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Airlines.

As aviation becomes more digital, [cybersecurity] incidents are inevitable—the real measure is how we respond. Like a boxer, it's not about avoiding every hit, but staying on your feet, keeping operations running, and maintaining safety.

Turkish Airlines Chairman, Professor Ahmet Bolat *p12-15*

IATA

2025 – 04

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Easing the supply chain issue

"Airlines depend on a reliable supply chain to operate and grow their fleets efficiently. Now, we have unprecedented waits for aircraft, engines and parts, and unpredictable delivery schedules. Together, these have sent costs spiralling by at least $11 billion for this year and limited the ability of airlines to meet consumer demand. There is no simple solution to resolving this problem, but there are actions that could provide some relief. To start, opening the aftermarket would help by giving airlines greater choice and access to parts and services. In parallel, greater transparency on the state of the supply chain would give airlines the data they need to plan around blockages while helping OEMs to ease underlying bottlenecks."

On modularity when implementing modern airline retailing

"Although revenue uplift and cost reduction are both important drivers of the transition to 100% Offers and Orders, the higher priority for most airlines is modularity. Modularity doesn't just ease the path to Offers and Orders enablement, but it does so in a way that increases future flexibility and decreases dependence on any one solution provider."

On cargo trade lanes

"Air cargo demand grew 2.9% year-on-year in September, marking the seventh consecutive month of overall growth. Buried in that growth is a significant alteration of trade patterns as US tariff policies, including the ending of de minimis exemptions, kick in. On one side of the equation, a decline in North America-Asia demand has set in over the last five months. But this has been more than compensated for with strong growth within Asia and on routes linking Asia to Europe, Africa and the Middle East. While many had feared an unwinding of global trade, we are instead seeing air cargo adapting successfully to serve shifting market demands."

On SAF feedstocks

"We now have unequivocal evidence that if SAF production is prioritized then feedstock availability is not a barrier in the industry's path to decarbonization. There is enough potential feedstock from sustainable sources to reach net zero carbon emissions in 2050. However, this will only be accomplished with a major acceleration of the SAF industry's growth. We need shovels in the ground now."

On European challenges

"Aviation issues are being brought to the doors of regulators and politicians who hold the levers that can help reinvigorate European air connectivity. We are a year on from Mario Draghi's landmark report on European competitiveness and the value of a competitive and sustainable aviation industry cannot be ignored. Three decades ago, de-regulation sparked a revolution in air transport that turned the European project into a community and catalyzed economic growth. Europe's policymakers must seize the day, rediscover the potential for aviation to stimulate the continent's economy, and free its airlines from onerous regulation accumulated over 25 years."

Willie Walsh
IATA Director General

DIGEST

THIS ISSUE'S NEED-TO-KNOWS

Reminbi to be available for the IATA Clearing House

The Renminbi (CNY) will be added as one of the settlement currencies available to airlines and other suppliers through the IATA Clearing House (ICH), IATA has announced.

The ICH is already offered in seven currencies, including US Dollars, Euros, British Pounds, Swiss Francs, Singapore Dollars, Australian Dollars, and Japanese Yen.

Settlements in the Renminbi currency will be available starting December 2025, following the completion of a trial period that will be undertaken by China Southern Airlines and Xiamen Airlines in November 2025. The new option offers significant benefits for airlines operating in China by reducing currency exchange risks, easing the onboarding of local suppliers and cutting overall costs.

"We welcome IATA's decision to add the Renminbi as a settlement currency. It is a positive development for air transport industry in China. Avoiding costly and multiple currency conversions will speed up settlement and reduce currency exchange risk," said Sun Yuquan, Chief Financial Officer of Air China.

The airline, which currently chairs the China Airline Committee, has been a strong champion for the addition of the Renminbi.

As part of IATA's industry-wide settlement system, the ICH provides fast, secure, and cost-effective settlement services to 581 airlines and other associated companies in the air transport value chain, processing USD63.8 billion in 2024. This includes 33 Chinese and foreign airlines operating in China.

"Our customers expect financial services from IATA that are continuously more efficient and cost-effective—Enabling settlement in Renminbi through the ICH helps meet that need," said Frederic Leger, Senior Vice President of IATA Products & Services.

"It's an important investment in the ICH which will deliver an enhanced service to our members airlines with no additional cost. And it's encouraging to see that the market is welcoming this addition positively."

IMAGES: ISTOCK

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As aviation security continues to evolve, the demand for sophisticated and efficient training solutions has never been greater.

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Traditional image analysis training for screeners, including locally hosted solutions, can be costly. X-Screen® cuts overheads by enabling organizations to provide cloud-based image analysis training which can be accessed 24/7/365 on a range of devices.

The diverse threat image library, fully compliant with European Union (EU) and United Kingdom (UK) standards, encompasses six levels of threat complexity and surpasses what is currently available in any 6x6 system. Our library is regularly updated to incorporate recent and emerging threats, allowing operators to stay current.

Brian Reid, Senior Director of Global Training & Education at Rapiscan, highlights the transformative impact of X-Screen®, stating,

"With cutting-edge simulation, pioneering features, and seamless adaptability to evolving regulations, X-Screen® empowers X-ray screeners to excel in modern security screening. This relentless commitment to excellence not only enhances security operations but has also led to a noticeable rise in screener proficiency wherever X-Screen® is implemented, reinforcing its vital role in protecting the aviation industry."

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SUPPLY CHAIN ISSUES COULD HIT AIRLINES FOR BILLIONS

IATA and global consultancy firm Oliver Wyman have launched a joint study addressing supply chain challenges in aviation.

The report, titled *Reviving the Commercial Aircraft Supply Chain* also explores the root cause of these challenges, the impact on airlines, and initiatives to move the air transport industry forward.

The worldwide commercial backlog reached a historic high of more than 17,000 aircraft in 2024, significantly higher than the 2010 to 2019 backlog of around 13,000 aircraft per year.

Troubles within the supply chain are delaying new aircraft and parts, resulting in airlines reevaluating their fleet plans and, in many cases, keeping older aircraft in operation. The issue is set to cost the airline industry more than $11 billion in 2025, driven by four main factors:

- Excess fuel costs (~$4.2 billion): Airlines are operating older, less fuel-efficient aircraft because new aircraft deliveries are delayed, leading to higher fuel costs
- Additional maintenance costs ($3.1 billion): The global fleet is aging, and older aircraft require more frequent and expensive maintenance
- Increased engine leasing costs ($2.6 billion): Airlines need to lease more engines since engines spend longer on the ground during maintenance. Aircraft lease rates have also risen by 20–30% since 2019
- Surplus inventory holding costs ($1.4 billion): Airlines are stocking more spare parts to mitigate unpredictable supply chain disruptions, increasing inventory costs.

Adaptable operations are key to crisis management

Sessions on crisis management at the World Safety and Operations Conference debated the strategies that can mitigate the impact of different crises.

A crisis can come in many guises and occur at any time. It is not just about an aircraft accident and so frameworks and processes must be adaptable and scalable. Sessions covered a variety of factors, including coding a crisis level, which necessarily differs for each airline.

Much of the discussion revolved around the number and seniority of the personnel required in a crisis response team. Caution was expressed about involving too many people even though there are always copious offers of help. For a start, the right representative from each applicable department must be chosen. The choice should allow for that department to carry on operating efficiently through the crisis.

