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Safety & Security: Data Driven Borders; Airfield Safety; Mission Critical Communications
Plus: New Rules of Investment; Modular Construction; Taking Cues From Theme Parks

IN THE SPOTLIGHT: **SAFETY & SECURITY**

Issue 4, 2026

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Clear and present danger

Ensuring the safety and security of the world's airports is a never ending challenge, writes Joe Bates.

The cyber attack on Manchester Airport Group in the UK and reports of 227 illegal drone flights near Ho Chi Minh City's Tan Son Nhat International Airport in just 13 days this summer provided another reminder, if ever one was needed, that the safety and security threat to the world's airports remains a clear and present danger.

The MAG attack led to the personal data of around 8.7 million people being posted online by the hackers, although they failed in their attempt to extort a ransom from the airport group, which operates Manchester (MAN), London Stansted (STN) and East Midlands (EMA) in the UK.

Contact details, vehicle registrations and postcodes were stolen in the breach that appears to have accessed databases containing Wi-Fi log in and car parking details.

Reflecting on the incident, Graeme Stewart, head of public sector at Check Point Software, noted: "We warned after the attacks on the automotive sector last year that aviation needed to move onto a war footing. This feels like the moment that warning becomes very real.

"Aviation needs to behave as though a sustained campaign has begun, because waiting for an attack that stops planes moving before treating this as serious would be a dangerous mistake."

Cyber attacks arguably pose one of the biggest security challenges ahead for the technology dependent aviation industry which has traditionally focused more on physical threats.

Indeed, as you will be able to read more about in this 'safety & security' themed issue of *Airport World*, airports continue to invest in new technologies and processes and procedures to combat everything from hidden weapons and explosives in baggage to the relatively new threat of drones.

From an airfield safety perspective, ACI, IATA and CANSO recently launched a pioneering joint initiative to reduce the risk of runway incursions, which remain a global challenge for the industry (see page 20).

Other airfield related stories under the spotlight in this issue include Bengaluru-Kempegowda's runway safety initiatives; and the use of autonomous vehicles/robots for a growing number of activities on aprons, taxiways and runways.

The themed section also includes features about cyber resilience, digital borders, mission critical communications, and the EU's new Entry/Exit System.

Elsewhere in the issue we have features about how airport sustainability goals can impact on their PPP appeal; and the impact new technology will have on the way future airport facilities are designed and built.

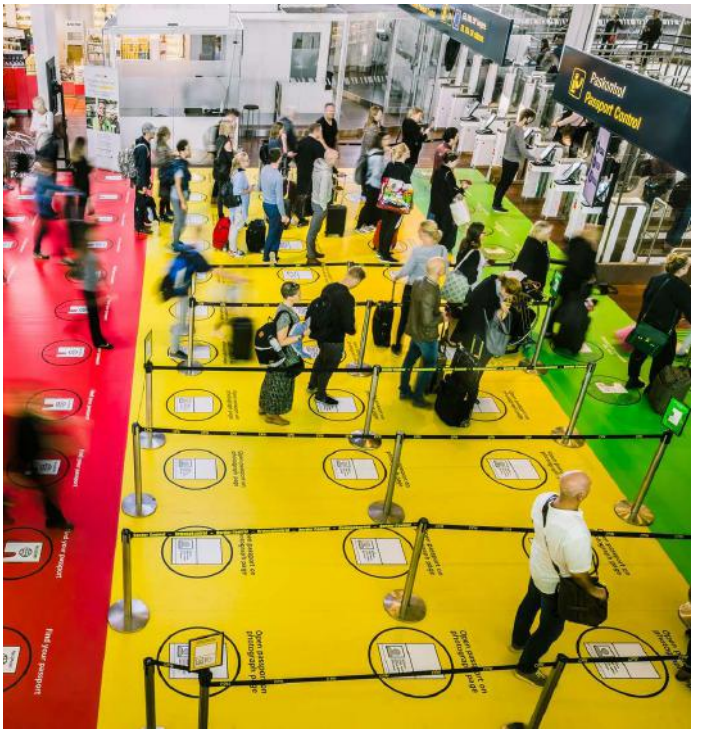
Our main airport feature is on Techo International Airport, Cambodia's new gateway to the world, which has made a hugely favourable impression on both passengers and the airlines in its first year of operations.

If that's not enough, we also have articles about whether airports need to embrace a little theme park magic when it comes to managing queues and enhancing the customer experience; and the benefits of modular construction.

We round the issue out with our 'business exchange' pages and sustainability news about hydrogen-powered ground equipment trials in the UK and the new fleet of electric buses at Sydney Airport in Australia.

I hope you'll agree that it's another cracking issue of your favourite airport magazine.

AW



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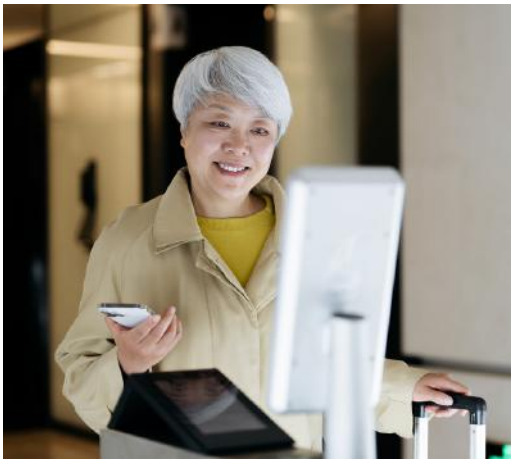

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Thinking big!

Cambodia Airports CEO, Julien Bert, talks to Joe Bates about switching operations to Phnom Penh's new $1.5 billion gateway to the world, Techo International Airport.

The opening of Techo International Airport (KTI) last September changed everything for air travel to Cambodia as the gateway is bigger and better than its predecessor and certainly equipped for future expansion.

In short, the airport boasts a state-of-the-art 240,000 square metre terminal building, single 4,000 metre long runway and cargo facilities that between them are capable of handling up to 15 million passengers and 175,000 tonnes of cargo per annum.

And with future expansion – its master plan includes proposals for a second pier and additional runway subject to demand – the new airport could eventually accommodate up to 50 million passengers yearly.

"The new airport is definitely a big step up in terms of size, capacity and technology and allows us to think big for the future," admits Cambodia Airports CEO, Julien Bert.

Located 25 kilometres south of Phnom Penh, good road connections make it is quicker and easier to get to KTI from the city centre than to its predecessor on the outskirts of the capital due to traffic congestion.

Travelling between Techo International Airport and central Phnom Penh by road typically takes around 40 minutes, and that could be even shorter in the future with the addition of a dedicated high-speed lane for buses.

KTI is certainly a big improvement from the old airport in terms of its technologies, which include biometrically enabled eGates at immigration, self-service kiosks and automated baggage drop machines as well as the latest smart security equipment.

The airport has 32 gates, most of which are served by double bridges, and 23 stands capable of handling Code E aircraft or simultaneously accommodating two Code C aircraft.

It is also equipped with an Airport Operations Control Centre (AOCC) that connects all the different IT systems, technologies and facilities and the people that are responsible for monitoring them across the airport site.

Now Cambodia Airports aims to use its 30 years of experience of operating in Cambodia and the support of VINCI Airports – one of the biggest airport operators in the world – to grow passenger numbers and enhance KTI's role as a cargo and logistics hub by leveraging its strategic location and new facilities.

THE BIG MOVE

Although the move from Phnom Penh International Airport (PNH) to KTI happened overnight on September 9, 2025, Cambodia Airports had been planning the move for over two years.

Indeed, Bert previously worked as VINCI Airport's general manager for the transfer to KTI before becoming CEO of Cambodia Airports in April this year, so was well prepared for the move of 3,500 different stakeholders, 3,150 staff and more than 30 airlines to Techo International Airport.

He says: "Well, the first thing to say is that after months of preparation, ORATs (Operational Readiness, Activation and Transition) that involved hundreds of tests of new equipment and systems and thousands of hours of training for our teams, we were well prepared for the overnight transfer.

"Yes, there were challenges, and like at the opening of any new facility not everything went perfectly, but we had no big issues, and overall it all went pretty smoothly despite some of the systems, equipment and facilities not being 100% ready on opening day."

He adds that, as anticipated, it did take staff and the airlines a few hours to get used to their new, much bigger surroundings, but notes that it was really just a question of adapting to the new environment and some more sophisticated technologies.

"At the end of the day, I measure success through on-time performance, as that's what it is all about really, and our OTP at KTI is better than it was at PNH," says Bert.

"So, I think this has allowed the airlines and passengers to focus on the big, beautiful new airport and the new facilities it offers them.

"We have yet to get the annual results of an ASQ survey as the airport only opened last September, but early passenger feedback is favourable with people saying things like it is 'beautiful', 'quick' and 'spacious'."

TRAFFIC MIX

As the direct replacement for Phnom Penh International Airport, KTI instantly became Cambodia's biggest airport and international gateway to the world.

International flights currently account for close to 98% of all passengers passing through the airport, with domestic services around 2% and transfer traffic less than 1%.

The mix makes KTI an O&D airport, and this isn't likely to change anytime soon due to the location of some of the Asia's biggest hubs on its doorstep – Bangkok Suvarnabhumi (BKK), Guangzhou Baiyun (CAN), Kuala Lumpur (KUL), Singapore Changi (SIN) and Seoul Incheon (ICN).

As a result, these destinations are among the top five routes served from KTI, while Siem Reap, home to Cambodia's world-famous Angkor Wat temple complex, and Sihanoukville are the most popular domestic destinations.

Home carriers Air Cambodia and Cambodia Airways are the biggest operators at KTI due to their extensive regional networks beyond Cambodia that include China and most neighbouring countries across Southeast Asia.

Spring Airlines, AirAsia Cambodia and China Southern complete the top five airlines in terms of market share.

Legacy carriers serving KTI include Air China, Asiana, Cathay Pacific, China Eastern, Emirates, Etihad, Korean Air, Malaysia Airlines, Qatar Airways, Thai Airways and Turkish Airlines.

Sky Angkor Airlines also counts KTI as its home base operating scheduled flights to Bangkok, Macau, Seoul and the Mainland Chinese cities of Changsha, Chengdu and Quanzhou as well as seasonal services to Gaya in India.

The mix all adds up to a total of 30 airlines operating flights to 40 destinations across Asia and the Middle East, including 16 cities in China.

Bert expects the new airport to become the catalyst for attracting new airlines and services to Cambodia, although he notes that its route development ambitions aren't currently being helped by geo-political events on its doorstep and further afield.

"I am hopeful that the new airport will bring additional capacity when the market picks up and we once again see the appetite from the airlines to expand their networks," he comments.

PASSENGER NUMBERS AND CARGO GROWTH

Between them, PNH and Techo International Airport handled a total of 5.3 million passengers in 2025, and Bert expects something similar this year because of the "geopolitical disruption" in the Middle East and "regional tensions" that have impacted on airline networks and tourism to Cambodia.

He did, however, reiterate that Cambodia Airports continues with its marketing efforts to expand the route network from KTI and Sihanouk International Airport (KOS), its other gateway in the port city of Sihanoukville in the southwest of the country.

"We projected growth before we faced these challenges and we remain confident that it will happen, it is just a little difficult to make traffic forecasts in the current operating climate," noted the cautiously optimistic Bert.

"But, what I can tell you is that our marketing teams are putting a lot of effort into growing our route network at Cambodia Airports and across the VINCI Airports network, working at regional and national levels and across different countries to continue to develop and diversify our routes and destinations."

He cites last year's opening of new Etihad and Turkish Airlines routes at KTI as one example of how Cambodia Airports has benefited from synergies of working with VINCI Airports, whose global network now covers more than 70 airports across 14 countries that between them handle in excess of 330 million passengers per annum.

"The Etihad route came about after direct discussions between VINCI and Etihad, with the airline launching the new service at KTI less than a month later," enthuses Bert.

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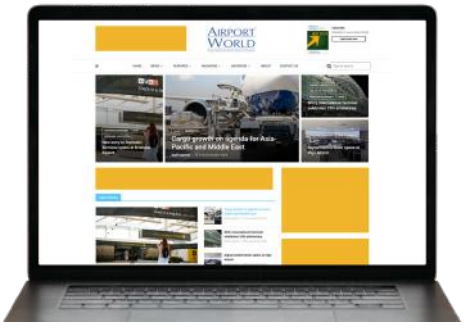

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"I am expecting that our passenger numbers this year will not be far from what we handled in 2025, but hopefully with slight growth."

Traffic stats show that numbers across Cambodia's three international airports (KTI, KOS and the Yunan Aviation Industry Investment Group operated Siem Reap-Angkor International Airport) fell by 6% in the first five months of 2026, but a shining light for Cambodia Airports has been cargo, which is positively booming.

Indeed, cargo volumes across the three airports soared by 34% to 38,951 tonnes during the same period, with the bulk of shipments being handled at Techo International Airport.

The increase, ironically fuelled by the same regional disruption that is currently having an adverse impact on passenger traffic, has led to cargo volumes rising by 40% at KTI this year compared to the corresponding period last year at PNH.

In essence, the closure of Cambodia's land border crossings with neighbouring Thailand has seen cargo and logistics companies turn to airfreight to export shipments out of the country that have traditionally gone by road.

As a result, freighters and bellyhold cargo on passenger flights have effectively replaced the thousands of trucks that used to transport garments and textiles, footwear, electrical machinery and other goods to Thailand and beyond every week.

The unexpected development has resulted in a decision being made to expand the airport's cargo facilities to ensure that it is equipped to keep up with demand.

Bert says: "Our cargo facilities upon opening were initially pretty similar to what we had at Pochentong [the old name for PNH] because the design was made at a time when volumes were much, much lower than today, but things have changed, and we now need more capacity.

"The decision to treble the size of the airport's cargo facilities will add more capacity, give us more flexibility to manage all kinds of goods, and potentially become a cargo hub."

To give you an idea of just how cargo volumes have soared in the last six to eight months, KTI is on target to handle more than 100,000 tonnes of freight this year compared to the 50,000 to 80,000 tonnes traditionally handled at PNH.

This follows cargo hitting an all-time high in 2025 when 93,000 tonnes passed through the combination of KTI and PNH before it closed.

SIHANOUK INTERNATIONAL AIRPORT

Cambodia's only other international gateway after Techo and Siem Reap-Angkor Wat is Sihanouk International Airport in the south of the country, which is experiencing strong traffic growth, although admittedly from a low base as it continues to recover from the COVID pandemic.

The 170,000 passengers that passed through its facilities in 2025 represented a huge 85% upturn on the previous year, but it is still a long way off the record 1.68 million that used it in pre-pandemic 2019. Its recovery continues this year with passenger traffic 100% up on the first half of 2025, leaving Bert optimistic about its future growth as it bounces back as a tourism destination and develops its cargo operations.

His confidence is based on the tourism appeal of the region's beach resorts and tropical islands in the Gulf of Thailand and the airport's cargo and logistics potential because of its location close to Sihanoukville's deep-sea port, Free Trade Zone and fast motorway connection.

Sihanouk International Airport has gained Level 3 certification in ACI's Airport Carbon Accreditation programme.

The programme plays a key role in supporting the decarbonisation efforts of airports worldwide, and the global efforts of the aviation sector to achieve net zero carbon emissions by 2050.

COMMITTED TO CAMBODIA

Bert says that the main objectives for Cambodia Airports this year, and going forward, is to focus on further strengthening its expertise in the aviation ecosystem.

