy-to-measure metrics

Compliance vs. compassion

Brian Cobb, Chief Innovation Officer at Cincinnati/Northern Kentucky International Airport (CVG), describes the airport's ambitions to advance accessibility among its community.

AS A SKYTRAX award-winning airport for seven of the past eight years, Cincinnati/Northern Kentucky International Airport (CVG) is well positioned as a leading global airport. A key tenet is to 'Go Beyond', further prescribed for employees and business partners to 'make travel through CVG an unforgettably positive experience'. This conscientious approach encourages furthering its market base among those less travelled. It's about giving a voice and options to those who have been turned off, or worse, turned away from the joys of air travel.

Where compliance falls short

We're likely bound by rules established by a regulatory body, and within those rules are more specific standards for supporting disabilities on behalf of employees. The inevitable question is: "Will we comply to minimum standard, or will we go beyond to maximise accessibility."

Immediate questions from the organisation's leaders come into play, with typical lines being "is it really necessary?", "there are other, more important priorities?", "what is the return for what seems like a small number of users?". These questions can be frustrating, giving the appearance that the bar is set higher to reach approval for accessibility needs. How many of us are lobbying for the compassionate approach that actually lowers the bar as the ethically right thing to do?

BRIAN COBB, Chief Innovation Officer at Cincinnati/Northern Kentucky International Airport (CVG) is a graduate of Embry-Riddle Aeronautical University, having received his bachelor's degree in Aeronautical Science. He also holds commercial pilot and flight instructor licenses and associated aircraft ratings, and received ACI's "International Airport Professional (IAP)" designation in 2013. Cobb has over 25 years of aviation experience, working in both airline and airport sectors.

Consider the cost

No business is successful by discouraging use of its product. Couple this with the consistent rise in disabilities, considering improved global diagnosis, such as Autism Spectrum Disorders (ASD) and burgeoning physical challenges. Juxtapose this with the growing wealth of the world's developing nations' population and direct forecast impact for air travel demand. If we do nothing towards social acceptance and support for improving accessibility, we risk depriving air travel for an entire population and their caregivers. Or perhaps we're better to market this in financial terms as losing consumer confidence and their business.

Consider this simple market impact for ASD. The U.S. Center for Disease Control (CDC) in 2018 "determined that one in 59 children in the United States are diagnosed as being on the spectrum", with "Autism affecting all ethnic and socioeconomic groups"[1]. While the spectrum itself has varying degrees of capabilities, the fact remains that social challenges exist. These social challenges can be debilitating. Furthermore, their caregivers are often constrained themselves as they must consider all limitations in daily life.

Facilitate change

CVG created LIFT™ (Leading Individuals Forward Together) in 2012. The programme has been met with resounding success and consistent growth. Initially formed for support around ASD, LIFT has since branched to include numerous disabilities and travel-related health challenges. With support of community health professionals, each learning event is designed to provide comfort and encouragement for the individual and their caregivers, raise understanding and instill sensitivity of the disability among airport community personnel and employees.

The award-winning LIFT programme continues to organically build upon its prior successes. Recently expanded programmes include the introduction of non-ASD learning disabilities, miniature therapy horses, site familiarisation for service animals in training, and awareness for heart patients with advanced mechanical implants.

After learning about an invasive experience through security and multiple lines of questioning by airline staff that one heart patient had to endure, CVG staff recognised the lack of awareness surrounding a new technology. A ventricular assistive device (VAD) is an advanced treatment option for end-stage heart failure. It is a mechanical pump that's implanted in the heart to help it pump more effectively. Unfortunately, the device design appears as the passenger is hiding wires connected to an exterior pack. The pack is actually a battery unit connected to multiple wire leads that may not be disconnected at any time.

CVG's U.S. Federal Agencies and airline partner staff were fascinated with the in-person patient learning through first-hand experience. Immediate knowledge sharing took place and compassion took hold as each agency and airline committed to sharing the learning materials among their respective headquarters.

In place now

Before-you-fly interactions at CVG are notable given our interest in starting our customers' journey prior to when they leave home. Customer experience staff worked to develop several options to pre-journey the airport for those less familiar or not well-travelled in a larger airport environment. Leveraging Google 360 technology, staff coordinated with a 360 specialist to photograph and stitch full facility tour capabilities in high-resolution. CVG remains one of very few U.S. airports to offer touring capabilities via desktop or mobile.