Other concerns include responding appropriately, deciding on a crisis management center, and virtual comms. Multiple and hasty statements can escalate a crisis if handled incorrectly while a dedicated crisis management center holds multiple advantages, including clear in-person communication and focused attention on the task at hand.

Indeed, in-person communication was seen as essential despite the abundance of virtual options. These were considered useful only in the initial gathering of the crisis team phase and other exceptional circumstances. When used, online meetings should follow strict discipline. Most carriers don't allow Chat, for example, in case this leads to confusion or multiple conversations happening at once. For clarity, transcripts are essential. Similarly, microphones should be muted apart from the person speaking and only activated once the chair provides acknowledgement. Individuals also need to be aware of their physical environment and who may be able to hear the conversation.

The debates also touched on data security—the privacy of individuals must always be the first concern even though there will be multiple pressures from external sources to reveal details.

Getting approval for the dissemination of certain information must therefore form part of the crisis response framework. Finally, all airlines should run exercises regularly that cover a span of situations and incorporate the latest findings from similar events, even from non-aviation industries.

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In numbers

GLOBAL PASSENGER SURVEY

Source for data and charts: IATA

In 2025, web apps were the preferred choice for 19% of travelers, trending upwards from the 16% in 2024.

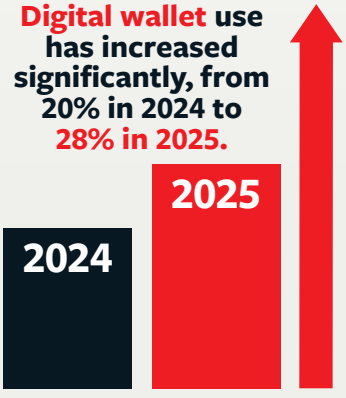
This move is led by younger travelers (25%), indicating that the **trend of shifting to mobile options** is likely to **strengthen** over time.

10,000

IATA's Global Passenger Survey results on over 10,000 responses

from more than **200 countries** across the world.

Digital wallet use has increased significantly, from 20% in 2024 to 28% in 2025.

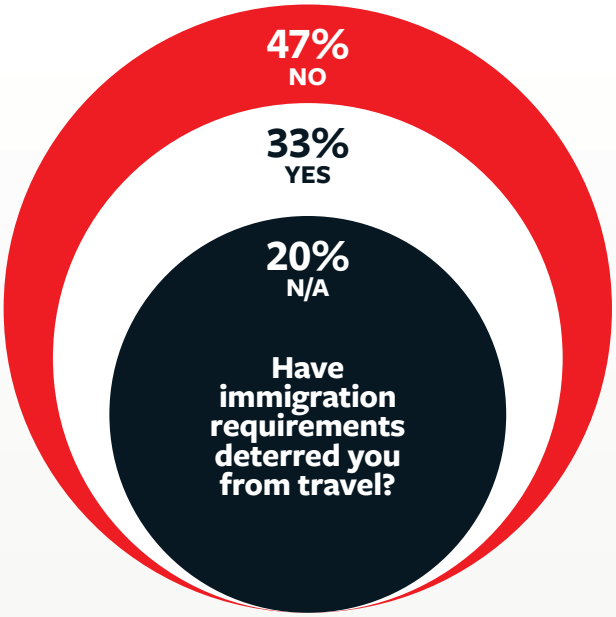


78%

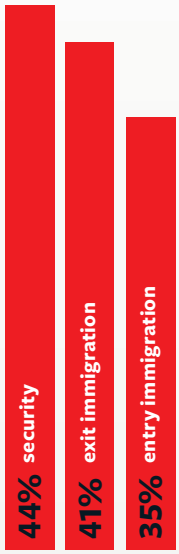
of passengers want to use a **smartphone** that combines a **digital wallet, digital passport, and loyalty cards** to book, pay, and navigate **airport processes**.

35%

Use of electronic bag tags, allowing passengers to generate their bag tags directly from a mobile device during check-in, reached 35% in 2025.

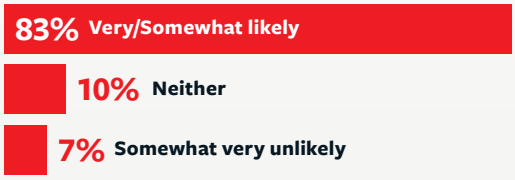


Half of passengers (50%) have **used biometrics** at some point in their airport journey, **up from 46% in 2024**.



Usage is most common at:

Q. How likely are you to share personal information with immigration authorities to speed up arrival processes?



85%

of passengers who have used **biometrics** are **happy with the experience.**

74%

of travelers say they would share biometric info if they could skip showing a passport or boarding pass at checkpoints like check-in, security, border control, and boarding.

of passengers who are **currently unwilling to share their biometric info** say they would **reconsider** if **data privacy** was assured.

Connectivity must endure

Turkish Airlines Chairman, **Professor Ahmet Bolat**, says the carrier is committed to connecting the world.

WORDS: GRAHAM NEWTON

Turkish Airlines is committed to remaining resilient and agile in the face of several industry challenges, as Chairman, Professor Ahmet Bolat explains.

What will your big order of aircraft mean for the future of the airline?

Turkish Airlines' latest aircraft order goes far beyond a mere fleet expansion. It is a bold reflection of our long-term strategic vision, underscoring our commitment to innovation, operational excellence, and sustainable growth. The addition of new-generation Boeing aircraft will significantly enhance our operational capabilities, efficiency, and environmental performance. These aircraft will not only help us meet growing passenger demand but also support our ambitious goal of operating a fleet over 800 aircraft by 2033.

The agreement also reaffirms our strong partnership with leading aircraft manufacturers and our role in advancing Türkiye's aviation ecosystem. With greater connectivity, we aim to welcome more international travelers, promoting Türkiye's cultural heritage and natural beauty while contributing to the growth of our tourism sector. With our unique service quality and expansive global network, Turkish Airlines will continue to lead the industry, setting new standards in efficiency, sustainability, and customer experience.

> **Limited production slots,** ongoing technical challenges, and logistical bottlenecks mean that **delays in deliveries are a reality for all airlines.**

Do the supply chain issues concern you? Are you confident you will get your aircraft on time?

The current pressures on global supply chains, coupled with the surge in demand for new aircraft and engines, are affecting the entire aviation industry. Limited production slots, ongoing technical challenges, and logistical bottlenecks mean that delays in deliveries are a reality for all airlines. This is of course a concern, as timely fleet growth is critical to our long-term strategy.

That said, we are encouraged by the gradual improvements we are seeing and expect the volatility to diminish over the coming years. We are working very closely with manufacturers and partners to minimize disruptions and also exploring alternative avenues—such as optimizing our current fleet utilization, considering short-term leasing options, and prioritizing certain aircraft types where needed.

Our strong position lies in the fact that we protected our workforce during challenging times, maintained flexibility in our planning, and are supported by one of the most comprehensive hubs in the world. These strengths give us resilience and agility. Although individual timelines may shift, we are confident that our overall fleet expansion targets will remain on track and aligned with our 2033 strategy.

How difficult is it to manage a large network when the world is experiencing dynamic geopolitics that could open or shut airspace at any time?