Summing up, he comments: "At the end of the day, Cambodia is one of the most dynamic countries in Asia in terms of annual GDP growth and we are excited to be here and to play our part in developing its airports.

"We have been in Cambodia for over 30 years and have a very deep knowledge of the aviation ecosystem and enjoy good relationships with the authorities, airlines and many different agencies.

"Our strategy is to continue to strengthen our expertise and maintain our operational excellence in all layers of the ecosystem, starting with more partnerships in terms of education, training and innovation. This is key for us and key to the future success of Cambodia's airports."

TRADITIONAL DESIGN OF PASSENGER TERMINAL

The new terminal is a thing of beauty, with Foster + Partners stating that its design reflects Angkorian traditions "through sweeping roof canopies supported by structural trees" inspired by the rumduol – Cambodia's national flower.

Around 180 skylights ensure plenty of natural light, while tropical landscaping, and a nine-metre Buddha statue in the Abhayamudra pose, together create a distinctive sense of place that celebrates Cambodian heritage.

The terminal building comprises a central head house and a single aerofoil shaped northern pier. A southern pier is planned and could, potentially, open in the early 2030s if justified by passenger growth.

The building's layout is said to prioritise short walking distances – although some early passengers have complained about a 10 to 15 minute walk from the kerb to the gates as opposed to the short five minute one at PNH – and features clear sightlines and simple orientation to ease navigation.

Passenger processing, security and immigration, and retail are sheltered by a single overarching roof canopy that stretches from the kerbside drop-off to airside.

The modular roof is supported by structural 'trees' that each span 36 metres. The roof has an undulating form that crescendos at the centre of the building, echoing Cambodia's spectacular palaces and temples.

AW

Enhancing security

Our security news round up covers the TSA's new screening strategy, new partnerships, and the installation of state-of-the-art technology in terminals across the globe.

The US's Transportation Security Administration (TSA) has unveiled its new Horizon 25 Strategy for airport screening as the agency approaches its 25th anniversary.

The new strategy, outlined by TSA Administrator David Cummins in late August, has three main objectives – the modernisation of TSA's checkpoints, enhancing the traveller experience, and strengthening security across connecting modes of transport.

This strategic vision, noted Cummins, is designed to drive excellence and resiliency for many years to come.

To rapidly advance key strategic initiatives, Cummins said he will bring together innovators and ground breakers from across the agency, including field and headquarters personnel, in September.

These initiatives include enhancing TSA PreCheck, improving the passenger experience, streamlining the acquisition of new technology, expanding TSA's capabilities to counter the threat of unmanned aircraft systems, and advancing other key priorities.

According to the TSA, this strategy will accelerate public-private partnerships with industry leaders across sectors to expand modernisation across the administration.

An evolved Screening Partnership Program will replace TSA Gold+ "to better harness the role of the private sector in delivering a safer, more secure, and more efficient aviation system".

Each initiative of this strategic vision is said to reflect the core philosophy Cummins brings to the agency.

"TSA does not have to choose between a secure checkpoint, an efficient checkpoint, and an elevated passenger experience," said Cummins. "Through Horizon 25, TSA can, and will, deliver all three at once."

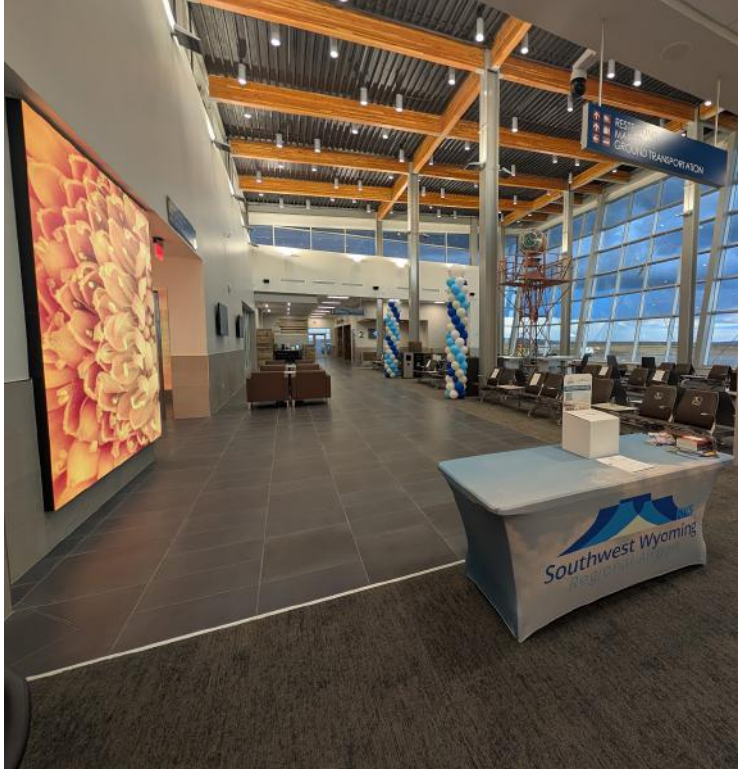
NEW SECURITY PARTNER AT SFO

VMD Corp has been awarded a five-year contract to provide passenger and baggage screening services at San Francisco International Airport (SFO) under the Department of Homeland Security's TSA Screening Partnership Program (SPP).

The award marks a major expansion of its aviation security footprint and reinforces the company's position as a trusted partner in protecting the US's critical transportation infrastructure.

VMD says by leveraging advanced screening technologies, highly trained personnel, and industry-leading operational practices, it will help safeguard millions of travellers each year while supporting the airport's mission to provide a secure and seamless passenger experience.

In addition to passenger and baggage screening, VMD – an Xcelerate Solutions company – will oversee designated security areas and deliver specialised security training programmes designed to stay ahead of evolving threats in today's dynamic aviation environment.



UPGRADING SECURITY OPERATIONS AT SOUTHWEST WYOMING REGIONAL AIRPORT

Southwest Wyoming Regional Airport (RKS) has modernised its security operations by introducing a platform from Genetec that brings video, surveillance, access control, licence plate recognition and communications into a single interface.

The airport selected Genetec's Security Center platform as part of its terminal modernisation project to support future expansion, evolving Transportation Security Administration (TSA) requirements, and potential new carriers and destinations.

Introduced as part of a recently completed $43 million upgrade, airport leaders wanted to replace aging video surveillance and access control systems with an open and flexible platform that would allow them to expand security infrastructure without being locked into proprietary systems.

As a result, the RKS team now has full visibility across the airport terminal, weather station, fuel station, and Sweetwater Aviation facility.

This has allowed them to improve visibility across the airport, respond faster to incidents, and streamline day-to-day security management from one platform.

Devon Brubaker, airport director at Southwest Wyoming Regional Airport, enthused: "We might be a small airport, but this investment allows us to operate like a much larger one."

PUNTA CANA DEPLOYS SEETRUE TECHNOLOGY

Punta Cana International Airport (PUJ) in the Dominican Republic has deployed SeeTrue's artificial intelligence platform to target the illegal movement of drugs and undeclared currency.

This new technology is part of the integrated checkpoint security solution at PUJ, recently deployed with Leidos, which includes the ClearScan checkpoint CT baggage scanner running these new AI-based threat detection algorithms.

"As a centre of excellence, Punta Cana has set a new standard for what checkpoint security can achieve," enthused SeeTrue's co-founder and CEO, Assaf Frenkel.

"This is a milestone not just for Punta Cana International Airport but for the global security screening industry."

SCREENING UPGADE AT FIVE AOT GATEWAYS

The security checkpoints at five airports in Thailand are to be upgraded with state-of-the-art Rohde & Schwarz screening technology.

The airports, which include Bangkok Suvarnabhumi, will install R&S's QPS201 machines, bring together advanced detection capabilities with efficient, intuitive procedures designed to benefit both passengers and staff.

The model uses millimetre wave technology and AI-based algorithms to identify prohibited items while keeping false alarm rates low.

The QPS201 achieved TSA qualification, approving it for use in US passenger security screening checkpoints and has achieved certification to TSA and European Civil Aviation Conference (ECAC) highest standards. There are more than 2,000 systems deployed in airports worldwide today.

Customer, Airports of Thailand (AOT), is said to have appreciated the performance, accuracy and speed of the QPS201.

AW

Data driven **borders**

With the decision to admit most passengers made before they fly, SITA's senior vice president for borders, Pedro Alves, argues that the next wave of border capacity will come from acting on this and not from adding more floor space at airports.

In today's digital world, consumers expect personalised experiences from platforms such as Amazon, Spotify, and Netflix, where data is transformed into relevance, convenience, and value.

The most effective digital experiences are built on turning customer insight into action. Without doing so, organisations miss the opportunity to anticipate needs, personalise engagement, and create value at every interaction.

The same principle applies at the border. Travellers do not want to be treated as a transaction. They want a journey that is seamless, intuitive, and tailored to their circumstances.

The data to do this already exists. The opportunity is to use it intelligently, making border crossing simpler, faster, and more personal for every traveller.

That is the difference between collecting information and turning it into better decisions. It is also the most useful way I know to describe where border operations stand today. Borders are now reaching a similar moment.

For many domestic and international journeys, governments already know a great deal about a traveller before they arrive. They have access to advance passenger information, passenger name records, electronic travel authorisations, visa data, watchlist checks, travel history and other sources that help build a clearer picture of who is travelling and why.

The individual technologies matter. But the real transformation is not ETA, ESTA, eVisas, API or PNR. It is the emergence of traveller intelligence.

FROM TRAVELLER DATA TO TRAVELLER INTELLIGENCE

For decades, border controls were designed around a simple reality: the first meaningful opportunity to assess a traveller happened when they arrived at immigration.

That assumption no longer holds. Many governments can now assess eligibility, verify identity, identify risks and make informed decisions hours, and sometimes days, before travel begins.

Electronic Travel Authorisation programmes pioneered by Australia, and later adopted in countries such as the UK, US and Canada, are the most visible examples of this shift. But they are only part of a much broader transformation.

For decades, governments have been building the foundations for earlier border decisions through Advance Passenger Information (API), Passenger Name Record (PNR) programmes, visa systems, watchlist checks and risk assessment capabilities.

Today, more than 100 countries require airlines to provide API data, more than 70 operate PNR programmes, and more than 350 airlines exchange passenger information with governments worldwide.

Individually, these programmes solve different operational and security challenges. Together, they create something much more powerful: a continuously evolving picture of the traveller before they ever reach the border.

Australia provides one of the clearest examples of what this transformation can achieve. By combining travel authorisation, traveller data and risk assessment before departure, Australia has spent decades moving border decisions earlier in the journey.

This has enabled border authorities to build greater confidence in who is travelling, assess risk before arrival and focus resources where they are needed most.

CAPACITY IS INCREASINGLY A DATA INTELLIGENCE CHALLENGE

Queue times and levels of service remain important indicators of border performance. They tell us how efficiently travellers move through immigration halls.

But as passenger volumes continue to grow, they also expose a difficult reality: there is a limit to how much capacity can be created through infrastructure alone.

Immigration halls have walls. Airport expansion is expensive. And passenger demand changes far more quickly than physical infrastructure can adapt.

The challenge is that borders cannot build their way out of every capacity constraint.

Think again about Netflix, Spotify and Amazon. Their success does not come from having more content, more songs or more products. It comes from understanding what matters, predicting what comes next and acting on that intelligence before the customer asks. Borders are beginning to face a similar challenge.

For most countries, the majority of passengers are low risk. Yet many border processes still devote the same level of attention to every traveller, regardless of what is already known about them.

When governments combine travel authorisations, API, PNR, visa information, watchlist results and travel history, they gain something more valuable than data: confidence.

Confidence in who the traveller is. Confidence in whether they are eligible to travel. Confidence in whether they require closer attention.

That confidence allows routine decisions to move before departure, enabling officers to focus their expertise where it creates the greatest value, and the question changes from "How many travellers can we process?" to "How many decisions can we make before they arrive?"

WHAT LEADERS SHOULD MEASURE NEXT

For decades, border agencies have focused on delivering acceptable levels of service at immigration.

That remains important. But as borders become more intelligence-led, other measures become equally important:

- How many travellers can be assessed before arrival?
- How much officer time is dedicated to higher-risk or more complex cases?
- How quickly can operations recover after disruption?
- How effectively is infrastructure being used?
- How accurately can resources be deployed based on expected demand?

These metrics provide a more complete picture of border effectiveness than queue length alone. Because the goal is not simply moving people faster. It is making better decisions.

WHAT IT ASKS OF ALL OF US

This shift will only succeed if it is built on trust. A decision made before departure is only as good as the information that supports it. Airlines, airports and governments all have a role to play in ensuring information can be shared securely, accurately and responsibly.

Travellers should understand what information is being used, why it is needed and what choices they have. Governments must always retain authority over border decisions.

Privacy must shape the design from the beginning, not arrive as a final compliance check. And passengers should not have to prove who they are again and again as they move between countries.

The industry's challenge is no longer collecting more information. It is creating trusted frameworks that allow information to be used more effectively.

That is why the theme of September's ICAO TRIP Symposium in Montréal, Putting Trust into Practice, felt particularly relevant.

THE FUTURE BORDER IS BUILT ON INTELLIGENCE

Yes, there will always be travellers who require closer assessment. Yes, there will always be situations where human judgement is essential.

And yes, governments will always retain responsibility for deciding who may enter a country. What changes is where decisions begin.

Netflix, Spotify and Amazon built better experiences not because they collected more information than everyone else, but because they became better at turning information into intelligence and intelligence into action.

Borders now have the same opportunity. The next generation of border capacity will not come primarily from larger immigration halls, more counters or additional infrastructure.

It will come from making better decisions earlier, with greater confidence, using information governments already possess. Because increasingly, the border is no longer where the decision is made.

AW

Smart solution

A new 5G mission-critical communication system has enhanced safety and operational efficiency at China's Xi'an Xianyang International Airport, writes Hytera's Leo He.

Xi'an Xianyang International Airport's new 5G MCX mission-critical communication system was delivered in partnership with Hytera.

The system supports high-bandwidth, high-reliability operations across all departments and covers four terminals and other key facilities spread across the gateway's 24 square kilometre campus.

The partnership with Hytera was part of the airport's Phase III expansion project to boost capacity and operational efficiency, with the airport deploying a digital-first communication system to meet the growing demands of safety, co-ordination, and real-time responsiveness.

And the project's impact has been independently recognised, last year receiving an innovation award at the 2025 Digital City Forum organised by the China Information Association.

The recognition effectively affirms the airport's leadership in smart airport development and highlights the project's value as a replicable benchmark within broader digital city construction.

OBJECTIVES

From the outset, Xi'an Xianyang International Airport faced a challenge common to many large aviation hubs: communication systems were fragmented, difficult to scale, and increasingly misaligned with the airport's growing operational complexity.

The project objective was not simply to upgrade technology, but to build a unified, future-ready communication platform capable of supporting frontline operations, centralised command, and emergency response in real time.

TECHNOLOGY DEPLOYED

In total, 1,116 Hytera PNC560 5G MCX devices – a mission-critical smart device that combines the productivity of a smartphone with the reliability of a professional radio – were deployed across twelve critical departments, including air cargo logistics, ground handling, the Operations Control Centre (OCC), security, maintenance services and passenger services.