Another of CVG's initiatives included the addition of Aira. As a subscription-based, third-party company, Aira offers real-time hands-free wayfinding navigation for the visually impaired.

Over recent years, CVG has removed all revolving and bi-fold doors and replaced them with automated, wide-access doors; modified all security lanes to accommodate wheelchairs; reprogrammed elevators to 'home' position with doors open and lights on at the most frequently used floor; developed a ground-based business continuity plan for conveyance outages and/or emergency egress whereby accessible ramps will be mated to passenger-loading bridges and coupled with accessible shuttle buses.

ABOVE: Segway Loomo pilot test at CVG, demonstrating the carriage of a customer's carry-on bag

On the horizon

In the coming years, CVG expects robotics and autonomous technologies to advance the experience of PRMs. CVG was the first U.S. airport and the second world-wide to trial WHILL, an advanced personal electric vehicle. CVG's premise was simple: Could we reduce the need for human service to push wheelchairs if a consumer with limited mobility could navigate the airport via WHILL? The study period indicated a reasonable acceptance rate and quick study – 30 seconds or less – on how to use the semi-autonomous chair. The add-on benefit of the device was a caregiver feature, allowing them to navigate the chair via smartphone over Bluetooth connectivity. The future design considered full-autonomy mode via connecting to Wi-Fi nodes acting as waypoints. Ultimately, the device has yet to be incorporated for full passenger use due to the facility design requiring multiple up-down transitions. However, CVG has been quick to share its study results with others which led to additional pilots and full deployments in airports around the globe.

A robotic development currently underway is the modification of Segway's Loomo. Loomo is a next-gen miniature Segway that doubles as a self-curated robot via open code capabilities on the Android platform. CVG is collaborating with one of its university partners on a use case to again facilitate a 'digital concierge' with critical focus on passengers with limited mobility. We anticipate Loomo operating as a terminal-to-gate wayfinding guide, capable of transporting a customer's carry-on, acting as an interpreter, and several other to-be-developed features.

CVG's hard work and dedication ensures that our staff and airport community remain transfixed on the horizon, advancing industry agendas, and ensuring that all existing and future customers enjoy access to the fascination of flight.

> *"It's about giving a voice and options to those who have been turned off, or worse, turned away from the joys of air travel"*

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Passengers with additional needs require **consistent standards**

Gatwick Airport's Accessibility Manager, *Sara Marchant*, looks at how the UK's proposed Passenger Charter is an opportunity to introduce consistent standards for passengers with reduced mobility across the entire airport journey.

THE UK'S LONG-TERM vision of aviation is set out in its Aviation 2050 Green Paper and one proposal it contains is for a Passenger Charter to strengthen airports' and airlines' customer experience.

This would build on the good work already being done by airports in this area and seeks to improve the airport experience for passengers with reduced mobility.

Lots of good work has been done here, but the Charter could be an opportunity to introduce some truly consistent standards across all airport stakeholders as this is where things often go wrong and disabled passengers experience poor service.

To be truly effective in helping passengers with a disability, any new standards must apply to every organisation that comes into contact with the passenger during their journey, be they an airport, airport partner, airline or handling agent.

This is key, as during a journey a passenger will deal with various organisations and poor service at any point can ruin the entire experience.

Airports are often fragmented environments where hundreds of different organisations can be based on a single campus. Ensuring consistent standards can therefore be a challenge but a broad-based charter may help bring these often-disparate parties together.

Critically, it will be the promotion of a consistent level of service across the passenger journey that will enable the Charter to drive meaningful change, and not a singular fixation on easy-to-measure metrics such as waiting times. Passengers value how they are treated, not just the time in which it takes to complete one part of a journey.

Similarly, the Charter must not lead to significant cost increases for passengers, as this could have the unintended consequence of excluding certain demographics from travelling altogether.

The Gatwick family

One way we are driving consistent and meaningful change across the airport is through the 'Gatwick Family' initiative. In a nutshell, the initiative is looking to unite the entire 30,000-strong workforce, whether they work for Gatwick, an airline, ground handler, retailer or caterer with the aim of building closer, more productive relationships with each other.

Not only does this make Gatwick a better place to work, it is helping us deliver better journeys for the airport's 46 million annual passengers.

Through this collaborative, campus-wide approach we have already become more effective at tackling disruptive passengers. People causing trouble are only a tiny fraction of the airport's 46 million passengers, but just one individual can cause disproportionate harm once on board an aircraft.