Managing a global network in an era of shifting geopolitics is both a challenge and a responsibility. Airspace can close or open with little notice, but our duty is to ensure that global connectivity endures. We address this through agility, advanced technology, and close collaboration with governments, regulators, and industry partners. These dynamics push us to be more innovative, more resilient, and more committed to our mission.

Over the years, Turkish Airlines has built one of the most extensive networks in the world—

IMAGES: TURKISH AIRLINES

and for good reason. The geographical position of our hub, Istanbul Airport, is a unique asset that enables us to connect the world seamlessly. Our network is composed of numerous carefully integrated and interconnected routes. Although adding new routes enhances both the scale and quality of this network, the removal of certain routes does not compromise the resilience or integrity of the overall structure.

Is the industry resilient enough in the face of these shocks – especially cyber incidents?
Aviation has always proven resilient, guided by strict international standards that helped us adapt through crises from conflicts to pandemics. Airspace closures are disruptive, but strong network carriers can adjust quickly, minimize missed connections, and regain efficiencies once routes reopen.

Cybersecurity is now the newest and most serious test. As aviation becomes more digital, incidents are inevitable—the real measure is how we respond. Like a boxer in the ring, it's not about avoiding every hit, but staying on your feet, keeping operations running, and maintaining safety.

At Turkish Airlines, we go beyond compliance by investing in proactive defenses, working with partners like IATA and STAR Alliance, and aligning with regulations such as EASA's new Part-IS. These steps make cybersecurity a core part of resilience. Aviation has always adapted, and I am confident we will continue to keep the skies open and secure.

What other challenges might restrict the growth of your airline and the industry?
The biggest brake on growth today is supply. OEM production rates, engine turnaround times, and parts availability remain tight, which slows deliveries even as demand stays strong. We mitigate this with flexible fleet planning, leases, and multi-vendor sourcing, but it remains a constraint.

Infrastructure and sustainability are also key challenges. Airport capacity, slot access, and air traffic control staffing can limit frequency growth, while sustainable aviation fuel (SAF) costs, emissions rules, and noise regulations add planning complexity. Finally, fuel prices, financing costs, and foreign exchange volatility can pressure margins. Through disciplined capital allocation, strong revenue management, and efficiency measures, we ensure that growth remains prudent, and the customer experience is protected.

How important is the airport to your strategy and how closely do you work together?
Istanbul Airport is an important part of our 2033 vision. For us, it is not only an operational hub but also the cornerstone of our plan to reach 813 aircraft and 171 million passengers annually by our 100th anniversary. Its scale eliminates the traditional constraints of hub airports while its unique geography allows us to channel high-frequency feeder traffic from narrow-bodies into our wide-body network across six continents. This advantage directly shapes our fleet and growth strategies, which already exceed the industry average.

Another advantage is the Triple Runway Operations system—Europe's first—which increased hourly movement capacity from 120 to 148, enabling sustainable growth without bottlenecks.

Is cargo gaining in importance and what needs to be done to modernize the cargo sector?
Cargo has become a true strategic pillar for airlines. The pandemic showed its critical role in supply chains, and today e-commerce, high-value goods, and time-critical shipments continue to expand its importance.

Modernization requires a holistic approach—smart terminals, stronger intermodal links, and full digitalization across booking, capacity, documentation, and payments. Industry standards like IATA's ONE Record will ensure seamless data exchange, while artificial intelligence (AI) will transform forecasting, pricing, and routing to make cargo faster and more efficient.

For us, Istanbul is not only an operational hub, but also the cornerstone of our plan to reach 171 million passengers annually by our 100th anniversary.

Turkish Cargo strengthening its position as one of the top three air cargo brands around the globe, we believe it will also provide a framework for the industry as a whole.

Can we make the industry net-zero by 2050 and what are the biggest sustainability challenges?

Net zero by 2050 is ambitious but achievable if the industry acts with urgency and partnership. At Turkish Airlines, we are committed to becoming carbon-neutral by 2050, centered on five pillars: next-generation aircraft, SAF, renewable energy, carbon offsetting, and operational efficiency.

SAF is the most immediate lever, expected to deliver around 65% of emission reductions, but supply covers less than 1% of global demand and costs remain four to five times higher than conventional fuel. This gap is the biggest challenge, alongside the need for new propulsion technologies and supportive infrastructure.

We are addressing this through long-term SAF offtake agreements, investments, and partnerships with local and international initiatives. But real progress depends on coordinated support—governments, regulators, and financing all working together. With that collaboration, aviation can reach its 2050 target while continuing to connect the world responsibly.

Is artificial intelligence a game-changer? Where will it have its greatest impact?

AI is already transforming aviation. It enhances safety, improves reliability, and elevates the passenger journey, making it a true catalyst for operational excellence and customer satisfaction at Turkish Airlines.

Our Apron AI project illustrates this well: by monitoring every step of a turnaround with advanced image processing, we can detect delays, optimize resources, and bring full transparency to ground operations. Beyond that, AI powers predictive tools for delay forecasting, catering stock estimation, and crew scheduling—making our operations more resilient.

On the commercial side, AI supports dynamic pricing for upgrades and seat selection, while TK Asistan, our digital assistant, personalizes the passenger experience. Looking ahead, robotics and autonomous systems will further boost efficiency.

Is aviation still an attractive career choice for the younger generation?

Aviation remains one of the most attractive career paths for young people. The fundamentals are strong: Boeing projects a need for around 2.5 million new pilots, technicians, and cabin crew over the next 20 years, while Airbus forecasts steady growth in air travel demand through 2044. These figures show that jobs will continue to be available, offering competitive pay, long-term stability, and a rare opportunity for global mobility. With Turkish Airlines, this means flying to more countries than any other airline.

That said, the nature of these jobs is evolving. AI, automation, and advanced analytics are reshaping how airlines operate, from predictive maintenance to crew scheduling. Sustainability targets are opening entirely new fields in SAF, hydrogen propulsion, and next-generation aircraft design. Future careers will be less about repetitive tasks and more about managing advanced systems, integrating data science with engineering, and designing greener technologies.

This aligns closely with what younger generations seek: meaningful work where technology and sustainability are core. At Turkish Airlines, we're investing in reskilling, building university partnerships, and creating faster entry routes into both traditional and emerging fields. Our Take-Off programs alone received over 19,000 applications this year, with more than half from candidates under 25, showing aviation remains a career of choice for young talent.

Cybersecurity incidents are inevitable—the real measure is how we respond. Like a boxer, it's not about avoiding every hit, but staying on your feet, **keeping ops running, and maintaining our safety**.

19k+

Turkish Airlines' Take-Off programs alone received over **19,000 applications in 2025**, with more than half from **candidates under 25**, showing aviation remains a career of choice for young talent.

Taking action to address non-CO2 emissions

Applying effective mitigation solutions on the effects of non-CO2 emissions requires a greater focus from not just aviation, but all stakeholders

WORDS: GRAHAM NEWTON

IMAGES: ISTOCK/SHUTTERSTOCK

The air transport industry is actively working together with research scientists and other stakeholders to find robust and effective solutions to mitigate contrails and other non-CO2 effects. At the World Sustainability Symposium (WSS), American Airlines and TUI discussed their experience in testing operational solutions and the critical need for stakeholder engagement and strong multi-stakeholder collaboration.