The smart terminals enable airport staff to perform multiple functions in the field — from scanning cargo and submitting digital work orders to initiating voice or video calls with command centres.

Each device leverages the high-speed 5G network to ensure low-latency communication, precise positioning, and secure data exchange, all of which are essential for the airport's daily operations.

X'ian Xianyang International Airport stated: "By deploying a dedicated 5G private network, 5G-enabled smart terminals, and a converged communication dispatch platform, we have enabled core airport operations – from command and emergency response to security, firefighting, and ground services – to operate with real-time digital mobility.

"This project resolved long-standing interoperability challenges and established an integrated communications foundation that supports both current operations and future evolution."

While Hytera's West China regional director, Haiming Ding, noted: "Every successful critical communication deployment starts with a deep understanding of customer needs.

"For Xi'an Xianyang International Airport project, we worked closely with the airport team to deliver a reliable and intelligent communication solution that improves co-ordination and operational efficiency."

OUTCOMES AND BENEFITS

The broadband system integrates voice communication, HD video, real-time positioning, digital work orders, and security inspection scanning, transforming inspection, emergency response, and collaborative dispatch from a "passive reporting" model to "active situational awareness."

In pilot operations with the Xi'an Xianyang International Airport maintenance team, system management and response times improved by up to 80% compared with legacy private network operations, enabling faster decision-making and more co-ordinated field operations.

And by retiring traditional narrowband radios and independent spectrum leases, and consolidating onto a unified broadband communication platform, the solution enabled hardware reuse, centralised operations management, and reduced losses.

As a result, combined savings from spectrum rental and manual inspection costs are approximately $55,221 per year, demonstrating the solution's operational and financial effectiveness with real-world regional validation.

RELIABLE COMMUNICATION WHERE IT MATTERS MOST

A dedicated 5G private network now provides stable, uninterrupted coverage across baggage handling areas, aircraft aprons, and service roads – environments where reliability is critical but traditionally difficult to guarantee.

Real-time push-to-talk and multimedia messaging allow ground crews to co-ordinate loading, unloading, and transport with greater precision.

As a result, baggage transfer efficiency has improved, operational errors have been reduced, and on-time performance has become more predictable, directly contributing to a better passenger experience.

SECURITY AND EMERGENCY RESPONSE

Security and inspection teams now operate with dynamic patrol routing, instant alerts, and one-touch emergency video calls.

When incidents occur, frontline personnel can transmit live real-time frontline situation awareness to command units immediately, enabling faster assessment and more informed decision-making.

Each terminal is equipped with an emergency button that triggers cross-department co-ordination, instantly engaging fire, medical, and police teams. This capability has strengthened both daily safety management and the airport's ability to respond decisively under pressure.

AIRPORT OPERATIONS CENTRE: PRECISION, VISIBILITY, AND ACCOUNTABILITY

At the Airport Operations Centre, high-precision positioning and centralised dispatch provide decision-makers with full situational awareness.

Whether responding to severe weather disruptions or reallocating resources during peak travel periods, the AOC can track personnel movements, issue precise instructions, and maintain complete communication records.

This ensures accountability, traceability, and disciplined command execution across all departments.

SCALABLE SOLUTION AND SETTING NEW BENCHMARKS

As Phase III of the airport's expansion progresses, this communications foundation will support Xi'an Xianyang International Airport's evolution into a multimodal transportation hub, seamlessly connecting air, rail, and highway networks.

Through this initiative, Xi'an Xianyang International Airport has demonstrated how mission-critical communication technology can move beyond basic connectivity to become a true enabler of efficiency, safety, and resilience.

The project has arguably set a clear benchmark for digital airport transformation – one that is practical, scalable, and ready to support the future of global aviation.

Xi'an Xianyang International Airport is the largest airport in Northwest China handling around 50 million passengers annually. AW

About the author

Leo He is product director for Hytera's Industry Smart Terminal Business Unit.

Safety matters

***Airport World* editor, Joe Bates, takes a closer look at some of the latest airfield safety news and developments from across the globe.**

INDUSTRY EFFORT TO REDUCE RUNWAY INCURSIONS

Airports Council International (ACI), the International Air Transport Association (IATA) and the Civil Air Navigation Services Organisation (CANSO) have launched a joint initiative to reduce the risk of runway incursions.

A runway incursion is, of course, defined as an aircraft, vehicle or person being incorrectly present on a runway or within its protected area.

Incursions are documented in IATA's Annual Safety Reports, and several recent incursions have been fatal.

Preventing incursions requires close co-ordination between airlines, airports, air navigation service providers, regulators and frontline personnel.

The Joint Runway Safety Initiative focuses on three areas:

- Improving safety reporting and data capture, including incidents, near misses, precursor events and observations from frontline personnel.
- Strengthening Local Runway Safety Teams as the main forum for airlines, airports, air navigation service providers and other stakeholders to assess local risks and agree on co-ordinated action.
- Sharing progress and lessons learned so that effective practices can be adopted more widely by airports and organisations with similar operating environments.

"Airports sit at the centre of this challenge, where every part of the aviation system converges," noted Darryl Dowd, ACI World's vice president of safety, security and operations.

"Local knowledge and sustained collaboration are what turn safety guidance into real reductions in risk, and ACI is committed to supporting our members as they put these tools to work."

IATA's senior vice president for operations, safety and security, Nick Careen, said: "Flying is the safest form of long-distance travel.

"Maintaining that record requires a relentless focus on continuous improvement, supported by global standards, safety data and collaboration.

"This initiative brings airlines, airports and air navigation service providers together to identify runway risks earlier and take co-ordinated action."

The initiative builds on existing efforts, including the Global Action Plan for the Prevention of Runway Incursions (GAPPRI) – a collaboration between ICAO, EUROCONTROL and the Flight Safety Foundation, endorsed by IATA, ACI and CANSO – as well as the ICAO Global Runway Safety Action Plan.

The Joint Runway Safety Initiative will further the goals of these global plans using tools and programmes developed by IATA, CANSO and ACI, including risk-assessment resources, runway safety checklists and support for Local Runway Safety Teams.

These include ACI's Runway Safety Team Implementation Package, developed under its Airport Excellence (APEX) in Safety programme; the Runway Safety Checklist, co-developed by ACI and CANSO; IATA's Runway Incursion Safety Risk Assessment; the GAPPRI gap analysis tool for airlines; and assessments of airline risk assessments and mitigations through the IATA Operational Safety Audit (IOSA) programme.

CANSO's senior vice president for global operations, Andrea Sack, said: "Runway safety depends on clear communication and co-ordinated decisions across the airport environment.

"Strong Local Runway Safety Teams bring controllers, airports, airlines and other operational partners together to identify risks and agree on practical actions."

SAFETY AWARD FOR KEMPEGOWDA

Bengaluru's Kempegowda International Airport (BLR) has been recognised with the Diamond Award at the ACI Asia-Pacific & Middle East Safety Recognition Awards 2026, reinforcing its reputation for leadership in safe and resilient airport operations.

The ACI Safety Recognition Awards honour airport operators for advancing safety culture and strengthening safety management through effective, practical, and innovation-led solutions. The Diamond Award represents the highest level of distinction under the programme.

The award acknowledges BLR's sustained focus on runway safety, anchored by its Runway Safety Team (RST) and a collaborative, data-led operating model across the airport ecosystem.

Key initiatives include an indigenous Runway Safety Maturity Matrix, hotspot mitigation measures, enhanced pilot awareness programmes, advanced Foreign Object Debris (FOD) management practices, and continuous interventions to strengthen airside safety and operational efficiency.

Commenting on the recognition, Girish Nair, BLR's chief operating officer, noted: "As aviation ecosystems become increasingly complex and interconnected, safety can no longer be viewed as a standalone operational function.

"It must be embedded into the everyday functioning of the entire airport ecosystem. This recognition reflects the maturity of BLR Airport's safety framework and our continued focus on building resilient, globally benchmarked, and future-ready operations.

"More importantly, it reinforces the importance of proactive collaboration across stakeholders in strengthening operational reliability, passenger confidence, and long-term aviation resilience."

AI POWERED ROBOTICS FOR SAFER, SMARTER AIRSIDE OPERATIONS

Roboxi was among the 10 ACI World Business Partner (WBPs) to promote their breakthrough technologies during the Innovation Showcase sessions of last year's Airports Innovate conference in Busan, South Korea.

In the case of Roboxi, chief commercial officer, Dr José Luis Gil Yepes, used the opportunity to introduce delegates to a multi-functional autonomous robotics platform designed to transform airside inspections and maintenance.

Powered by artificial intelligence and machine learning, its robots automate critical tasks such as FOD detection and removal, surface and lighting inspections, bird deterrence, and perimeter control.

He revealed that Roboxi's 180-degree thermal scanning system ensures that it has a detection and deterrence range of up to 500 metres, and that crucially for safety, each robot/vehicle uses a transponder to "co-exist with aircraft and ground crew" communicating via 4G, 5G and satellite.

And it can save airports money, according to Yepes, who stated that the traditional method of detecting FOD – driving across runways manually looking for debris – costs the industry an estimated $22 billion a year.

Similarly, runway inspections that rely on visual inspections from engineers cost $4 billion a year and employing dedicated personnel to scare birds away from the airfield (using lasers, guns, animals or sound) costs airports an estimated $1.2 billion per annum.

"Our solution represents a transformative step toward fully autonomous airside operations, positioning airports at the forefront of technological advancement," said Yepes.

"In essence, Roboxi provides real-time data insights that ease the decision-making process and can also automatically perform immediate required tasks. This enables operational efficiency and safety."
The technology is currently in use or has been trialled at several airports

across Europe that include Amsterdam Schiphol in the Netherlands, Frankfurt in Germany and Toscana Aeroporti's Florence and Pisa airports in Italy.

"In Amsterdam, we integrated the robot into a major orchestration system and it could communicate with other stakeholders and other airport vehicles and co-ordinate tasks via a central airport system," noted Yepes.

In the future Roboxi believes that there will be fleets of autonomous vehicles working 24/7 across the airport campus, "communicating with each other and elevating airside operations to new heights".

MILESTONE FOR FAA'S SURFACE AWARENESS INITIATIVE

US Transportation Secretary, Sean Duffy, has announced that the Federal Aviation Administration (FAA) has installed its Surface Awareness Initiative (SAI) tool at more than 100 US airports.

The aircraft and vehicle surveillance tool will improve runway efficiency and help air traffic controllers keep operations running safely.

Specifically, SAI allows controllers to track aircraft and vehicles in real time, including in poor weather conditions or when aircraft may be out of sight from the control tower.

SAI uses Automatic Dependent Surveillance-Broadcast (ADS-B) data from aircraft and vehicles, enabling controllers to see surface traffic.

"We are moving at the Speed of Trump to bring air traffic controllers the surface safety technology they need to continue improving our airspace," said Duffy.

"We're going to continue fast-tracking our deployment so that all 220 FAA towers that did not have surface surveillance capabilities can now have a new tool at their disposal for controllers."

FAA Administrator, Bryan Bedford, said: "SAI is vital for controllers. It gives them the big picture of the airport's surface right at their fingertips.

"For our controllers to work at their best, they need the technology to match their expertise."

SAI is currently operational at 100 air traffic control towers. They include the recent additions of Billings-Logan, Gulfport-Biloxi, Greenville-Spartanburg and Corpus Christi international airports.

The FAA plans to install the technology at a further 44 US gateways by the end of 2026.

NEW FUNDING TO BOOST AIRPORT SAFETY

Aurrigo International plc has been awarded £1.43 million in funding from the UK government to investigate how autonomous vehicles can be used to make airports safer.

Best known for its Auto-DollyTug and Auto-Cargo vehicles in use at eight global airports, Aurrigo will use the grant to deploy its Auto-Shuttle vehicles to complete several routine tasks, including performing security patrols, routine perimeter inspections and counting birds and encouraging them to move somewhere safer.

They will also be used to inspect runway and taxiway surfaces for cracks, wear or spotting loose objects that can cause serious damage to an aircraft.

Named SENTRY, the project also taps into the expertise of Warwick Manufacturing Group at Warwick University, the guidance of the Civil Aviation Authority (CAA) and a specialist testbed facility located near Teesside International Airport.

"Airports are busier and more hazardous than most passengers ever realise," explained Aurrigo's chief technology officer, Simon Brewerton.

"Away from the terminal, staff spend their days walking and driving around parked aircraft, along taxiways and up and down runways, checking for loose debris, chasing away birds, patrolling for security, and inspecting the roadways for damage.

"Much of this work happens in the dark, in wind and rain, and always with aircraft moving nearby."

He continued: "SENTRY will investigate whether some of that work could be done by small autonomous vehicles that will navigate on their own, following a set of rules agreed in advance with air traffic control.

"Working with our partners, we are developing the technology and building it into our Auto-Shuttle, which will firstly be deployed in controlled environments before operating in real airport conditions at Teesside International Airport and at Cincinnati in North America."

This project has been designed to increase safety by detecting obstacles, birds, damage to runways and security issues, whilst also boosting efficiency through automated inspections and supporting aircraft to move smoothly around the airport.

Brewerton added: "Our team will measure the changes the autonomous vehicles make, including staff time savings, how quickly issues were spotted and the positive effect on reducing emissions.

"The findings will be written up in a public report that will be shared with airports, regulators and the wider sector, providing a best practice use case for adopting more autonomous vehicles.

"Aurrigo's technology is not about replacing people, it is about taking the cold, repetitive, three-in-the-morning jobs off the roster.

"It will free-up experienced staff for the work that genuinely needs human judgement and gives airports a practical way to raise their safety standards."

DRONE SIGHTINGS RAISE SAFETY CONCERNS

Concerns have been raised about the risk drones pose to flights at Tan Son Nhat International Airport in Vietnam after 227 illegal drones were detected near the Ho Chi Minh City gateway in just 13 days.

Speaking at a recent conference in the city, Lieutenant Colonel Nguyen Truong Long, deputy head of Tan Son Nhat International Airport's Border Gate Police, noted that the UAVs were detected illegally flying in no-fly zones between August 27 and September 8, mostly below 80 metres, with many operators unaware of the restrictions

Southern Airports Authority director, Tran Doan Mau, added that in the first nine months of 2026 the airport recorded 32 aviation safety incidents, including 13 involving lasers, eight kites, four balloons and three UAVs.

And on August 11, two flight crews spotted UAVs at altitudes of 1,800-3,000 feet in the airport's approach and departure paths. Kite flying near the airport also disrupted air traffic on August 13.

The Southern Airports Authority said it would report problems involving enforcement powers and penalties to the Civil Aviation Authority of Vietnam and seek tighter co-ordination between police and military forces to reduce the danger posed by UAVs.

AW

AI, airports and cyber resilience

Charlotte Clayson, Kathryn Noble and Matt Whelan from Trowers & Hamlins explore the growing role of AI and connected technologies at airports, and the importance of building cyber resilience and security alongside them.

Airports are among the most complex, data-intensive environments in the modern economy with thousands of passengers passing through their terminals, connecting to free Wi-Fi, booking car parking, accessing airport lounges and fast-tracking through security on a daily basis.

Each of those interactions generates data; and that data has value, not only to the airports that collect it, but to the criminal hackers who seek to exploit it.

The fast pace of developing AI technology means that these processes are becoming more efficient. However, the integration of AI comes with its own, developing risks, including cyber security.