Through the Gatwick Family initiative, we have raised awareness of the issue and created a network of staff – in bars, restaurants, terminals and shops – that report incidents of disruptive behaviour early, before they potentially escalate.

We have also significantly improved diversity awareness among all staff. The initiative however has been particularly important in our efforts to ensure that we are delivering consistent standards for passengers with a disability, be it physical or hidden.

Staff training is key

A fundamental part of our efforts to become the UK's most accessible airport was to train all frontline staff to recognise which passengers might need a little extra help. We rolled out training on a range of hidden disabilities and all staff are now able to recognise and confidently deliver appropriate help to passengers who require assistance in an empathetic and positive way. We provide this training ourselves and free of charge for other organisations across the airport campus, including airlines and ground handlers, to drive consistent standards across the passenger journey.

At the time of writing, over 2,500 staff across at least 14 different businesses on the airport campus have received training to recognise and help people with dementia alone.

We also introduced the UK's first hidden disability lanyard scheme which is a discreet signal that the person wearing it may need a little extra help and support when passing through the airport.

Thanks to the relationships built through the Gatwick Family and our widespread free training programme, the lanyard is now widely recognised across the airport campus so staff know what to do if they see a passenger wearing one.

Such has been the success of the scheme, that not only is it being used by every major airport in the UK, it is being adopted by many international airports and is also being picked up in different industries – rail, shopping complexes, cinemas, hospitals, major supermarkets – with interest continuing to grow.

Gatwick has encouraged this consistency of approach by supplying training slides, posters, graphics and photos for free, so that everyone uses the same symbol.

Talk to the experts

It is also important that discussions are not limited to organisations on the airport campus. We have been careful to work closely with disability and passenger groups to define our new, improved service standards in partnership with them. Our training is also written in conjunction with both disability charities and individuals with relevant disabilities. People living with disabilities also attend or deliver training where practical and we have found that this really brings the issue to life for staff being trained and helps make it both meaningful and memorable.

These relationships with disability charities have also helped us design new infrastructure – another key component to a good passenger journey. We recently became the first UK airport to open a sensory room following close consultation with the National Autistic Society, and our design teams used a tool provided by the Royal National Institute of Blind to make sure the perspective of blind and visually-impaired passengers was considered when designing new facilities.

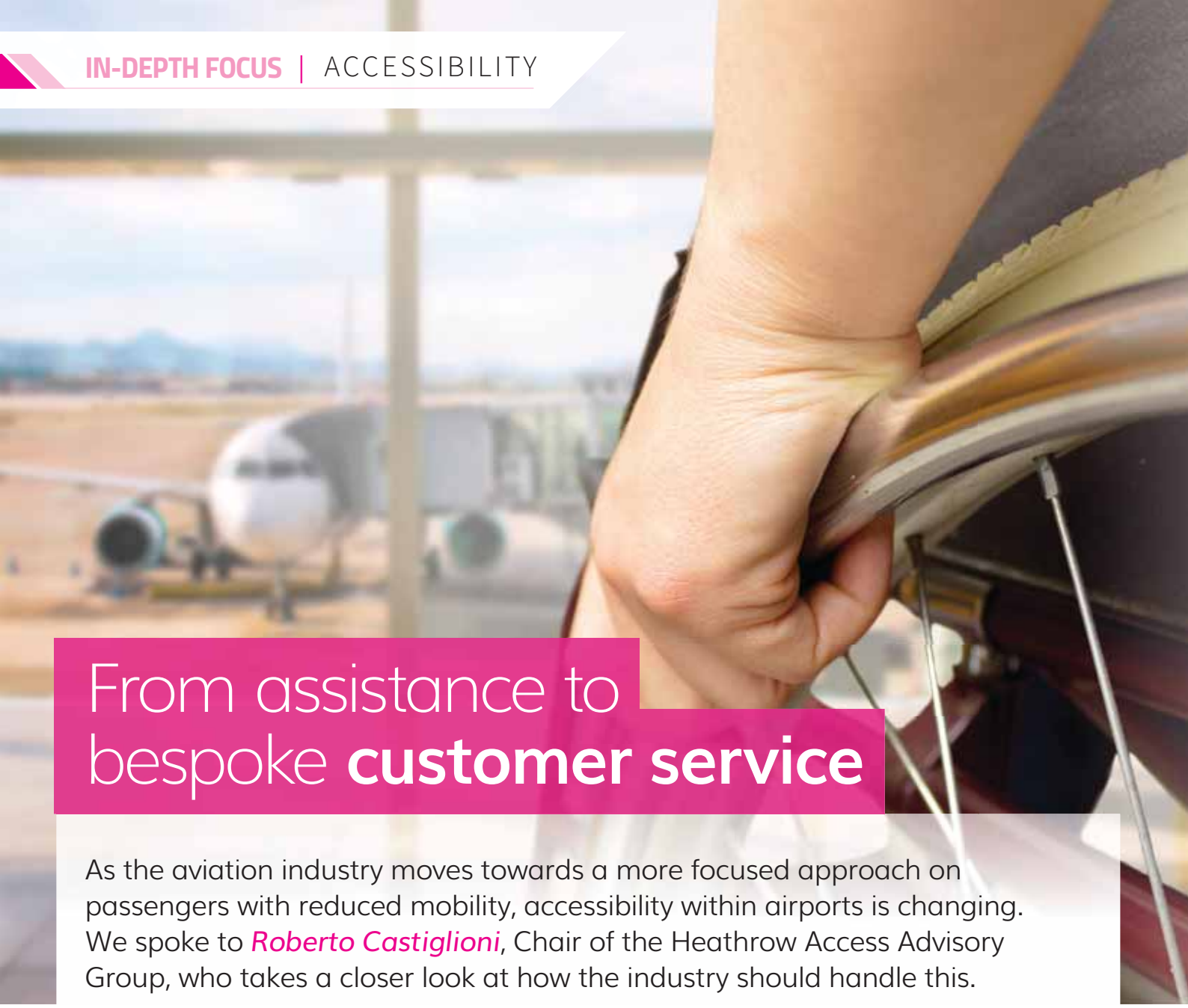
Given the large number of passengers passing through the airport we know that we will not get it right every time. However we are broadening the range of disability groups we engage with and have new feedback and learning mechanisms in place to help us constantly improve our accessibility services, facilities and training.