Aircraft non-CO2 emissions include water vapor (H2O), nitrogen oxides (NOx), sulfur oxides (SOx), carbon monoxide (CO), soot (PM 2.5), unburned hydrocarbons (UHC), aerosols, and traces of hydroxyl compounds (-OH), most of which are released in the atmosphere at cruise altitudes of 8–13km above sea level. These constitute a tiny fraction of total engine exhaust emissions, but they can have a climate warming effect that is similar to that of aviation's CO2 emissions.

Although there are fixed rates for CO2 and H2O—aircraft emit 3.16 kg of CO2 and 1.25 kg of H2O per kilogram of jet fuel burned—the climate impact of NOx, SOx, or soot particles are more difficult to estimate because they depend on complex physical and chemical atmospheric processes and involve interdependencies and trade-offs. This means that designing and implementing effective mitigation solutions can be equally complex, despite sometimes being referred to as "low-hanging fruit".

Contrails

Contrails are the main concern as they are estimated to constitute most of the net non-CO2 climate warming impact. In the right atmospheric conditions, soot particles lead to the formation of the ice crystals that make up contrails. Although some contrails have a net cooling effect depending on the time of day, there is scientific consensus that the global net impact is warming.

"Contrail avoidance has been presented as an easy and low-cost mitigation solution since a small percentage of flights concentrated in Europe, North America, and the North Atlantic

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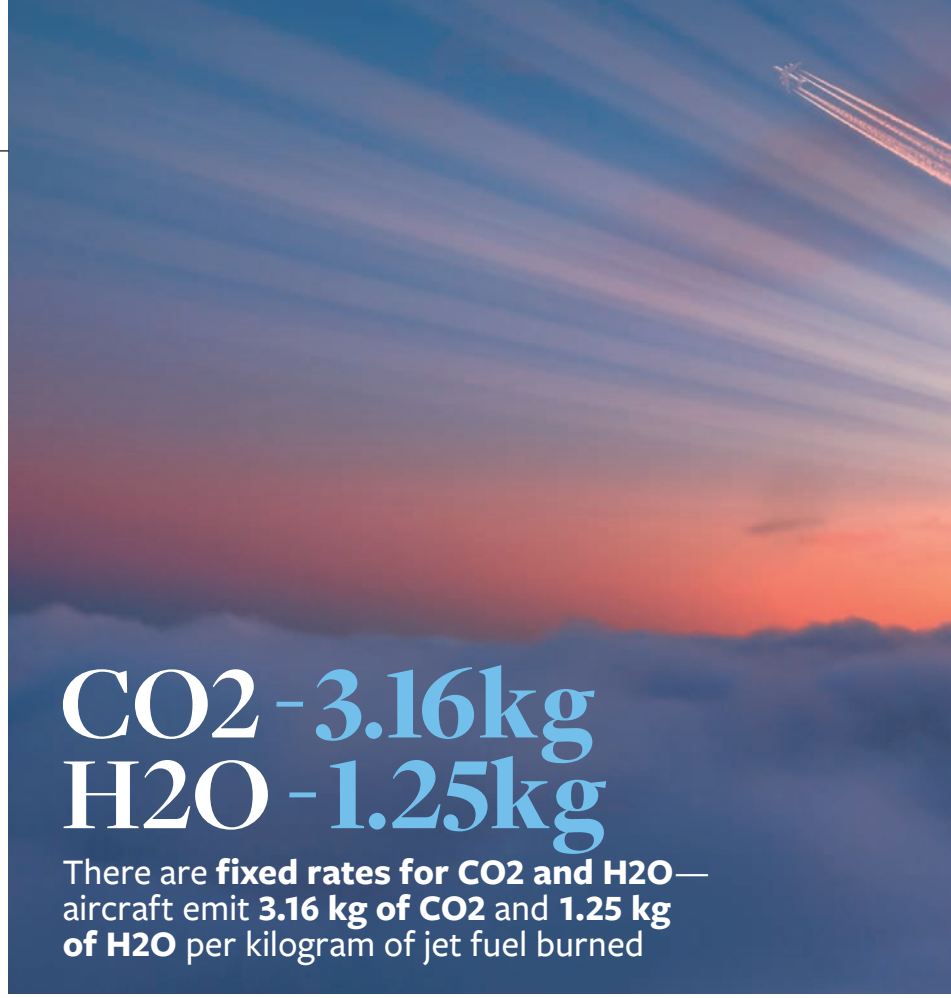


regions are responsible for the majority of the contrail climate warming impact," says Nellie Elguindi, IATA's Manager, Non-CO2 Emissions. "But it's not that simple and there are still scientific, technological, and operational challenges that need to be resolved. It is a complex topic with economic and environmental trade-offs that rely on highly dynamic inputs."

Even a brief examination of possible solutions underlines the point. The obvious step is to reroute flights to avoid areas where contrails might form. But the challenge lies in being able to accurately predict where a persistent contrail will form and the extent of its climate impact. Weather science isn't yet at the point where it can confidently predict areas where aircraft might cause warming contrails.

Nor is the modelling good enough to provide a value for the CO2 equivalent impact of a contrail versus the CO2 emitted by the extra fuel burn caused by rerouting. The surrounding atmosphere, the angle of the incoming solar radiation, the optical thickness of the contrail, and whether it is above the ground or the sea are among the many factors involved.

And this is just the beginning of the story. Operational challenges must also be considered. The feasibility of diverting numerous flights, especially in a crowded airspace, is a key factor, for example. If safety dictates rerouting only a fraction of flights, the effectiveness of this strategy on the climate and which flights get diverted are further questions.

Clearly, more testing needs to be done at a system-wide level to better understand these decisions. Elguindi says rerouting may be a potentially effective way for the industry to mitigate contrails but addressing all the uncertainties and fully understanding the impacts and risks is essential before determining whether large-scale implementation is feasible.

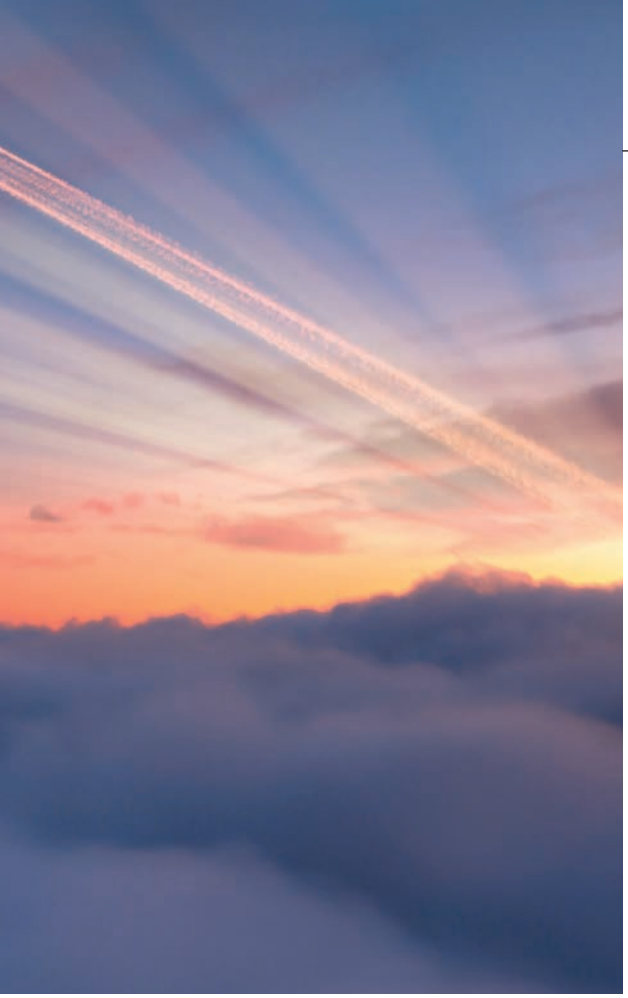
The need for SAF

Another potential pathway for contrail mitigation is the use of low aromatic, low sulfur fuel, which basically means taking out some of the chemical compounds that cause soot particulates. These particulates contribute to contrail formation and reducing them can reduce the warming impact of contrails.