Separately, the importance of broader cyber resilience within the sector has most recently been emphasised by the attack on Manchester Airports Group, which operates Manchester (MAN), East Midlands (EMA) and London Stansted (STN) in the UK.

As airports increasingly deploy artificial intelligence, technology and connected digital systems to improve the passenger experience and operational efficiency, cyber resilience must sit at the very heart of that technological transformation.

In this article we examine the ethical considerations of AI in the aviation industry and its impact on cyber security.

AI IN THE AIRPORT ENVIRONMENT: OPPORTUNITY AND RESPONSIBILITY

The airport sector is undergoing a fundamental technological shift. Where passenger processing was once defined by shared terminal equipment and standardised check-in infrastructure, airports are now deploying AI-enabled systems across virtually every stage of the passenger journey.

Biometric identification at eGates, AI-driven security screening, predictive maintenance of critical infrastructure, automated baggage handling, and intelligent self-service kiosks are no longer aspirational; they are operational realities in airports across the United Kingdom and globally.

The industry is moving from simply processing passengers to understanding them: AI-enabled touchpoints can now interpret passenger context, anticipate needs and deliver personalised services in real time.

This transformation, however, generates vast quantities of sensitive data. Every AI-enabled touchpoint collects, processes and transmits personal and operational data across interconnected networks.

The more intelligent and connected these systems become, the greater the volume of data flowing through airport infrastructure, and the larger the potential attack surface for malicious actors.

The commercial value of this data is significant: for many airports, non-aeronautical revenues (driven in part by data-enabled services) account for a substantial proportion of total income.

The same data that enables personalisation and operational efficiency is precisely the data that threat actors seek to exploit.

The deployment of AI in airports does not operate in a regulatory vacuum. Although the United Kingdom, for example, has not yet enacted dedicated AI legislation, AI systems are already subject to a substantial body of existing law.

The UK GDPR, the Data Protection Act 2018 and the Data (Use and Access) Act 2025 impose strict requirements on automated decision-making, particularly where decisions produce legal or similarly significant effects on individuals.

The Equality Act 2010 constrains the use of algorithmic systems that may perpetuate or amplify discrimination across protected characteristics (a risk that is particularly acute where AI is deployed in passenger screening, security profiling or service eligibility decisions).

Beyond these statutory obligations, the UK government's principles-based regulatory framework (emphasising safety, transparency, fairness, accountability and contestability) places the onus on deploying organisations to demonstrate that their AI systems operate responsibly and in accordance with fundamental rights.

A further dimension of risk arises from the airport AI supply chain. The majority of AI systems deployed in airports are not developed in-house but procured from third-party technology vendors.

This creates what has been described as the problem of "moral outsourcing", if airports delegate operationally and ethically sensitive functions (such as passenger identification, security screening and data analytics) to systems over which they may have limited visibility or control.

Critically, legal responsibility cannot be delegated down the supply chain. An airport deploying a third-party AI system that produces discriminatory, unlawful or unsafe outcomes will bear liability regardless of the system's origin.

Robust contractual safeguards (including transparency obligations, audit rights, liability and indemnity provisions, and change control mechanisms) are essential to managing this risk.

Equally important is rigorous pre-procurement due diligence, encompassing supplier audits of training data, validation processes, bias testing and regulatory alignment.

Perhaps most fundamentally, the current landscape demands a shift in how airports approach the design and construction of their increasingly digital and physical infrastructure.

Cyber security and AI governance should be embedded at the design stage rather than retrofitted after deployment, ensuring that consultant and contractor procurement factors in these requirements, including intellectual property liabilities and ownership considerations.

This principle, often described as "ethics by design" or "security by design", requires organisations to conduct structured risk assessments, data protection impact assessments and algorithmic impact assessments during the design phase, before systems go live.

Successful implementation and security of AI-enabled and complex digital solutions relies not only on this being a key consideration at concept and construction phases, but also in the training of engineers and analysts who will maintain and interpret data generated by these systems throughout operations.

Chris Yang on Unsplash.

This is particularly important where design and construction is being undertaken to upgrade and enhance existing facilities and buildings.

Integration of existing and new technological models and products will impact on the efficiency, future-proofing, ROI, and security of the airport's AI network.

For airports undertaking new construction or terminal redevelopment, this means careful consideration is required to ensure effective and co-ordinated integration of cyber-resilient architecture into the physical fabric of the building and the airport's complex building management systems: network segmentation, computer services, secure data centres reliable power sources, resilient communications infrastructure and access controls should be designed alongside passenger flow, retail space, mechanical and electrical systems, and operational facilities.

The convergence of digital and physical security is a prerequisite for any airport seeking to deploy AI responsibly and to future-proof its operations against an evolving threat landscape.

The recent cyber attack on MAG illustrates precisely the risks that arise when the volume of data generated by connected, passenger-facing systems is compromised.

Whilst the MAG attack did not itself involve AI, it demonstrates the broader cyber security challenges facing airports as they adopt increasingly data-intensive technologies.

THE IMPACT IN REALITY

For MAG, approximately 8.7 million customers had their data accessed and published by hackers, who subsequently demanded a ransom for the return of that data. The majority of the data related to customer email addresses was gathered through airport Wi-Fi sign-ups.

However, more detailed personal information (including vehicle registrations and postcodes) was also accessed, obtained through passengers who had booked car-parking spaces, lounge access or fast-track services.

The incident has been referred to the Information Commissioner's Office (ICO), which has confirmed it has launched an investigation.

MAG has moved quickly to put protective measures in place for those impacted and has been clear that passenger and aviation safety have not been compromised.

For those passengers whose data has been compromised, this is a particularly sensitive issue, where personal information has been provided to improve their experience in transit, but has led to them becoming victims of an attack.

This does not mean the sector should avoid digital transformation. AI-enabled systems offer transformative benefits for both passengers and operators alike.

However, the more interconnected and data-dependent an organisation becomes, the larger its attack surface. Every new system that processes passenger data, and every third-party vendor that integrates with airport infrastructure, represents a potential vulnerability.

Without robust AI governance, ethical safeguards and supply chain oversight operating alongside protective cyber security measures, the very technologies deployed to enhance the passenger experience risk becoming the vectors through which that experience is compromised.

Recent incidents do not exist in isolation. They form part of a broader pattern of escalating cyber attacks against critical infrastructure and large data-holding organisations across the United Kingdom.

The UK is now the most targeted country in Europe for cyber attacks, with the estimated annual cost of significant cyber attacks on the UK economy reaching a staggering £14.7 billion according to research by KPMG.

Recent high-profile incidents affecting major UK institutions such as the NHS and the Ministry of Defence, and businesses such as Marks & Spencer and Jaguar Land Rover, have demonstrated the devastating operational and financial impact of cyber attacks, with incidents ranging from sophisticated social engineering to ransomware deployment.

LESSONS FOR AIRPORTS: WHAT CYBER RESILIENCE LOOKS LIKE

The MAG attack demonstrates the risks to passenger data and the evolving threat landscape. However, there are actionable steps that airports and other large data-holding organisations operating in a complex or AI-augmented environment, can take to protect themselves and the data they hold:

– Incident Response Plans must be well prepared. MAG responded to this incident very quickly, notified relevant individuals and authorities, and worked with specialists to mitigate the risks.

Ensuring that incident response plans are in place and stress tested on a regular basis can have a significant and positive effect on the potential impact of a cyber attack.

– Security monitoring must be comprehensive. Monitoring only a fraction of an IT environment leaves significant blind spots. Organisations should ensure security monitoring platforms are fully integrated across their networks.

This is especially acute for airports, whose IT environments span terminal operations, retail, transport and aviation systems.

– Keep software current. Running end-of-life operating systems exposes organisations to known vulnerabilities which are an easy target for threat actors to exploit.

– Conduct regular vulnerability scanning. Routine scanning (both internal and external) should be a standard part of any cyber security programme; otherwise critical weaknesses may go unidentified and unpatched.

– Plan for supply chain risk. The majority of AI systems deployed in airports are procured from third-party vendors, and an exploited vulnerability in one supplier can have knock-on effects across the entire airport ecosystem.

Airports must conduct rigorous due diligence on every supplier that handles passenger data or provides AI-enabled services, encompassing not only cyber security standards but also ethical safeguards, bias testing and regulatory alignment.

Legal responsibility for the outcomes of third-party AI systems cannot be delegated down the supply chain.

– Embed security into design and construction. Whether building new terminal infrastructure or integrating AI-enabled systems into existing operations, cyber security and data protection should be incorporated at the design stage and maintained and tested appropriately throughout operations to optimise efficiency and coordination with the live building management systems.

Network architecture, data storage, access controls and AI governance frameworks should be specified alongside physical infrastructure requirements.

Retrofitting security measures after deployment is invariably more costly, less effective and leaves systems exposed during the interim period.

THE ROAD AHEAD

Whilst the MAG breach did not compromise passenger safety or aviation security, and did not have an impact on operations, it will, in all likelihood, continue to attract scrutiny given the sheer number of individuals involved.

More broadly, the incident underscores that as the sector enhances its service offering through interconnected and customer-facing systems, cyber resilience is essential.

For organisations that also deploy AI, ethical AI governance is an interdependent discipline that must be pursued alongside robust cyber security.

Any organisation that deploys AI without adequate ethical safeguards, supply chain oversight and security-by-design principles exposes itself to significant cascading risk, and any organisation that handles large volumes of personal data without robust cyber security measures is similarly vulnerable.

The intersection of AI, aviation and cyber security is a present one. As airports deploy increasingly sophisticated AI systems across their operations, they must invest with equal sophistication in the cyber resilience frameworks that protect them, whether technical, operational, or people led.

That investment must begin at the earliest stages of design and construction: airports that embed cyber security, data protection and AI governance into their infrastructure from the outset will be far better positioned to withstand the threats of tomorrow than those that seek to retrofit protections onto legacy systems.

The goal is not to resist digital transformation, but to ensure that it is pursued securely, ethically and with the resilience that critical national infrastructure demands. AW

About the authors

All work at *Trowers & Hamlins* in the UK. Charlotte Clayson is a partner for dispute resolution and litigation; Kathryn Noble, partner, projects and construction; and Matt Whelan, senior associate, corporate and commercial.

Dealing with **disruption**

Clare Williams Fannin of Templemere discusses the hot topic of EES with Copenhagen Optimization's Kasper Hounsgaard.

The full rollout of the European Union's Entry/Exit System (EES) for non-EU nationals caused huge travel disruption across the continent's airports this summer and prompted widespread discussion across the aviation industry.

Indeed, five hour waiting times at some border control points led ACI EUROPE, IATA and A4E to submit an Open Letter to the President of the European Commission calling for the flexibility for member states to suspend EES whenever passenger volumes exceeded the operational capacity of border control facilities.

Naturally, much of that conversation has centred on border technology, processing times, and the potential impact on passenger queues.

Yet, while EES may have introduced a new operational challenge, it has also highlighted something much broader: many of the pressures airports are experiencing today did not begin with EES. They have existed for years.

Every major operational change presents airports with two challenges. The first is implementing the change itself. The second – and often the more significant – is understanding how that change ripples across the wider airport operation.

From Copenhagen Optimization's perspective, EES has demonstrated that introducing new technology into an airport does not happen in isolation.

"An operational change at border control can have consequences for queues, staffing, passenger flows, gate operations, airline schedules, and ultimately the passenger experience," says Kasper Hounsgaard, president and co-founder of Copenhagen Optimization.

"Many of the pressures associated with EES – long queues, mismatches between demand and staffing, and fragmented communication – were already familiar operational challenges.

"EES did not create the underlying planning problem, it exposed how difficult it can be to manage change when different stakeholders are working from different forecasts, assumptions, and operational plans."

The broader lesson, he believes, is that technology alone cannot create resilience.

"Airports also need the ability to anticipate the operational impact of change, test different scenarios and co-ordinate their response across the entire operation," notes Hounsgaard.

FROM REACTIVE TO PROACTIVE PLANNING

So, what are the biggest operational challenges airports need to address?

For Hounsgaard, many of the issues highlighted by EES are closely connected, but the fundamental problem is fragmented planning and the lack of a shared operational picture.

"When stakeholders use different data and assumptions, staffing becomes reactive and decisions are often made only after queues or delays have developed," he explains.

"Limited scenario planning compounds the problem because teams may have a plan for the expected day, but no shared response for what happens when processing times increase, equipment fails or demand differs from the forecast."

Better visibility is therefore important, but visibility alone is not enough.

"The real value comes from turning shared information into a co-ordinated plan and clear operational decisions," says Hounsgaard.

This distinction is increasingly important as airports face greater operational volatility. Rather than simply responding to disruption once

it has occurred, airports need to understand what might happen under different conditions and agree how they will respond.

BUILDING RESILIENCE INTO THE OPERATION

In practice, operational resilience means identifying pressure before it becomes disruption and having the ability to adjust the plan as conditions change. That starts with better forecasting, says Hounsgaard.

"Airports need to combine historic, scheduled, and live operational data to understand what is likely to happen, rather than relying on a static plan created at the beginning of the day or season," he notes.

Continuous planning is equally important. Passenger demand, airline schedules, staffing availability, and operational conditions can all change, meaning that the plan needs to evolve alongside them. Scenario planning also has an important role to play.

"For EES, for example, airports should not plan around one assumed processing time," says Hounsgaard. "They should model low, medium, and high-friction scenarios and understand when queues will form under each one."

The benefit is not simply a better forecast. It is the ability to agree with what happens next.

He adds: "If you understand the point at which pressure starts to build, you can agree in advance what action should be taken, whether that means changing staffing levels, opening additional capacity, or adjusting gate allocations."

This allows airports and their partners to move from reacting to disruption to managing it.

NO SINGLE STAKEHOLDER HAS THE FULL PICTURE

The need for better planning also reinforces the importance of collaboration between airports, airlines, border agencies, and other operational stakeholders.

Each organisation manages a different part of the passenger journey, but their decisions are closely interconnected.

"An airline schedule affects passenger presentation at the border; border processing times affect passenger flows and connections; and staffing or capacity decisions in one area can create consequences elsewhere," says Hounsgaard.

"No single organisation has all the information or controls the entire journey. Collaboration is therefore essential, particularly as airport operations become more complex and less predictable."

However, effective collaboration means more than exchanging updates when something goes wrong.

Hounsgaard says: "It means developing forecasts and scenarios together, agreeing which data and assumptions to use, and making decisions from one shared operational picture."

That shared approach can help stakeholders make earlier and more confident decisions, while also allowing them to balance their individual priorities against the performance of the airport as a whole.

PREPARING FOR THE NEXT DISRUPTION

While EES provides a clear example of the challenges created by operational change, the lessons extend well beyond the border.

Airports are likely to face increasing volatility from extreme weather, sudden changes to airline schedules, diverted flights, workforce constraints, equipment or system failures, and future security and regulatory requirements.