We are determined to do everything possible to ensure that passengers in need of assistance have an equal opportunity to fly.

The UK government is seeking views on its long-term vision of aviation – Aviation 2050 Green Paper – until 20 June 2019. The green paper outlines a new aviation strategy, including the proposal for a Passenger Charter.

> *"Passengers value how they are treated, not just the time in which it takes to complete one part of a journey"*

SARA MARCHANT, Accessibility Manager for Gatwick Airport, started her career in Law Enforcement working on the Investigation Division of HM Customs and Excise for 17 years and has spent the last 11 years at Gatwick Airport, helping to improve the passenger experience. She has been focused on improving accessibility – with particular regard to hidden disabilities – training and awareness, engagement with charities and support groups, whilst working with project designers to make new and upgraded areas of the airport accessible.



From assistance to bespoke **customer service**

As the aviation industry moves towards a more focused approach on passengers with reduced mobility, accessibility within airports is changing. We spoke to *Roberto Castiglioni*, Chair of the Heathrow Access Advisory Group, who takes a closer look at how the industry should handle this.

ON 2-3 MAY 2019, Heathrow Airport hosted an international workshop which focused upon passengers with reduced mobility (PRMs) and hidden disabilities. The European Commission, UK Department for Transport, UK Civil Aviation Authority, ILT (Dutch NEB), ENAC (Italian NEB), IATA, airports, airlines and service providers came together to discuss the state of play regarding accessible air travel.

Where does the industry stand?

The findings of the European Commission, currently revising the Interpretative Guidelines of 2012, provided a good insight in terms of accessibility in the aviation sector.

After their first round of consultation with industry and disability organisations, the European Commission listed a number of topics they wish to address in the new working document: A definition of PRM; a pre-notification of special assistance needs by PRM; transmission of information between travel agents, airlines and airports; safety rules of airlines to carry PRMs and their mobility equipment; assistance dogs (e.g. training requirements); medical equipment (e.g. what should be carried for free); liability in case of loss or damage of mobility equipment; calculation of PRM charges; and the quality standards of airports.

The ongoing process will see the Commission run further rounds of consultation of NEBs and stakeholders at EU level this autumn, and the adoption and publication of revised interpretative guidelines this winter.

The list of key topics raised, with more likely to surface, tells us how much remains to be done to make air travel accessible for people with disabilities. However, these topics are technical and likely to impact operation frameworks more than the passenger experience.