Neat sustainable aviation fuel (SAF) contains almost no aromatic compounds or sulfur, but when blended with conventional aviation fuel the benefits are reduced or lost. Unblended or 100% SAF is still in the certification stage, however, although trials have proven the concept. It may be possible to alter fuel composition—and so reduce potential contrail warming—by removing or reducing naphthalenes and sulfur. Elguindi says the technology exists, but producers and suppliers have little incentive to do this given the associated added costs.

"There are also additional life cycle emissions due to the extra processing that need to be considered when evaluating the net climate benefit," she notes. "Modifying fuel standards may be a way to mitigate non-CO2 effects, but there are many other factors involved, including policy incentives. It is another challenging undertaking, and the industry should not be rushed into implementing a solution before it's ready."

> "**Airlines are being proactive** by participating in **live flight trials**. Our knowledge is improving every day, **but there is still some work to be done.**"
>
> **Nellie Elguindi, IATA Manager, Non-CO2 Emissions**



Prioritizing SAF or cleaner fuel use on specific routes that are more prone to forming highly warming contrails has been suggested as one way forward, but again the viability of such a strategy comes with multiple and obvious logistical and infrastructural issues.

Future technologies show some promise. Electric-powered aircraft would eliminate all CO2 and non-CO2 emissions, but the technology has limited scale and such aircraft are unlikely to feature on the main contrail-forming routes at high altitudes.

As for hydrogen, this too will eliminate soot particles but increase water vapour emissions. Hydrogen contrails would likely be made of fewer but larger ice crystals. Exactly what this would mean in terms of climate impact needs further research. Hydrogen would at least fully eliminate NOx emissions when used in a fuel cell, which would bring both climate and air quality benefits.

Non-CO2 reporting

Given the interdependencies and trade-offs involved in non-CO2 emissions and the low Technical Readiness Level (TRL) of the proposed mitigation solutions, IATA opposes their inclusion in the European Union Emissions Trading Scheme (EU ETS) from 2027. There is already a pilot phase of monitoring, reporting, and verification (MRV) in place.

"It risks pushing airlines to implement mitigation solutions that aren't ready and potentially diverting industry resources that could otherwise be invested in mitigating the CO2 climate impact of aviation where there is more certainty," explains Elguindi. "At the moment, it is not possible to provide accurate information on the non-CO2 effect of a single flight. Moreover, the scope of the MRV should remain intra-EU only, to maintain consistency with the ETS scope for aviation."

All stakeholders, including manufacturers, scientific partners, and academia need to expand trials and studies of non-CO2. IATA plays a key role in facilitating stakeholder engagement and bridging the gap between scientific researchers and industry stakeholders. It co-hosts an annual contrails workshop with the Royal Aeronautical Society that brings together all stakeholders to discuss the latest advances in research and technologies, share experiences, and exchange ideas and insights.

IATA is also collaborating with other stakeholders to advance non-CO2 mitigation solutions. Ongoing efforts with the World Meteorological Organization (WMO) and the German meteorological service is advancing the development and installation on-board meteorological instruments, for example. The data this provides will increase contrail understanding and improve the weather forecasts needed for contrail avoidance.

"We need an industry-wide approach to find achievable smart solutions," confirms Elguindi. "We shouldn't embark on large-scale mitigation measures until we have a more complete understanding of the trade-offs involved and a robust risk assessment framework. Airlines are being proactive by participating in live flight trials. Our knowledge is improving every day, but there is still some work to be done."

8–13km

Most of aircraft non-CO2 emissions are **released in the atmosphere at cruise altitudes of 8–13km** above sea level

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CAE proudly presents Flightscape, a data-driven decision-making platform designed to optimize airline operations.
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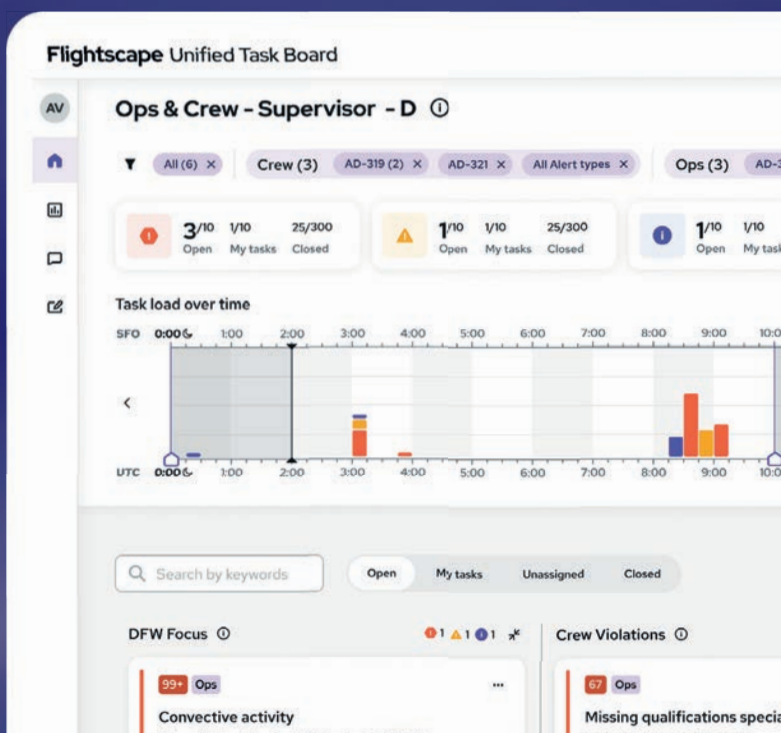
It should be a strategy.



flightscape.com

ORCHESTRATING THE FUTURE OF AIRLINE OPERATIONS

Fragmented systems, siloed data, and poor decision-making tools can be left in the past

Every five seconds, a flight takes off somewhere in the world enabled by Flightscape, powered by CAE. For passengers, and even many in the industry, that moment is the culmination of seamless orchestration behind the scenes. But airlines know the reality is far from simple. Flight operations are a high-wire act, balancing aircraft readiness, crew availability, gate management, catering, weather, and regulatory constraints, among other factors. One weak link can unravel the chain, with disruption rippling across the entire network.

Some analysts have estimated that airlines face 30,000 irregular operations daily. Others believe that lost connections, bad weather, stranded crews, and grounded aircraft collectively drain up to 4%–5% of annual revenues.

Yet studies suggest that half of these disruptions are preventable. The challenge to achieve this is not a lack of effort, but the limitations of fragmented systems, siloed data, and decision-making tools built for yesterday's problems.

Changing mindsets

This is where Flightscape signals a shift. At its core, Flightscape is more than an operations platform. It is a proving ground for how emerging technologies can reshape the very fabric of airline operations.