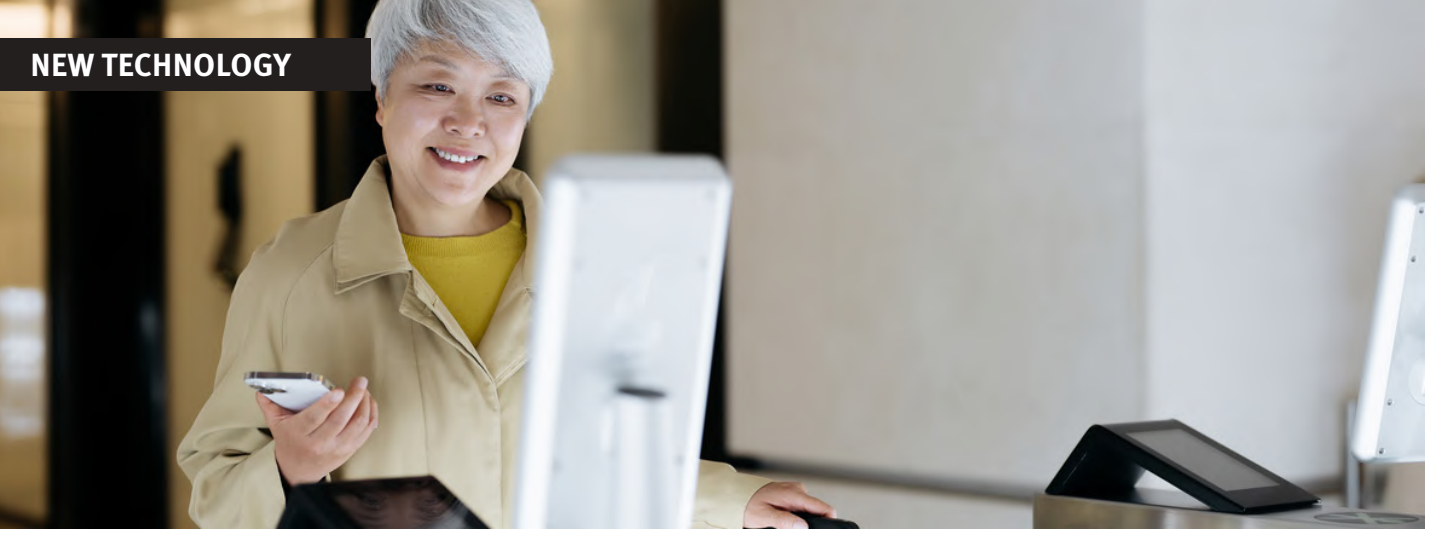
"The specific cause of the next disruption may be difficult to predict, but airports can prepare the capabilities needed to manage it," says Hounsgaard.

"Forecasting, scenario planning, flexible resourcing, and shared decision-making are applicable well beyond EES."

For airports, therefore, the lesson from EES is not simply about how to manage a new border system. It is about how to build an operation that can adapt when conditions change.

"The next competitive advantage for airports will not come solely from introducing more automation. It will come from combining technology with co-ordinated operational decision-making, using shared data to anticipate pressure, evaluate options and act together," concludes Hounsgaard.

EES may have exposed the challenge, but the opportunity for airports is to use that experience to build a more resilient operation for whatever comes next. AW



Building for a tech-enabled future

New technology will change the way airports are designed and built, writes Amadeus' Holger Mattig.

Airports are fascinating, complex organisms, designed to accommodate a multitude of needs and challenges. Each is unique, shaped by the pressures around it.

Whether beginning afresh within a new greenfield location, or rethinking an existing facility, we must consider capacity – how many passengers and flights can we expect to welcome each year?

Of course, budget plays a significant role, limiting or freeing our imagination accordingly. Local culture is a perhaps underappreciated element of the airport design process; we must ask ourselves what we can do to ensure local sensibilities are respected and expectations met.

Also, key is the concept for the airport – will this be an international location or focused on domestic markets? The centre of a hub-and-spoke model, or a node on a point-to-point network?

This influences what kind of aircraft an airport can expect – a location welcoming an influx of wide-body aircraft will need a very different gate configuration and turnaround capabilities to one focused on the much smaller narrow-body planes.

Airspace, safety, and operational integration must be considered, alongside ground transport and connectivity to ensure passengers can reach the airport.

Equally, the wider community, environmental and economic impacts should remain front of mind. Much to consider, then.

But, while many of these considerations are established and immutable, a host of trends, drawing on new technology, changing passenger expectations and a more general rethinking of the airport experience, are shaping how we design airports.

Here we explore some of these major themes and find that decisions taken today can have impacts that last decades.

HOW NEW TECHNOLOGY IS RESHAPING AIRPORT DESIGN

Baggage is one area where change is coming fast. Rising passenger numbers are driving airports to rethink baggage handling, with automation, robotics, and data intelligence improving capacity, efficiency, and resilience.

Smart technologies can reduce manual handling, detect potential equipment failures earlier, and streamline screening and loading processes.

Autonomous vehicles could take this a step further, with small robotic units collecting bags directly from passengers and transporting them into the baggage system – potentially reducing the need for fixed bag-drop infrastructure and freeing up valuable terminal space.

Off-site check-in could also see less baggage entering the airport in the first place.

With door-to-door baggage services increasingly positioned as a value-added option by airlines, some bags may bypass the airport entirely, potentially further reducing the footprint required for handling equipment.

Outside the airport front door, a push towards public transport could also reshape the physical footprint of airports, reducing the need for parking and space dedicated to private vehicles.

Rising 'kiss and fly' charges are one example of this trend in action, with pricing increasingly used to discourage drop-offs and encourage rail and other public transport options.

This raises a broader design question. If fewer passengers arrive by car, how much space do we really need for roads, parking, and vehicle access – and what could replace it?

In what will be welcome news for many passengers, new CT security scanners are making the process more seamless, allowing increasing numbers to leave liquids and electronics inside their bags rather than removing them for screening.

This technology is already improving throughput and cutting queue times, with a larger equipment footprint offset by reductions in the space required for passengers to wait.

Finally, trusted traveller programmes complement this shift by using pre-vetted passenger data to enable faster, lower-friction security and border processing, reducing queues and pressure on terminal infrastructure.

When questioned by IATA, 89% of passengers expressed an interest in such schemes.

WHERE DOES THE SHIFT TO DELIVERY MANAGEMENT FIT?

The trend, then, is undoubtedly toward doing more with less. Smaller departure halls require less investment, and by taking advantage of some of the changes outlined, can build better experiences for passengers.

Modern delivery management systems can accelerate the process, helping remove the fixed points departure halls are built around today.

Check-in desks become less necessary once airlines confirm the intention to fly through app location data and bag-drop alone, and the boarding pass is replaced by dynamic information sent to a mobile device.

Document checks that become digital can move earlier into the journey, rather than happening at a counter. The result is fewer desks and less dedicated processing equipment, with agents instead able to roam the terminal on tablets, connected directly to the delivery system rather than through shared hardware like CUPPS.

Terminal space once given over to processing can then be reallocated to retail and leisure.

HOW DIGITAL TRANSFORMATION CAN REDUCE THE AIRPORT FOOTPRINT

Self-service transformation is also changing the amount and type of physical infrastructure airports need.

Smaller, lighter self-service equipment can reduce the footprint of check-in and bag drop, for example, while more efficient digital displays and wayfinding systems can make better use of terminal space and reduce the need for large, fixed signage.

The balance between staffed and self-service processing is particularly important. Common-use technology means airlines can share counters and gates, reducing the amount of dedicated infrastructure required.

As more passengers arrive 'travel ready' – having completed check-in and other processes before reaching the airport – the need for traditional check-in desks could fall further.

Biometrics will have an equally significant impact. By enabling passengers to move through identity and border processes with fewer physical checkpoints, biometric journeys can change the shape and flow of a terminal.

Cloud technology is also reducing the physical footprint behind the scenes. A virtual airport operations centre (vAPOC) can replace large rooms filled with fixed consoles and video walls, freeing valuable space while reducing associated power and cooling requirements.

Greater flexibility can extend to the gate. Designing gates to handle both international and domestic passengers – including Schengen and non-Schengen flows where relevant – can increase utilisation and reduce the total number of gates required.

The result is an airport that can do more with less physical infrastructure – just as we have seen in *our project with Manchester airport.*

Tomorrow, the smartest airport may not be the one with the most infrastructure, but the one that needs the least. AW

About the author

Holger Mattig is senior vice president for product management at Amadeus Airports & Borders.

Taking cues from **theme parks**

Gresham Smith's aviation studio leader, Zoë Fisher, argues that airports need a little theme park magic when it comes to managing queues and enhancing the customer experience.

Airports and theme parks rarely share the same conversation, yet both face the same challenge: moving large numbers of people through constrained spaces while maintaining a positive emotional experience.

A recent visit to a bustling, animal-themed park made that contrast clear. Even in heat, crowds and long lines, guests navigated the park with noticeably less stress than the passengers who funnel through airports every day. The difference wasn't luck; it was design.

Theme parks treat queues as part of the experience: an opportunity to entertain, distract and prepare visitors for what comes next. Airports, by contrast, often treat queues as unavoidable processing.

That divide shapes how people feel, behave and move, and it presents a powerful opportunity for airports to rethink the passenger journey.

HOW THEME PARKS APPROACH QUEUING

Theme parks have spent decades studying crowd psychology and refining the art of waiting.

Their queues are strategically designed to engage and inform, using immersive pre-shows, interactive elements and scenic storytelling to make waiting feel purposeful. Guests begin the "ride" long before boarding.

Clear, progressive wait-time markers help visitors manage expectations and reduce anxiety. Digital tools play an equally important role.

Virtual queuing systems let guests reserve a place in line through apps or wearables, freeing them to explore shops and restaurants until their turn arrives. Behind the scenes, operators balance arrival rates with dispatch intervals to maintain steady flow and minimise bottlenecks.

These strategies work because they acknowledge a simple truth: people tolerate waiting far better when they understand it, feel engaged and know what comes next.

HOW AIRPORTS CURRENTLY MANAGE QUEUES

Airports, meanwhile, tend to treat queues like a necessary evil. The result is a landscape of stanchions, switchbacks and uncertainty that leaves passengers tense before they ever reach the gate.

Most terminals rely on static stanchions and serpentine lines that feel rigid and confining. Security and check-in queues often lack transparent wait-time information, leaving passengers unsure how long the process will take.

Amenities such as food, seating and restrooms are typically located beyond security, meaning travellers stuck in long lines have limited access to comfort.

The outcome is predictable: rising stress, rushed behaviour and inconsistent flow. For many travellers, the security checkpoint remains the most stressful part of the journey, which in the US, helps explain the surge in TSA PreCheck enrolment among leisure passengers.

According to TSA, active PreCheck enrolment recently surpassed 20 million, driven by the value and ease of expedited screening.

LESSONS AIRPORTS CAN ADOPT

The good news? Airports don't need animatronics or theatrics to improve the queuing experience. Instead, small, strategic shifts, rooted in intentional design and clearer communication, can dramatically change how passengers move and feel.

Virtual security checkpoints could allow passengers to reserve screening times, reducing physical congestion and giving travellers freedom to shop or relax until their window opens.

Real time wait-time indicators would help passengers manage their movement and reduce anxiety. Bringing refreshments or comfort zones closer to queues during peak periods would improve comfort without major infrastructure changes.

Data-driven flow management offers another opportunity. Computer vision, people-counting sensors and predictive analytics can help airports adjust staffing and lane allocation before bottlenecks form.

CURRENT TECHNOLOGIES IN USE AT AIRPORTS

Some airports are already experimenting with smarter queuing, though the industry hasn't yet taken a full leap. Emerging tools show promise, even if they're not being used to their full potential.

Hartsfield-Jackson Atlanta International Airport (ATL) for example, offers virtual reservations for early parking arrivals, encouraging timely entry and boosting concession activity.

While many terminals now incorporate cameras, Wi-Fi tracking and IoT sensors to measure crowd density and predict wait times.

Dynamic digital signage guides passengers toward shorter lines and improves wayfinding. In the US, smart gates and touch-free TSA PreCheck lanes, like those at Charlotte Douglas International Airport (CLT), streamline movement and reduce friction.

Smart stanchions tied to occupancy sensors can automatically adjust queue layouts based on real-time passenger volumes and flight schedules.

CHARLOTTE DOUGLAS: A CASE STUDY IN QUEUE EVOLUTION

CLT offers one of the clearest examples of how airports can rethink queuing at scale. For over a decade, planners and designers at Gresham Smith have reimagined how passengers move from landside to airside.

Beginning in 2017, CLT launched a major reconfiguration of its security checkpoints, consolidating five checkpoints into three more efficient, intuitive ones. The first opened in 2021; the final debuted in August 2025.

The redesign required maintaining passenger flow while construction continued. TSA's checkpoint design guidelines are prescriptive, but CLT introduced open sightlines that allow passengers to see the airside beyond security.

That visibility reduces stress by giving passengers a sense of progress – light at the end of the tunnel.

The queues themselves are long but visually shallow, helping passengers understand where they're headed. Operations within the queue were streamlined to reduce unnecessary movement.

Travellers simply choose among three checkpoint locations based on where they enter the terminal.

Wayfinding signage has been especially well received. Digital displays tell passengers how long it will take to reach other concourses, helping them decide whether to walk briskly or move at a more relaxed pace.

With more leisure travellers and fewer frequent business passengers, transparency has become essential.

Charlotte Douglas is also exploring smart stanchions as they've now implemented passenger-counting systems that monitor congestion and publish wait-time information as travellers enter the queue.

Adaptable queue systems could now adjust gates and swing lanes based on flight schedules and real-time passenger numbers, reducing the need for constant staffing changes.

A PATH FORWARD FOR AIRPORTS

If theme parks have taught us anything, it's that waiting can be designed – not endured.

Airports now have the tools to make queues calmer, clearer and more human-centred, turning a historically stressful moment into one that feels intentional and predictable.

By integrating psychological cues, virtual queuing, transparent communication and data-driven flow management, airports can create environments that feel more intuitive and less stressful.

CLT's evolution shows what happens when airports treat queuing as a design opportunity. When passengers feel informed and reassured, they move more predictably, spend more time in concession areas and require less staff intervention – benefits that support both experience and operations.

Waiting will always be part of air travel. The challenge is to make that waiting feel purposeful rather than punitive.

Theme parks have shown that queues can entertain, inform and guide. Airports now have the tools, and the opportunity, to do the same.

AW

Image courtesy of Rhiannon Elliott/Unsplash.

Image courtesy of Phil Mosley/Unsplash.

New rules of investment

The investor appeal of airport privatisation projects are now inextricably linked to their sustainability goals, writes Aervanta's Arthur Lavier.

In the early spring of 2026, a major international airport transaction in the Middle East quietly collapsed, and it had nothing to do with the ongoing conflict in the region.

On paper, the asset was a crown jewel: double-digit passenger growth, a strategic location at the crossroads of global trade, and robust commercial revenues.

Ten years ago, sovereign wealth funds and global infrastructure operators would have triggered a fierce bidding war. Yet, when the bidding window closed, the highest-profile consortia had walked away.

The deal did not flounder on regulatory disputes or tariff structures. Instead, it stalled because the asset lacked a credible, science-based Scope 3 emissions reduction plan.

In 2026, the global capital markets delivered a definitive verdict: an airport that cannot prove its pathway to decarbonisation is no longer an investable asset.

This is the new, uncompromising paradox of airport privatisation. The aviation sector stands at an unprecedented crossroads where the desperate need for capacity expansion collides directly with the absolute mandate for climate action.

THE NEW RULES OF AIRPORT INVESTMENT

For decades, airport Public-Private Partnerships (PPPs) were structured on relatively straightforward financial engineering. Investors evaluated passenger forecasts, non-aeronautical revenue potential, and regulatory asset base models to project long-term yield.