Understanding the needs of individuals – and designing services around them – is crucial if we are to make substantial progress in this field. At the workshop, Heathrow Airport presented the outcome of its initial Proof of Concept (PoC), which was run in cooperation with British Airways in April 2019.

> *"Current assistance models are built around one-to-one assistance schemes, exactly the opposite of future aspirations"*

The joint exercise targeted high-density flights (flights with more than 10 pre-booked PRMs onboard) to understand if the traditional wheelchair service still meets the needs of passengers. Passengers from all selected flights were offered guidance in their native language, group movement to final destination, assistance with hand luggage, or full wheelchair service.

The findings speak for themselves: 20 per cent of passengers said they booked wheelchair assistance because they needed help navigating the airport or assistance with their hand luggage; 48 per cent said they would have preferred not using a wheelchair; 84 per cent said they would rather choose to book an alternative service offered in the future. The Net Promoter Score of passengers who participated in the trials is almost double the Net Promoter Score of PRMs using standard services.

Quite clearly, these results warrant further studies on alternative assistance services that best meet the needs of passengers. More PoCs are scheduled to take place in coming months.

Where does the industry want to get to?

PRM demographics are changing. The next generation of PRMs will be a tech-savvy, well-educated generation that values independence over everything else.

Current assistance models are built around one-to-one assistance schemes, exactly the opposite of future aspirations. In coming years, one-to-one assistance services will only be required for a marginal segment of the travelling public. The vast majority of PRMs will only require help in specific instances.

For example, passengers who are in a wheelchair will likely only need help boarding or disembarking. However, this implies that infrastructure must be fully accessible; mainstream solutions like e-gates, help points, border force desks and concessions will need to follow universal design criteria.

In other words, the future will see airports and airlines move away from traditional assistance frameworks and embrace the new concept of bespoke customer service.

How do we get there?

Accessible infrastructure is the key element of this journey. The goal is to create inclusive airports and inclusive airframes.

The inclusive airport is a place where a person with a disability can enjoy the same level of access as everyone else. Inclusive airframes are those who feature provisions like accessible toilets and a dedicated space for those who can only travel in their own wheelchair.

Enhanced digitalisation of the journey will be the pillar upon which the future of bespoke customer service rests. PRM management software will need significant development to integrate features like digital self-enrolment to services, passenger real-time tracking, push/pull messages between passengers, service providers and airlines. PRM software will also require integration with fleet tracking and management of autonomous mobility devices.

Digitalisation of personal wheelchair passports will ensure handling agents can access real-time information about the device, for example how to put batteries in flight safe mode, how to fold or restore the device and technical information like weight and dimensions.

Assistance frameworks will need a major overhaul to ensure they are fit for purpose. The current blanket offering of wheelchair services on a one-to-one basis, holding passengers at PRM lounges to manage their flow whilst disregarding their individual aspirations, and the patronising experience of being escorted through the airport will be relegated to the past.

Agents training will also require a full overhaul. Training packages built around the medical model of disability will be replaced by models designed around customer service. In a not so distant future, PRMs will be offered a range of options regarding their journey, from manual or electric self-mobilisation to one-to-one assistance and everything in between. Access to choice is fundamental to drive customer satisfaction to the highest possible levels.

Far too often airports are required to make unscheduled refurbishments or post-delivery adaptations to meet accessibility standards. Designing accessibility-focused blueprints saves time and significant financial resources.

The future of bespoke customer service is set to enhance the passenger experience, improve customer satisfaction, and drive efficiencies to ensure long-term financial sustainability of a field that the ageing population is set to drive to continuous growth.

ABOVE: The Heathrow Access Advisory Group (HAAG) is focused on offering passenger-centric accessibility services, and frequently consults with PRMs to determine what these should be

ROBERTO CASTIGLIONI has been a member of the UK Civil Aviation Authority Access to Air Travel Advisory Group since 2012. He works with airlines, airports and PRM-service providers across the world to improve access to air travel for people living with disabling conditions. In his capacity as an accessible air travel expert he has worked with National Enforcement Bodies across Europe and on projects for the European Parliament and European Commission. He has been a member of the easyJet Special Assistance Advisory Group (ESAAG) since 2012 and has chaired ESAAG's Airport Experience working group since 2014. In September 2017, Castiglioni was appointed Chair of the Heathrow Access Advisory Group (HAAG) and joined the European Network Accessible Tourism NGO as an Accessible Air Travel Expert.

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