Flightscape is not automating tasks or making final decisions: it is augmenting the possibilities of human judgment and offering foresight and the ability to make informed data-based decisions where today there is only reaction. Imagine a storm compressing departure slots: Flightscape can anticipate the consequences and suggest gates to reassign, pushbacks to resequence, loads to rebalance, crews to reassign, and more—all to keep departures on time.

Flightscape is unique in the industry in that it leverages decades of data from both the airline and training domains and is backed by CAE's decades of high-tech expertise. The platform offers operations control centre (OCC) employees clean, connected, and actionable decision options. When operational data is reliable, airlines gain not only resilience but also the ability to personalize passenger service and build further trust.

But the bigger opportunity lies in breaking down silos. OCCs traditionally separate crew, flight, and airport functions. Flightscape is an interoperable ecosystem where the Unified Task Board enables data-driven decisions across the entire airline. Its modules include Operations Control, Crew Management, Flight Management, Airport Management, and In-Flight Services Management. As the complexity of aviation operations will do nothing but increase, the future will not be defined by silos and individual decision-making, but by a holistic, seamless, and integrated solution in which artificial intelligence enables smarter and faster decisions.

Delivering against disruption

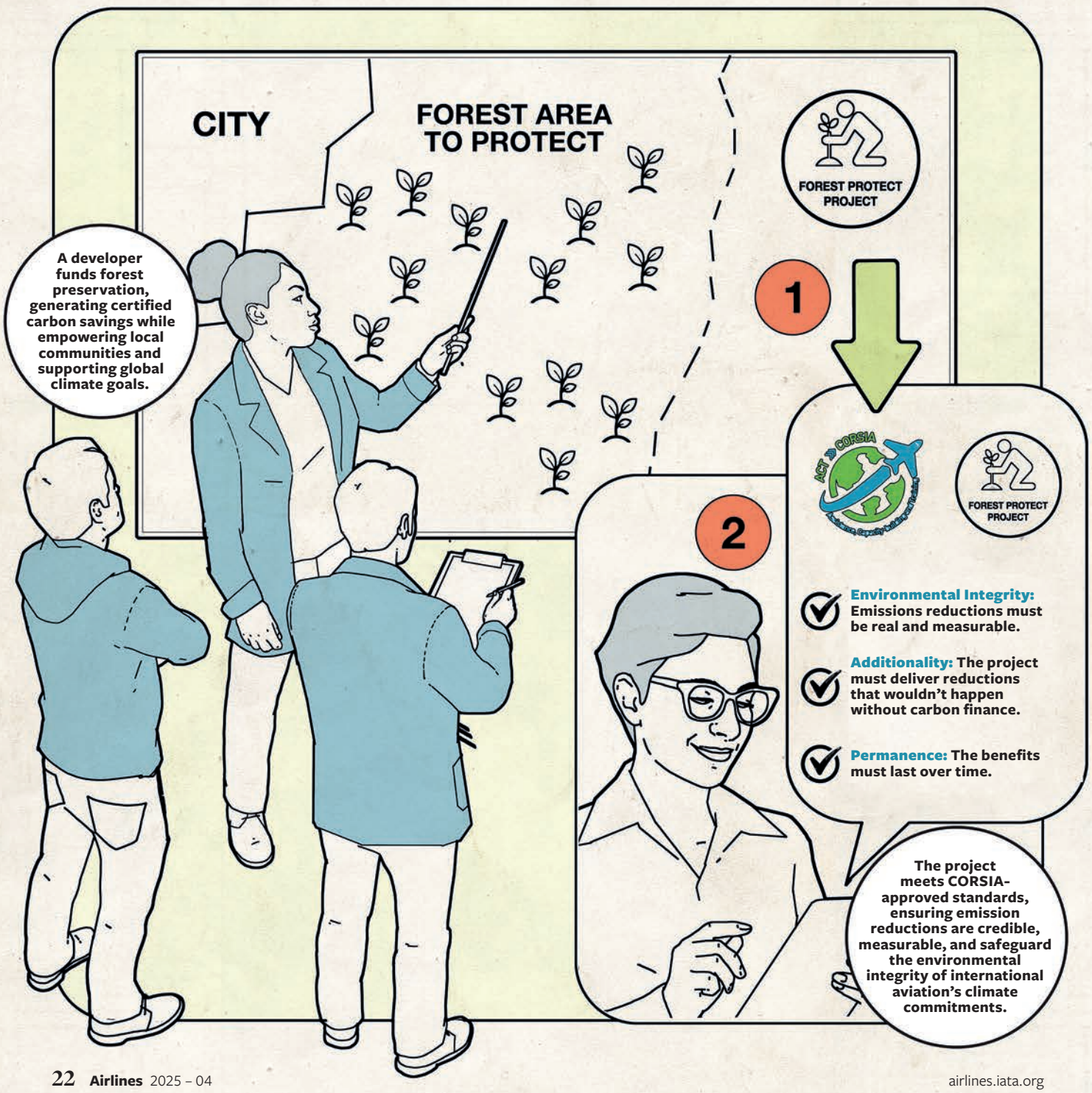
As a global aerospace leader, CAE is inviting airlines to co-create that future. Flightscape is already proving that disruption does not have to mean disorder. The next step is bolder: rethinking how airlines operate, decide, and serve. Together, we can move beyond managing irregularities to designing networks that are resilient by design, efficient at scale, and centered on the passenger experience.