Today, that calculus has been fundamentally rewritten. ESG covenants are no longer optional addenda or superficial checklists buried deep within the annexes of a prospectus. They are now standard, hard-coded conditions in PPP term sheets.

Institutional investors – pension funds, insurance giants, and sovereign wealth managers – operate under strict mandates that forbid the deployment of capital into assets that risk becoming stranded.

Consequently, private operators are demanding that governments provide clear legislative frameworks for sustainable aviation fuel integration, grid electrification, and intermodal connectivity before they even submit an initial expression of interest.

The modern airport investor is not just buying a physical asset; they are acquiring a complex carbon liability that must be actively managed from day one.

THE PRIVATISATION PARADOX

This shift has created a profound geographical imbalance. In high-growth emerging markets across Africa, the Middle East, and South Asia, the demand for aviation infrastructure is surging.

Rapid urbanisation, a rising middle class, and the expansion of trade corridors require billions of dollars in capital expenditure that state treasuries simply cannot afford.

Yet, the very airports that desperately require private capital are the least equipped to attract it under modern investment parameters.

Many of these gateways lack the robust sustainability frameworks, local supply chains for sustainable fuels, or national green grid connections necessary to satisfy international lenders.

When a secondary gateway in Sub-Saharan Africa or South Asia attempts to launch a traditional concession tender, they find themselves trapped in

a market vacuum. They often cannot secure the capital to modernise because they lack green credentials, and they cannot build those credentials without the capital that modernisation brings.

FROM CONCESSION TO HYBRID

To break this deadlock, the traditional long-term concession model is undergoing a rapid evolution. The historically popular thirty-year Build-Operate-Transfer (BOT) framework is increasingly giving way to sophisticated hybrid financing structures.

We are seeing the rise of blended finance, where development finance institutions, such as the International Finance Corporation or regional development banks, absorb first-loss risks or provide highly concessional equity tranches.

This initial public and multilateral backing de-risks the asset, allowing commercial banks and private equity to step in with confidence. Furthermore, traditional corporate debt is being replaced by green bonds and sustainability-linked loans.

These instruments tie the interest rate of the debt directly to verified operational milestones, such as achieving specific levels of Airport Carbon Accreditation, reducing water intensity, or transitioning ground support equipment to zero-emission fleets.

THE NET ZERO READINESS GAP

Through our transaction advisory work at Aervanta, we have identified a widening gulf between what we call “investment-ready" assets and those stuck in legacy operational paradigms.

A truly Net Zero-ready airport is characterised by a highly specific set of operational and structural attributes. It possesses a fully audited greenhouse gas inventory covering Scopes 1, 2, and 3, alongside a validated science-based target.

Its concession agreement explicitly defines the division of decarbonisation responsibilities between the state and the private operator, particularly regarding public transit connections and renewable energy generation.

To bridge this readiness gap, governments must treat climate strategy not as a post-transaction operational requirement, but as the foundational core of the transaction preparation phase itself.

WINNING THE NEXT WAVE

To position themselves successfully for the next generation of privatisation deals, governments and airport operators must act decisively.

First, states must integrate national aviation decarbonisation roadmaps directly into their PPP enabling legislation, giving investors legal certainty over long-term policy directions.

Second, airport authorities must initiate baseline carbon audits and establish preliminary ESG reporting frameworks well before bringing an asset to market.

Finally, transaction advisors must design bid evaluation criteria that weigh decarbonisation capabilities as heavily as financial offers.

The winning bidder should not merely be the one who offers the highest upfront concession fee, but the partner who demonstrates the most technically viable and financially backed plan to transition the airport to a low-carbon hub.

NAVIGATING THE GREEN TRANSITION

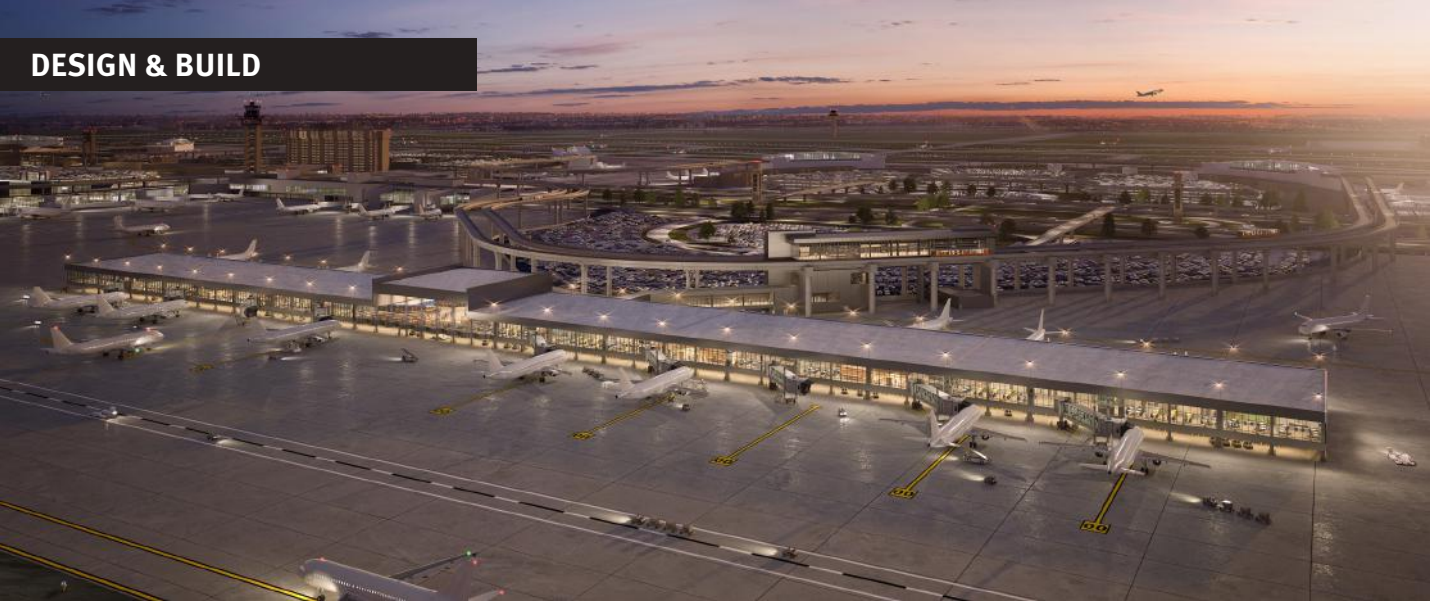
The era of simple capital deployment in aviation infrastructure has ended. As the industry advances through 2026, the gateways that thrive will be those that view capital and climate not as competing forces, but as twin engines of sustainable growth.

At Aervanta Aviation Consulting, we have spent years guiding governments and financial consortia through complex airport transactions across Africa and the Gulf.

Our experience has consistently demonstrated that when sustainability is designed into the very fabric of a transaction, it does not dilute returns – it secures them. AW

About the author

Arthur Lavier is managing partner at Aervanta Aviation Consulting (aervantaconsulting.com), a specialist advisory firm advising governments, operators, and institutional investors on aviation transactions, PPP structures and transition strategies globally.



Modular moves

Vivek Gurjar considers how modular delivery is helping airports expand capacity while protecting operations, the passenger experience, and revenues.

Airports have always been built around movement, but the facilities themselves have rarely been easy to change.

Passenger volumes rise, airline needs evolve, security requirements shift, and aging terminals demand renewal. At the same time, the airport must remain open.

Gates cannot easily be taken out of service, passenger routes cannot become construction corridors, and every delay can ripple through airline schedules, concession activity, and the wider transportation network.

That tension is reshaping how airport expansion is delivered. Modular construction, once considered a specialised alternative, is becoming a preferred strategy for complex aviation programmes because it allows airports to add significant capacity with far less interference with daily operations.

Its greatest value lies not in prefabrication alone, but in turning construction into a parallel process rather than a strictly sequential one.

FROM CONSTRUCTION METHOD TO OPERATIONAL STRATEGY

In an aviation setting, modular construction begins by dividing a terminal or expansion into large building segments.

Those modules are assembled in a fabrication yard near the airport, typically to at least a core-and-shell level, then transported on self-propelled modular transporters to the terminal site and connected into a continuous facility.

Depending on the project, the modules may arrive with concrete slabs, fireproofing, roofing, curtain wall, mechanical and electrical systems, and portions of the interior already installed.

The scale can challenge common assumptions about modular building. At Dallas Fort Worth International Airport (DFW), modules have ranged from smaller elevated sections installed over the Skylink rail system to terminal pieces measuring approximately 140 by 275 feet.

One Terminal F module weighed about 2,750 tons and stood 60 feet tall. At that size, modular construction bears little resemblance to a collection of standardised boxes. It is a major infrastructure project assembled from carefully planned components.

That shift in scale leads to the more consequential shift in project sequencing.

REPLACING A LINEAR SCHEDULE WITH PARALLEL WORK

Traditional terminal construction often proceeds in a long chain. Environmental reviews and permits must advance, old utilities must be located or relocated, hidden conditions must be addressed, foundations must be completed, and only then can the building rise.

At older airports, excavation may expose infrastructure installed decades earlier and poorly documented in available records, further complicating an already lengthy schedule.

Modular delivery allows a substantial portion of the building to be delivered elsewhere while site work continues. Crews can fabricate the structural frame, enclosure, roofing, and building systems as approvals progress and foundations are prepared at the terminal.

Once the receiving site is ready, completed modules can be moved into place, often at night during carefully controlled operational windows.

In a three-year programme, this approach can conservatively save four to six months. In one DFW example, an empty foundation site was transformed by installing terminal modules within roughly 15 days.

Modular construction, once considered a specialised alternative, is becoming a preferred strategy for complex aviation programmes because it allows airports to add significant capacity with far less interference with daily operations.

The lesson is not that the work disappears. In some respects, teams are co-ordinating two construction sites. The advantage comes from performing critical activities concurrently and relocating much of the work away from the airport's most constrained areas.

Compressing the schedule matters because time at an airport is inseparable from operational capacity.

PROTECTING GATES, PASSENGERS, AND REVENUE

Every gate taken out of service has an operational and financial consequence.

Long-term work zones can also force adjacent gate closures, alter aircraft circulation, disrupt baggage and service routes, and complicate passenger movement. By reducing the duration of intensive work at the terminal, modular construction can return gates and other revenue-producing spaces to service sooner.

The benefits extend beyond the secure side of the airport. Conventional projects generate a steady flow of deliveries, equipment, and worker transportation.

Those vehicles can compete with passengers on already congested arrival and departure roads, creating delays and a poor first impression before travellers reach the terminal.

Moving fabrication to a controlled yard reduces traffic within the active campus and separates construction logistics from the passenger journey. Contractors benefit as well. Crews working airside may lose productive time to remote parking, busing, security procedures, and badging requirements.

Airside work can also carry insurance requirements beyond the reach of smaller specialty firms.

A nearby fabrication yard provides easier access, reduces travel time, and enables more work to be done under conventional conditions. That can broaden competitive bidding and create opportunities for disadvantaged and smaller businesses that might otherwise be unable to participate in a major airport programme.

Those gains, however, depend on decisions made long before the first module begins to move.

LONDON STANSTED AIRPORT'S NEW SKYLINK WALKWAYS

London Stansted Airport will partner with Farrans and embrace off-site construction for the delivery of its new skylink walkways, writes Joe Bates.

The new skylinks are an integral feature of the airport's transformation programme, creating new walkways to directly connect the terminal to existing satellite buildings that are home to the departure and arrival gates.

The centrepiece of the programme is a three-bay extension to the existing terminal that will transform the customer experience.

Work will begin with the pre-assembly of skylink sections taking place 'offsite' in a vacant airport hangar on the northside of the airfield.

This method of construction will save time, and by reducing working at height, creates a safer working environment, as well as reducing congestion in busy airport operational areas.

Once each section is completed, they will be transported overnight from the construction hangar across the airfield on self-propelled modular transporters (SPMTs) to minimise disruption to the airport's operation.

Rob Stewart, London Stansted's capital delivery programme director, noted: "We now move to the construction phase of the work, where Farran's expertise and experience of delivering airport projects in busy operational environments will be invaluable."

MAKE THE MODULAR DECISION EARLY

Modularity should be evaluated at the outset of planning, not introduced after design is substantially complete.

The structural system, module breaks, temporary bracing, transport route, lifting or support conditions, and final connections all influence the architecture and engineering.

Depending on the project, the modules may arrive with concrete slabs, fireproofing, roofing, curtain wall, mechanical and electrical systems, and portions of the interior already installed. The scale can challenge common assumptions about modular building.

When a contractor proposes modular delivery late, the design team may have to retrace completed work, eroding the schedule advantage the approach was meant to create.

Design-build is especially well-suited to this work because designers, engineers, builders, and transport specialists can make co-ordinated decisions from the beginning.

When a construction manager at risk is used, the construction manager need to be engaged at approximately the same time as the design team. Early participation helps the team identify which portions of a programme should be modular, establish an appropriate fabrication yard, study the route to the terminal, and align fabrication with site readiness.

Experience also matters. Large modules must function as temporary structures during lifting and transportation, then as permanent buildings after installation.

Specialised engineering is required to model those different conditions without adding unnecessary material. On a recent airport peer review, an experienced modular engineering team identified nearly $10 million in steel that could be removed while maintaining required performance.

The example illustrates why owners need to seek teams that understand both the opportunities and the distinct technical demands of the process.

Early integration also provides the framework for protecting design quality.

QUALITY AND DESIGN REMAIN FULLY IN PLAY

Modular construction does not require a cookie-cutter terminal. Modules may be rectangular, angled, curved, or combined with conventionally built portions.

Indeed, an entire terminal need not be modular for the project to benefit. Teams can select the areas that provide the greatest schedule or operational value and use traditional construction elsewhere.

Nor does off-site work lower the standard of care. Fabrication in a controlled environment can improve quality, but large modules require additional checks at each critical stage.

Owners, contractors, inspectors, and engineers verify the work during fabrication, when modules are lifted onto transporters, after the move, and once they are set and connected at the terminal.

These inspections confirm that the building has maintained its structural integrity through temporary loading conditions and transport.

The method can also support long-term maintainability. Airport teams are extending modular thinking beyond terminal shells to restrooms, electrical rooms, mechanical rooms, and other repeatable spaces.

Standardised and catalogued components can simplify replacement and reduce the need to close an entire facility when one part fails.

This combination of flexibility and rigor explains why modular delivery is moving into the mainstream.

A NEW STANDARD FOR AIRPORT GROWTH

The next generation of airport development will be judged not only by the facilities it produces, but by how effectively those facilities are delivered while the airport keeps moving.

Modular construction offers a practical response to that test. It overlaps fabrication with approvals and site preparation, shortens disruption at the terminal, expands access to the work, and brings gates and passenger amenities online sooner.

Success requires more than choosing a construction technique. Owners aim to identify the opportunity early, select experienced partners, and organise the delivery model around continuous collaboration.

When those conditions are in place, modularity becomes an operational tool that protects the present while creating capacity for the future.

For airports facing relentless demand and little tolerance for downtime, that is rapidly becoming the standard by which expansion strategies will be measured.