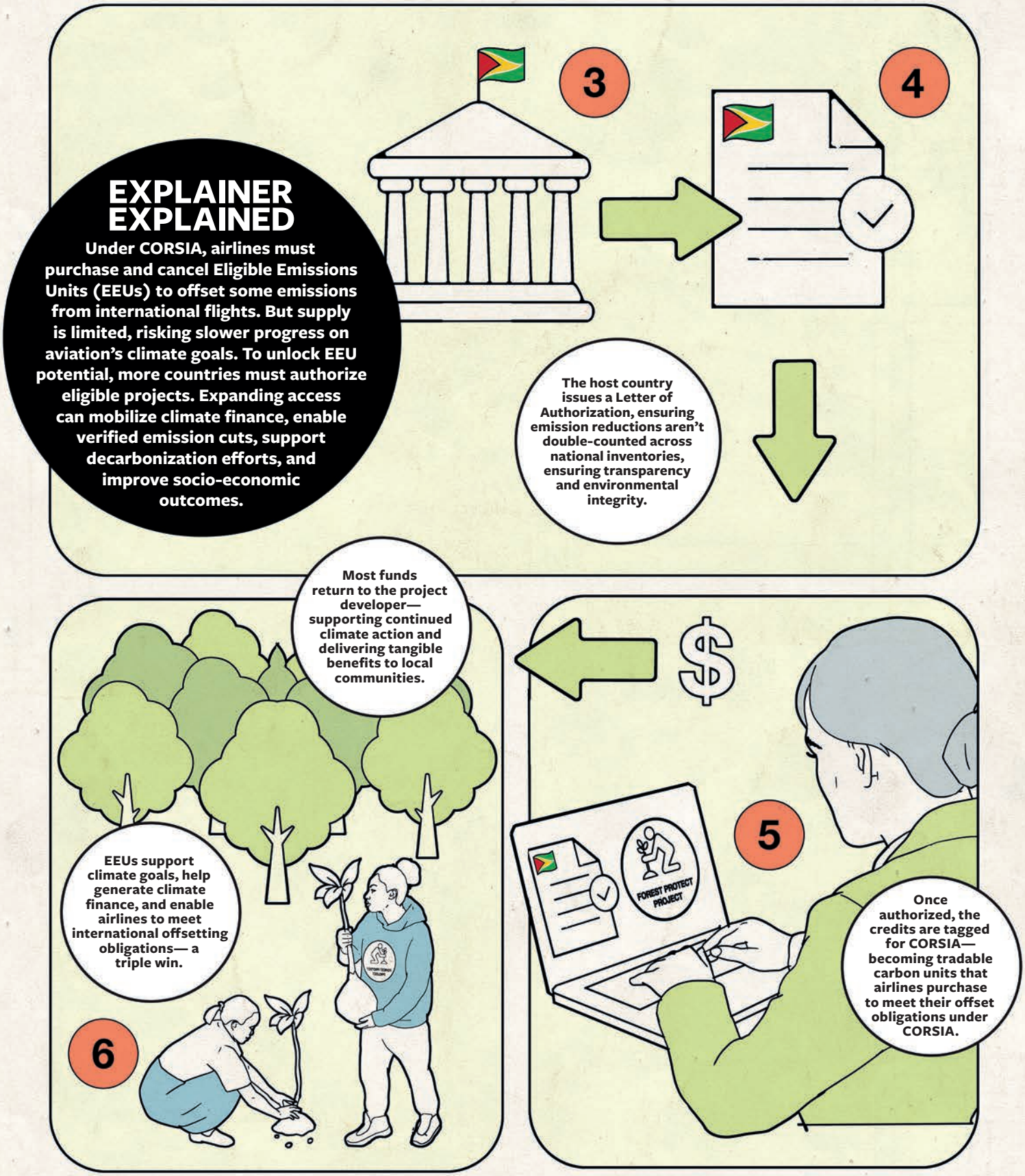
For more information: Visit https://www.flightscape.com/

DATA SOURCE: IATA **ILLUSTRATION:** SON OF ALAN

Explainer

EEUs are carbon credits authorized for aviation under CORSIA, enabling airlines to meet offsetting obligations. Proceeds support verified climate projects and benefit participating countries and local communities.




EXPLAINER EXPLAINED
Under CORSIA, airlines must purchase and cancel Eligible Emissions Units (EEUs) to offset some emissions from international flights. But supply is limited, risking slower progress on aviation's climate goals. To unlock EEU potential, more countries must authorize eligible projects. Expanding access can mobilize climate finance, enable verified emission cuts, support decarbonization efforts, and improve socio-economic outcomes.
3
4
The host country issues a Letter of Authorization, ensuring emission reductions aren't double-counted across national inventories, ensuring transparency and environmental integrity.
5
FOREST PROTECT PROJECT
Once authorized, the credits are tagged for CORSIA—becoming tradable carbon units that airlines purchase to meet their offset obligations under CORSIA.
6
Most funds return to the project developer—supporting continued climate action and delivering tangible benefits to local communities.
EEUs support climate goals, help generate climate finance, and enable airlines to meet international offsetting obligations— a triple win.

> **EU261-rules** are a clear example of **one-sided** EU-regulations, which **hit EU-airlines much harder** than any other **mode of transport.**

A uniquely Belgian offering

Brussels Airlines CEO **Dorothea von Boxberg** discusses the impact of EU regulations and explains how more diversity pays dividends.

WORDS: GRAHAM NEWTON

Brussels Airlines makes the most of its unique character even as it leverages the muscle of the Lufthansa Group. CEO Dorothea von Boxberg says that although EU regulations are challenging, investment in a sustainable fleet, the passenger experience, and organizational diversity will lead the airline to a more efficient and effective future.

How closely do you work with the Lufthansa Group—what decisions are independent of the Group and where do you collaborate?

We work together very closely with Lufthansa Group, without losing our own Belgian identity as Brussels Airlines. Being one of the hub airlines of the largest European airline group is an important benefit for Brussels Airlines. If you think about sales: we have one sales team already for many years, i.e. the Belgian sales team represents all Lufthansa Group hub airlines in the Belgian market. We also develop our digital touchpoints together. Sales, loyalty, servicing, our app is your travel partner—it is developed once and then offered by each of the airlines in their own brand. And it works: our app was awarded the world's best airline app last year. Lufthansa Group has a multi-hub, multi-brand strategy. So, while benefitting from many advantages of being part of the Lufthansa Group, we will safeguard our own identity and our 'Belgitude'. You'll find Belgian pralines and beer on board, our uniforms were designed by a Belgian designer, and we partner-up with Belgian brands for the furniture in our lounges. It's important to keep this local anchoring in Belgium. Our Belgian hospitality is shown where we meet our customers on the ground or in the air.

Is the Star Alliance still relevant?

Definitely. If you take a look at Brussels Airport: you'll see many Star Alliance carriers, and that's not a coincidence. United, Air Canada, ANA, Singapore Airlines, Thai Airways. Brussels is an important destination in their network because of the cooperation within Star Alliance. Passengers can seamlessly connect in Brussels on our European and African network, and the other way around: we can offer destinations across the world where we have no capacity to fly ourselves. With some of the partners the relationships have deepened over and above the alliance where we work together in joint ventures.

Which European regulations need improvement to keep European airlines competitive?

Aviation is a strategic industry, that connects people, cultures and economies. It is one of the

large enablers for interconnected supply chains and the wealth we enjoy from production, imports and exports. However, international competition is increasing but not on equal terms. EU regulation puts additional burden on EU carriers that does not apply to our non-EU competitors. To illustrate: by 2035, "Fit for 55" measures are estimated to add around €220 per return ticket on flight from Madrid to Shanghai via Frankfurt, versus only €40 for the same route via Istanbul.

The "EU Clean Industrial Deal" proclaims to boost European competitiveness while safeguarding climate protection. So far, we heard announcements, but tangible action is still missing. This year, the emissions trading system (ETS EU) and the SAF mandate (ReFuel EU) add costs of more than 700 million EUR to the Lufthansa Group—and this is just the beginning.

We are committed to reduce emissions, but it is key that the European regulator ensures fair competition. ReFuel EU leads to carbon and job leakage and encourages passengers to book tickets via non-EU hubs. This is not only threatening the European economy and European jobs: there is also no benefit for the environment.

Another important topic: EU air passenger rights. It's good that the European Commission and Council want to find a new balance between consumer protection and the operational reality of the industry. It is of utmost importance to create clarity of rules for both customers and airlines. Our daily goal is to bring passengers to their destinations. It is counterproductive if regulation incentivizes cancellations and drives up ticket costs. We need to rethink delay thresholds to have a realistic chance to organize replacements of crews or planes. Also, the EU261-rules are a clear example of one-sided EU-regulations, which hit EU-airlines much harder than any other mode of transport, or non-EU-airlines.

How can we encourage greater SAF production?

The market for SAF is yet a very small one. Right now there is enough SAF available to meet the 2% SAF mandate and also the voluntary purchases our customers do. But the SAF quota will steeply increase—within only ten years it will rise to 20%. ReFuel EU also asks for the eSAF sub-quota as from 2030. There is no industrial production available yet. To quote the EU commission: "At present, available and forecasted volumes of bio- and particularly of eSAF are not sufficient to meet the post 2030 [ReFuel EU] targets."