AW

About the author

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Jesús Caballero

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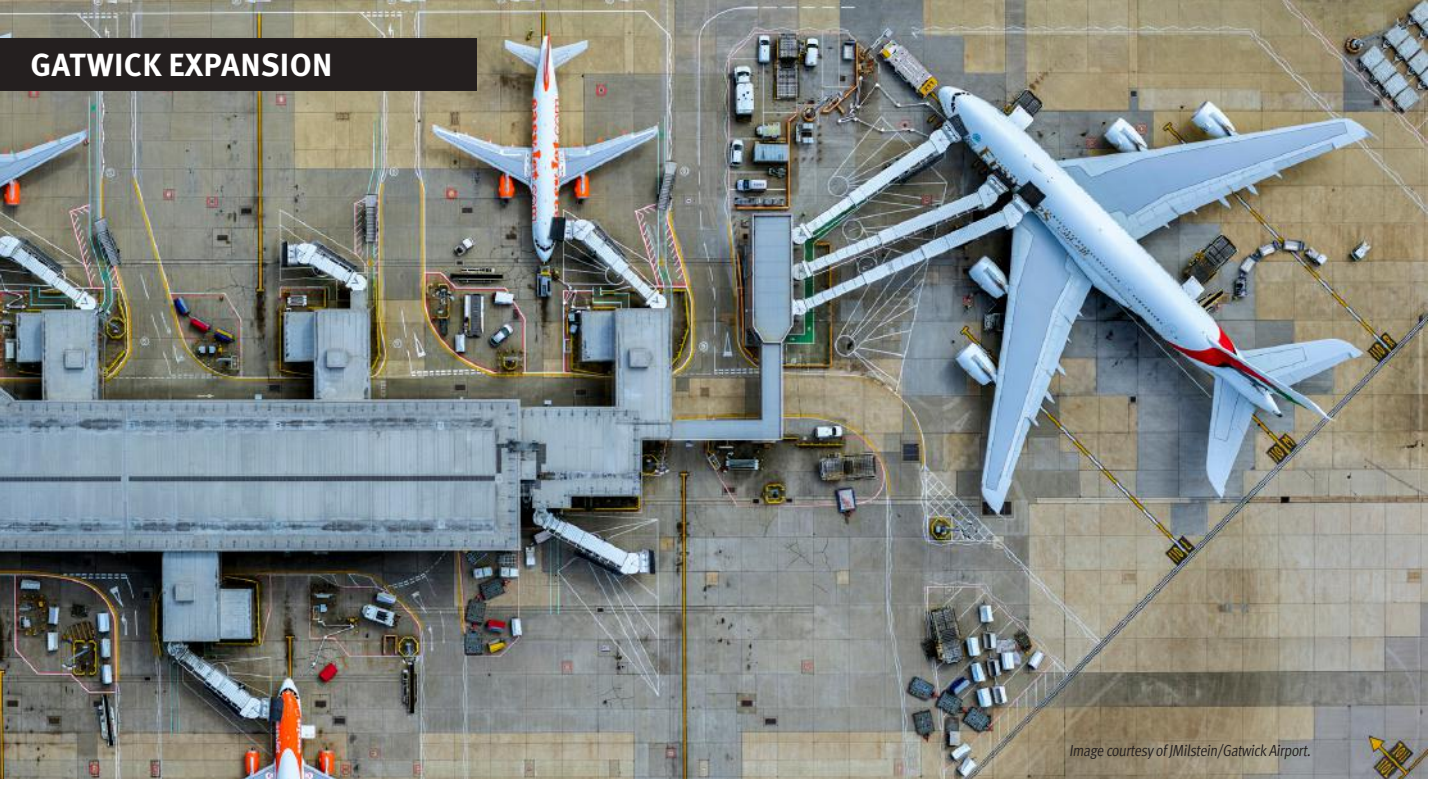


Image courtesy of JMilstein/Gatwick Airport.

Balacing act

Ivan Stevenson, associate professor for aviation management at Coventry University considers whether the green light for Gatwick's second runway means that the UK is facing a capacity crunch.

After decades of debate about airport expansion in the UK, Gatwick seems finally set to become a two-runway airport.

Following UK government approval in 2025, the Court of Appeal has dismissed the remaining legal challenge to its Northern Runway project in August, clearing the way for development to proceed.

The economic case appears attractive. By moving the centreline of its existing Northern Runway 12 metres north and undertaking associated infrastructure works, Gatwick can bring a runway that already exists into routine use alongside its main runway.

The privately financed development is expected to cost more than £2 billion and could ultimately enable the airport to serve up to 80 million passengers annually.

Gatwick estimates that expansion will create around 14,000 jobs and generate an additional £1 billion in economic benefit each year. Wider benefits are expected through tourism, trade, connectivity and increased competition between airlines.

Yet there is an apparent paradox. Gatwick handled 42.8 million passengers in 2025 – fewer than the 46.6 million it handled in 2019. If the airport has yet to recover its previous passenger peak, why does it need another operational runway?

The answer illustrates a wider problem with how airport capacity is often discussed.

The UK does not simply have too few runways. Capacity exists at airports around the country and even Gatwick continues to improve the productivity of its existing runway, increasing maximum scheduled movements from 55 per hour in 2025 to 57 in 2026.

The problem is increasingly one of having sufficient capacity in the places, at the times and in the markets where airlines and passengers value it most.

Heathrow provides the most obvious example. Its scarcity of slots can push airlines seeking additional London capacity towards Gatwick. This has contributed to Gatwick's increasingly diverse long-haul network, but it also requires some caution when interpreting that growth.

For some international airlines, Gatwick may provide valuable additional London access when their preferred Heathrow capacity is unavailable; experience also suggests that services can migrate when Heathrow slots subsequently become available.

Gatwick therefore performs an important role within London's multi-airport system without necessarily becoming a second Heathrow.

It remains predominantly an origin-and-destination airport with a strong leisure focus, while increasingly accommodating premium leisure and a geographically diverse long-haul offer. This distinction matters when considering the economic benefits of expansion.

Additional capacity at Gatwick has value because it creates opportunity: for airlines to enter markets, increase frequencies and develop new routes; for passengers to benefit from greater choice and competition; and for businesses to gain improved international connectivity.

Increased runway resilience and reduced constraints during peak periods also have economic value.

But additional passengers and aircraft movements should not automatically be treated as synonymous with economic growth.

Tourism provides a useful illustration. Increased inbound tourism undoubtedly creates economic activity, employment and export earnings.

Analysis commissioned by Gatwick forecasts that its expansion could facilitate substantial additional inbound visitor expenditure. Yet aviation capacity facilitates outbound tourism equally effectively.

In 2024, overseas residents spent £32.5 billion visiting the UK, while UK residents spent £78.6 billion travelling abroad.

There is therefore a danger in viewing continued growth in tourism as a substitute for the more difficult task of achieving sustained improvements in domestic productivity and economic performance.

Tourism is economically important, but an increasingly tourism-dependent growth strategy raises economic, environmental and social questions of its own.

The same caution applies more widely. Connectivity can enable trade, investment and economic development, but the relationship runs in both directions: successful economies generate aviation demand just as aviation can facilitate economic activity.

That makes Gatwick particularly interesting. Its Northern Runway is not a speculative new airport searching for demand. It adds capacity to an established airport serving one of the world's largest aviation markets, largely using infrastructure and land that already exist.

The financial risk also sits principally with its private owners rather than the taxpayer.

Nor can today's traffic alone determine the capacity Britain will need in twenty or thirty years.

Aviation is currently navigating aircraft and engine shortages, geopolitical instability, restrictions on Russian airspace and disruption across the Middle East, alongside changing passenger behaviour and the transition towards lower-carbon operations.

Inevitably, infrastructure investment has to be made amid times of uncertainty.

So, does the UK have an aviation capacity problem?
Increasingly, yes, but it is more nuanced than simply needing more runway pavement.

Britain has a spatial, temporal and commercial mismatch between where airport capacity exists and where the market most values it.

Gatwick's second runway will not resolve that problem, nor does its approval establish an economic case for unlimited aviation expansion. What it does provide is additional capacity at an airport where there is already demonstrable demand, while increasing competition, resilience and the opportunity for future connectivity.

Ultimately, that may be its greatest economic value. Airport capacity should enable a successful economy rather than become a substitute for creating one, but insufficient capacity should not be allowed to constrain the economic opportunities that do emerge.

AW

Business exchange

We provide a snapshot of the latest news stories from companies that support the growth and development of the world's airports.

SEA-TAC ADVANCES EVOLUTION PROJECT FOR S CONCOURSE

International travellers flying through Seattle-Tacoma International Airport (SEA) can look forward to a more spacious, intuitive and amenity-rich experience as the airport moves forward with plans to transform its S Concourse.

The Port of Seattle Commission recently authorised initial funding for the S Concourse Evolution project, advancing the next major phase of the airport's long-term modernisation programme. Major construction is scheduled to begin in 2027.

HOK is serving as lead designer for the project in collaboration with prime consultant and lead architect AECOM. Together with the Port of Seattle and a multidisciplinary consultant team, HOK is helping reimagine the 1970s-era facility into a more resilient, efficient and passenger-centric gateway for international travellers.

The project will modernise the S Concourse by adding 150,000 square feet of space, including a new upper concourse level, enhanced dual-level boarding operations for select gates and expanded dining, retail and lounge space. It also includes structural, seismic and building systems upgrades.

Guided by principles of connection, openness and a strong sense of place, HOK's design vision draws inspiration from the distinctive geography of the Pacific Northwest and its rich cultural history to create a welcoming and intuitive travel experience.

The project will repurpose portions of the former customs facility vacated by the International Arrivals Facility, allowing the airport to accommodate future growth while improving comfort, circulation and operational performance.

"The S Concourse Evolution project is an opportunity to transform international travel at SEA through spaces that create a more comfortable and intuitive journey that is deeply connected to the Pacific Northwest, while supporting diverse traveller needs with inclusive layouts," said Keith Hui, HOK's regional leader of aviation and transportation.

The facility is targeting LEED Silver certification and is expected to reduce annual operational greenhouse gas emissions by 58% while lowering annual energy use by 16% compared with Port standards.

NEW TRANZEET DELI OPENS AT DXB

Lagardère Travel Retail has opened a Tranzeet Deli in Terminal 3 at Dubai International Airport (DXB), a distinctive new dining concept created exclusively for the airport environment.

Inspired by the energy and character of New York's legendary delis and influenced by the design of urban transit networks, the concept combines handcrafted sandwiches and beverages with a design-led setting.

Drawing on the energy and movement of urban rail travel, the concept incorporates elements of both metropolitan transit networks and DXB's airport train system to create a distinctive airport dining experience.

Design cues including carriage-style seating, overhead handrails and grab handles, riveted metal finishes and transit-inspired wayfinding evoking the atmosphere of a modern train journey, while menu boards, signage and packaging continue the theme throughout.

Alison Macdonald, vice president for commercial concession management at Dubai Airports, enthused: "The addition of Tranzeet Deli brings another high-quality dining option to DXB, reflecting our continued focus on keeping the airport experience fresh, relevant and engaging for our guests."

YETI MOVE TAKES PART IN NORDIC AVIATION RESILIENCE PROJECT

Airports are critical infrastructure for Nordic societies. They safeguard mobility, security of supply, and the ability of authorities to respond effectively during crises and exceptional circumstances.

At the same time, airport maintenance operations face growing challenges: labour availability is increasingly uncertain, weather conditions are becoming more demanding, and disruptions to satellite navigation systems pose new risks to critical operations.

The new Nordic Aviation Resilience (NAR) project is developing the next generation of autonomous and remote-controlled solutions to enhance the operational reliability and resilience of airport maintenance operations.

The project builds on autonomous maintenance solutions already deployed across the Nordic region, including Yeti Move's technology, which is currently operating at Oslo Airport in Norway and Stockholm Arlanda in Sweden.

Its main objective is to strengthen the resilience of Nordic aviation infrastructure and ensure the safe operation of airports even during disruptions.

"Robust aviation is essential to Nordic resilience. At the same time, airports are vulnerable to disruption and new challenges," says Sindre Bornstein, CEO of Nordic Innovation, which is funding the project.

"The Nordic Aviation Resilience project plays a key role in strengthening the Nordic region's long-term resilience, which is an objective of Nordic Innovation."

The project is led by DIMECC AS, a Norwegian subsidiary established by DIMECC Ltd. Nordic Aviation Resilience (NAR) is the new company's first project and a strong opening for a new era of Nordic collaboration.

"The NAR project brings together Nordic stakeholders to develop practical solutions for strengthening the resilience and operational reliability of airports," explains DIMECC AS CEO, Eja Tuominen. "For us, the project represents an important step towards scalable solutions that support preparedness and resilience across the entire aviation sector."

The NAR project brings together Finavia (Finland), Yeti Move (Norway), GIM Robotics (Finland), and RISE CyberNode (Sweden).

It also draws on the expertise of airport operators Swedavia and Avinor in Sweden and Norway respectively along with Finnish tech company Boldyn.

The project builds on experiences gained from existing autonomous airport maintenance solutions and develops a next generation of technologies capable of operating even when Global Navigation Satellite Systems (GNSS) are degraded or completely unavailable.

During the project, the solutions will be tested in real airport environments together with operators. The goal is to create a scalable operating model that strengthens preparedness and competitiveness across the Nordic aviation sector.

"Yeti Move has extensive experience deploying autonomous and driver-assistance technologies at airports," enthuses CEO, Emil Lindegaard.

"We are proud to contribute to this project and further improve operational resilience and support wider adoption of autonomous technologies. The Nordics are perfectly positioned to be a global frontrunner in autonomous airport operations."

Yeti Move believes that the NAR project will lay the foundation for a large-scale Nordic demonstration and create new business opportunities around autonomous airport solutions.

It is also expected to strengthen the Nordic region's position as a global frontrunner in autonomous airport operations.

SHAPING PASSENGER JOURNEYS

Emanuele Macarra, custom interiors director at Poltrona Frau, explains why seating should be considered an integral part of the passenger experience.

Waiting, working, resting and reconnecting are all part of the airport journey, and seating has become one of the elements that can most directly influence how passengers perceive a space.

Poltrona Frau has developed a very distinctive culture around seating: an understanding of materials, ergonomics, craftsmanship and the relationship between people and the spaces they inhabit.

That savoir-faire was born in the world of interiors, but over time it has evolved and expanded into very different environments. What remains constant is the level of care and research behind every project.

Airports are among the most demanding environments we design for. A seat has to withstand intensive use, meet strict performance and maintenance requirements and respond to increasingly diverse passenger behaviours.

But performance alone is no longer enough. Airports are becoming places where people work, rest, meet, eat and spend significant periods of time. Seating therefore becomes part of the architecture and part of the passenger experience.

Our role is to reconcile these two dimensions: the technical complexity of a public environment with the sensitivity to comfort, proportion, materials and detail that belongs to Poltrona Frau's DNA.

A seat is one of the most immediate points of contact between a passenger and an airport. It is where people wait, work, recharge a device, have a conversation or simply take a moment to themselves.

For this reason, seating can no longer be treated as a purely functional element. It contributes to comfort, to the identity of the space and, ultimately, to the quality of the journey itself.

THE EVOLUTION OF AIRPORT SEATING

The future is about adaptability. Passenger needs change, technologies evolve and airports need spaces that can be reconfigured rather than replaced.

Systems such as Bay, developed with Foster + Partners Industrial Design, respond to this through modularity, demount ability and the integration of services such as power and charging.

The goal is not simply to design a better seat, but to create environments that are more flexible, welcoming and responsive — because the passenger experience is shaped by every moment of the journey, including the time spent waiting.

SENSE OF PLACE SEATING

Narita International Airport in Japan is a good example. For its waiting areas, Poltrona Frau Custom Interiors supplied 8,691 Aetos seats and 300 FLY_AIR chaise longues in 24 colours inspired by the shades of the Japanese seasons.

The project shows how airport seating can do more than accommodate passengers: through colour, material and configuration, it can become part of the visual language of the terminal while still delivering comfort, connectivity and long-term performance.

AIRPORT LOUNGES

In a lounge, the relationship becomes even more personal. Passengers may spend longer periods in the space and move between different activities — working, dining, resting or seeking privacy.

At Milan Linate, for example, we furnished ITA Airways' Runway Lounge, where Jay Lounge chaise longues define the Silent Room, while Archibald and Martha armchairs contribute to a more domestic and refined atmosphere.

Here, seating helps create distinct moments within the same journey.

LANDMARK DIGITAL APRON OPERATIONS PROJECT

TK Elevator (TKE) has been selected by Athens International Airport (ATH) as a strategic partner for the comprehensive digitalisation of its apron operations.

As a result, TKE will replace its earlier generation Advanced Visual Docking Guidance System (A-VDGS) units at 24 contact stands and introduce the technology for the first time at 80 remote stands, significantly enhancing safety, efficiency and situational awareness at the apron.

All 104 ApronVision A-VDGS units will be fully integrated into MAX Monitor & Control, TKE's real-time operating, monitoring and analytics platform.

According to TKE, ApronVision is the world's most advanced visual docking guidance systems, using LiDAR technology to generate up to 2.6 million data points per second – far beyond traditional A-VDGS.

The solution offers all-weather capability through LiDAR and transponder redundancy, supports long range and 360-degree scanning with multiple gate capability, including dual aircraft docking, expanding apron control range and eliminating blind spots.

"This partnership shows how airports can turn data into real operational value: real time information, higher safety and more

efficient use of gates and ground equipment," says Ignacio Medina, CEO of airport solutions at TK Elevator.

While ATH's chief operating officer, Alexandros Aravanis, notes: "We see this project as a key step in our long-term strategy to make our operations smarter, safer and more efficient.

"By partnering with TK Elevator, we are shifting towards an integrated digital ecosystem, enhancing the digital capabilities of our apron operations through improved real-time visibility, operational awareness and performance monitoring."

HEINEMANN EXPANDS BERLIN BRANDENBURG PARTNERSHIP

Gebr Heinemann has extended its contract with Berlin Brandenburg Airport (BER), laying the foundation for a significant expansion of the duty free and travel value offer in the security area of Terminal 1.

As part of the further development of the market place beyond security, the retail space will grow to around 3,800 square metres.

The project is said to underline the shared ambition of Heinemann and Berlin Brandenburg Airport to create a more attractive, convenient, and experience-driven environment for international passengers.

Steffen Jopp, managing director of Gebr Heinemann at BER, said: "The expanded space will allow us to introduce new concepts and create a more inviting atmosphere that encourages travellers to spend time in the market place."

RELIABLE COMMUNICATION IS KEY

As North America's busiest airports continue to raise the bar for the passenger experience, clear, reliable communication has become an essential part of that equation.

In the latest J.D. Power North America Airport Satisfaction Study, 24 of the highest-rated airports rely on AtlasIED's public address and life safety communication technologies, arguably underscoring the company's role in supporting seamless passenger communications across some of the continent's top airports.

The study measured passenger satisfaction across mega, large, and medium airports using feedback from more than 30,000 travellers in the United States and Canada.

Of the 30 airports recognised in the report, AtlasIED communication systems are installed in all 10 top mega airports, six of the top 10 large airports, and eight of the top 10 medium airports.

"The air travel experience depends on clear, reliable communication," commented John Goodrich, director of global installed systems, AtlasIED.

"Airports require communication platforms that deliver exceptional speech intelligibility, support multilingual messaging, and can scale to meet the needs of facilities serving millions of travellers each year."

MENZIES EXPANDS NORTH AMERICAN FOOTPRINT

Menzies Aviation has completed the integration of G2 Secure Staff in under 12 months, creating a unified North American business with more than 12,500 former G2 colleagues fully integrated into its systems, operating processes and brand.

The integration programme was the largest in Menzies' history and followed the $305 million acquisition of G2 Secure Staff in August 2025.

Hassan El-Houry, CEO of Menzies Aviation said: "The successful integration of G2 enhances our ability to meet demand and strengthens our position in the world's largest aviation market. We remain highly confident in the long-term growth of the US economy and aviation sector and will continue investing in our people, capabilities and customer partnerships to support that growth."

The integration created a combined 20,000-strong US workforce, which provides ground handling, air cargo and fuel services at 108 airports across the country. It also resulted in Menzies adding 70 new partners to its customer base and winning significant new business including cabin cleaning and passengers with reduced mobility (PRM) contracts – expanding Menzies' service offering.

PPG'S ALLWAYS SERVICE ARRIVES AT LONDON HEATHROW

Plaza Premium Group has launched ALLWAYS, its premium meet & assist service, at London Heathrow (LHR).

Designed to help travellers move through the airport with greater ease, confidence and comfort, ALLWAYS provides personalised assistance across arrival, transit and departure journeys.

According to PPG, the expansion directly addresses shifting traveller expectations highlighted in ACI World's 2025 ASQ Global Traveller Survey, which revealed a growing demand for more personalised and convenient airport experiences.

Bora İşbulan, PPG's deputy CEO, noted: "ACI World's latest Global Traveller Survey confirmed our observations on the ground in airport hospitality: passengers no longer measure their journey by speed alone and increasingly look for support that feels personal, intuitive and reassuring — not simply transactional. ALLWAYS was developed directly in response to that shift.

"For business travellers, that means a dedicated point of contact to ease tight connections, support schedule certainty, reduce airport stress and help them move efficiently between meetings, flights and ground transport.

"For families and leisure passengers, it offers the reassurance of a personal guide through a busy, high-pressure environment. As one of the world's busiest hubs, LHR is precisely where this human element matters most – making it the natural next home for ALLWAYS."

Beyond meet and assist services, travellers can customise their experience with add-on services including porter assistance, buggy transfers, fast-track access, and Plaza Premium Lounge entry.

PAVING THE WAY FOR GREENER RUNWAY RESURFACING

Material innovations are making runway resurfacing quicker, easier and more environmentally friendly, writes Dr Paul Phillips, technical director at Associated Asphalt.

By 2050 it is estimated that upwards of 250,000 commercial flights a day could be operating across the globe.

In an era marked by environmental urgency and the need for rapid decarbonisation, this presents modern airports with a complex challenge – meeting soaring demand while working towards net zero.

While renewables, smart technology and even the promise of electric planes continue to dominate the narrative, it's equally important not to forget the fundamentals – such as asphalt.

Every 20 years or so airport runways need to be resurfaced to meet safety regulations. For busy commercial airports this can even be as frequent as every ten years.

Inherently, this resurfacing process has involved numerous direct and indirect carbon sources. This includes the construction methods used and embodied carbon in asphalt, binder and other materials used – all of which can weight up to a considerable carbon impact.

Thus, as the industry transitions to a more sustainable future, it is important that this process becomes more environmentally friendly.

A BREAKTHROUGH IN BITUMEN

Alongside advances in recycled materials and smarter production techniques, part of the answer lies in reconsidering one of the most key materials used in airside infrastructure – bitumen.

Traditionally derived from crude oil, bitumen acts as the binding agent in asphalt. Finding a viable, low-carbon alternative to conventional binders has therefore been a long-standing ambition for the sector.

However, historically many of the bio-based alternatives developed to date have struggled to consistently match the demanding performance requirements of asphalt, particularly in the highly challenging environment of aviation infrastructure.

Today that changes. The result of extensive research and development, this is seen in the arrival of AA Pure – which uses a by-product from commercial nut processing industry alongside a naturally occurring hard bitumen to produce an incredibly low-carbon binder.

Crucially, its EPD demonstrates a 60% carbon footprint reduction across product and logistics compared with standard oil-based binders.

PROVEN PERFORMANCE

A powerful example of this opportunity can be found in our recent work with one of Europe's busiest business aviation gateways, London Biggin Hill Airport.

As part of its progressive plans to reach carbon neutrality by 2029, last year saw the airport become the first UK facility to integrate AA Pure into its operational pavements across its taxiway and main apron.

One year on from the pilot – which saw a total of 120 tonnes of asphalt mixed with AA Pure – and extensive field trials confirm that it delivers superior fuel resistance and reduced temperature susceptibility compared to traditional alternatives, verifying its structural resilience against intense aircraft wear.

Airport World has previously reported on how organic cashew-based bitumen has been used to build and test a 200-metre long section of road on the apron at Frankfurt Airport.

Alongside other sustainability initiatives, it's important that the approach to runway construction keeps up with its own bold and rigorous climate-relevant action.

By taking advantage of the latest material innovations now, airports can make a huge carbon reduction impact today and help pave the way for a greener future.

AW

Going green

***Airport World* shines the spotlight on Sydney Airport's new electric bus fleet and hydrogen-powered ground equipment trials at Exeter Airport.**

Sydney Airport in Australia has unveiled its new electric bus fleet featuring bespoke First Nations artwork celebrating the stories and culture of the Dharawal People of Coastal Sydney.

The new fleet features 50 new electric buses which will progressively replace diesel-powered vehicles used to transport passengers and staff across landside and airside operations.

The move is an important milestone for the airport as it transitions to net zero carbon emissions for scope 1 and 2 by 2030.

Marking the significance of the project, the buses feature commissioned artwork by Shane Youngberry, a proud Dharawal artist, developed in partnership with the Gujaga Foundation.

Sydney Airport's group executive for government relations, sustainability and legal, Karen Tompkins, noted: "The new fleet meets the airport's commitment to Net Zero for Scope 1 and 2 by 2030, while celebrating the cultural significance of the lands on which it operates.

"The 50 new electric buses reduce our scope 1 emissions from our operations, with the bus being powered by 100% renewable through our power purchase agreement.

"Importantly, they also improve the passenger experience by providing quieter, cleaner and more comfortable transport across the airport precinct."

Meanwhile, in the UK, it is being claimed that a trial has generated new operational evidence that could help the global aviation industry understand how hydrogen-powered ground equipment can be introduced safely and practically, and what is needed to support wider adoption.

The study, led by Exeter Airport, Cranfield University and ULEMCo, tested a dual-fuel hydrogen–diesel ground power unit over multiple days in winter operating conditions.

A new Cranfield University report finds that the equipment performed safely and reliably, delivered measurable reductions in diesel use and carbon emissions, and required little change for the ground teams operating it.

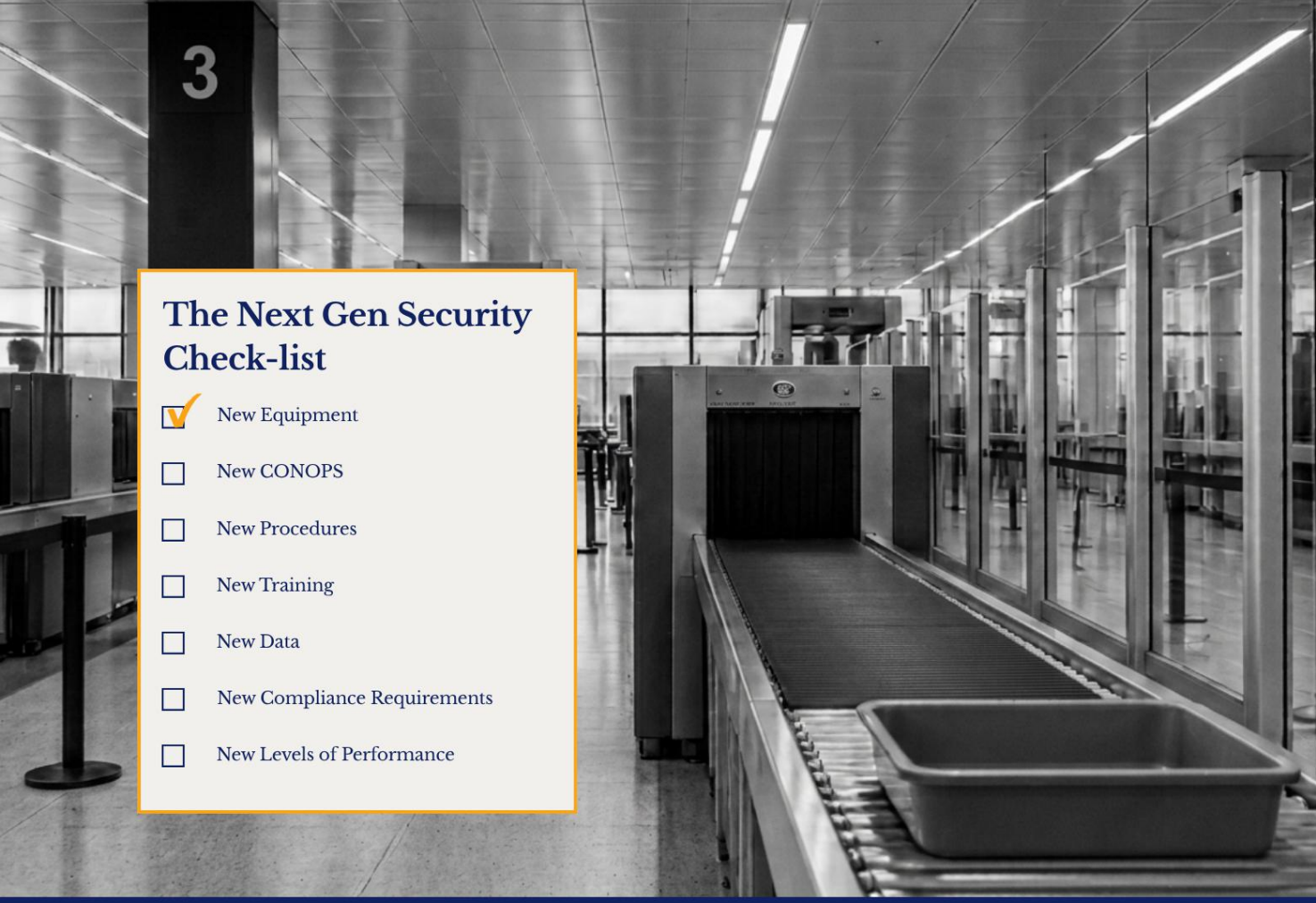
The findings are also said to provide insights into where dual-fuel hydrogen technology may be most effective, suggesting that its greatest benefits could be achieved in equipment used continuously or for longer operating cycles.

The Winter Operations HyGPU project follows the groundbreaking Zero Carbon Turn trial at Exeter Airport in April 2025, which achieved several UK firsts when three different hydrogen-powered technologies supported the live turnaround of a TUI Boeing 737.

Across eight operational days, the equipment completed 15 tests lasting a total of almost six hours. It consumed 7.41kg of green hydrogen, displacing an estimated 24.23 litres of diesel and avoiding approximately 63.9kg of carbon dioxide emissions.

No safety incidents or significant operational problems were reported. Airport ground crew also found little practical difference between operating the converted equipment and using a conventional diesel GPU.

Dr Thomas Budd, associate professor of airport decarbonisation at Cranfield University and author of the report, said: "This trial has taken us another step beyond a one-off demonstration and given us valuable operational evidence about how dual-fuel hydrogen equipment performs in winter conditions." AW



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