The EU Commission has just very recently issued the Sustainable Transport Investment Plan (STIP) to mobilize investments to build the European SAF industry. The direction is right, but the suggested tools are simply not sufficient: funds are not secured to make the promised 2.9 billion EUR available, while these numbers seem small compared to the estimated 100 billion EUR of required investments until 2035. We need a policy that counteracts first-mover disadvantages and brings effective innovation & investment incentives.

What other sustainability issues need highlighting—such as SES, EU ETS, ReFuel etc?

Decarbonizing the aviation sector will require numerous efforts from all players: we will need new generations of aircraft and engines to reduce fuel burn and CO2 emissions per ton transported. Flying direct instead of detours – the big objective of Single European Skies would reduce CO2 emissions by up to 10% Innovations like AeroShark, a foil simulating the aerodynamic skin of a shark, will reduce drag and help in reducing CO2 emissions. There are so many things that could be done and need to be done.

In reality, aircraft programs like the hydrogen aircraft are hugely delayed. Single European Skies has not achieved its objectives. The sharkskin foil is not certified on most aircraft. But what doesn't change are the overall CO2 reduction targets—which leave the burden to a much larger extent than foreseen on airlines. In the Draghi report the burden for the European

IMAGES: BRUSSELS AIRLINES

13

The Belgian carrier will soon fly 13 A320neo aircraft

2006

Brussels Airlines was founded in 2006 as flag carrier of Belgium following the merger between SNBA and Virgin Express after Sabena's bankruptcy in 2001

90+

Operating from its base in the Belgian capital, the airline covers more than 90 destinations in Europe, North America and Africa

3500

Brussels Airlines organization employs 3,500 people

aviation sector was quantified at 61 billion EUR p.a. as from 2035. We risk a significantly weakened industry, exporting jobs and connectivity to airlines from outside the EU.

Are OEMs and industry partners doing enough to help airlines reduce noise? And are national regulators losing sight of the Balanced Approach?

At Brussels Airlines, we will soon proudly fly 13 A320neo aircraft, which have a much lower fuel consumption and much lower noise curtain. However, although aircraft manufacturers are researching new technologies, it does indeed go slower than we hoped for. Moreover, the supply chain issues at OEMs lead to long waiting times for new aircraft. You can immediately spot the discrepancy with short-term regulatory intention and real life aircraft deliveries.

The discussion about airport noise is an old and recurring topic. That is why the EU has adopted the balanced approach to hear all voices—the ones of neighbors impacted by noise but also the ones of economic impact and connectivity for the region to make balanced decisions.

At Brussels Airport, the Balanced Approach was originally not followed for the new environmental permit. We are relieved that the Balanced Approach is now about to start and look forward to discussion bringing all voices to the table and then a balanced decision.

Where will technology and artificial intelligence have the biggest impact?

I find that still difficult to judge. Data is very important in aviation—and we generate large amounts of data. We use a number of predictive tools, for example in revenue management and in maintenance. We also have many transactional processes where I believe agentic AI can take over parts. One first example in that direction is our chatbot answering customer questions and helping in servicing. While the clear business cases are not so obvious yet, I believe that there are many opportunities that we still need to understand and seize.

> While **benefitting from being part of the Lufthansa Group**, we will also safeguard our identity, our **'Belgitude'**. You'll find **Belgian pralines and beer on-board**, Belgian-designed **uniforms**, and Belgian **furniture** in our lounges. It's **important to keep this local anchoring**.

Given recent events, how can the industry improve its cyber resilience?

Cyber resilience is a great example for why it is so important for Brussels Airlines to be part of Lufthansa Group and a very professional cybersecurity program.

The awareness for the large risks is a first step. Continuous focus on making funds available and having the right teams and technology working on cyber resilience is crucial. Besides technology, the awareness of the users is important to stay safe.

How do we improve diversity in the industry, and do you feel pressure as a role model?

I believe that IATA's 25by2025 initiative was an impactful step towards more women in leadership roles in aviation.

But diversity of course doesn't end there. At Brussels Airlines we employ people of all abilities, people of different gender, national and ethnic origins, religions, age groups, and sexual identities and orientations. This diversity within the company brings many different skills, perspectives, and experiences.

For us diversity and equal opportunities are important. This also leads to a more varied understanding of customer needs and contributes to a customer-oriented development of products and services.

I am very happy when my work as a female CEO encourages other women to take over leadership roles. Making it natural rather than exotic is important to me.

Are there any other issues that you feel are not receiving enough attention?

What receives a lot of our attention at Brussels Airlines, is our improvement plan: Brussels Airlines is growing its fleet and investing millions in the passenger experience.

We'll give our flagship lounge a makeover in 2026, we'll introduce new cabins in 2027, we invest in our onboard food and beverage offerings in all cabins and much more. We are looking forward to the coming years.

“Flying is still astonishing”

Thomas Reynaert on advocacy in a polarized world, and IATA’s priorities for policymakers

WORDS:
CHRIS GOATER

ILLUSTRATION: SAMI KERR

Thomas Reynaert has had a career that spans two worlds: technology and aviation. After a successful stint in tech, he’s back in the skies—this time as IATA’s Senior Vice President for External Affairs. In this interview, he talks about what drew him back, what aviation can learn from other sectors, and how he sees the future of global aviation advocacy.

Thomas, your career has moved between tech and aviation. What brought you back to this industry—and to IATA specifically?

People often say, “Once aviation bites you, the bug never leaves.” It sounds like a cliché, but it’s true. I’ve always been a frequent flyer, even when my roles weren’t directly in aviation. Flying was part of my life, and I missed it during COVID. I was at IBM—a fantastic company—when Willie Walsh called and explained that he needed someone to lead the ramping up of advocacy efforts globally. I didn’t hesitate. IATA is a unique organization with incredible expertise and data, which makes our advocacy powerful. Honestly, walking into the Brussels office on my first day felt like coming home.

Given your experience in tech, what can aviation learn from that sector about advocacy and engaging regulators?

Tech and aviation operate in very different advocacy environments. In tech, especially B2B, you rarely deal with consumer issues. Politicians care about voters, and in aviation, our members provide a service directly to consumers every day. Expectations are high: passengers pay for a service and expect to arrive on time. Behind that simple expectation lies a complex web of conditions—safety, operations, supply chains—that must align perfectly.

Airlines are takers of technology, not makers. Digitization, AI, next-generation computing—these will be critical for our operational efficiency. Tech firms often ride the wave of “sexy” innovation. Aviation should reclaim that narrative.

From a lobbying perspective, consumer issues and sustainability dominate, especially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370,000+ tCO_2e[1]
abated[2], equivalent to 660,000+ passengers flying from London to New York[3]

57
corporations and airlines[4] have joined Avelia since its launch

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retirements executed on the Avelia platform

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***** Compared to conventional jet fuel

[1] CO_2e (equivalent) emissions includes CO_2, CH4 and N2O. Life cycle GHG emissions are calculated on a well-to-wake basis and include feedstock production and collection; feedstock processing, transport, distribution and combustion of SAF. The well-to-wake emissions have been calculated as per the SAF's verified life cycle GHG emissions intensity from the relevant sustainability certification scheme.

[2] Calculated based on representative life cycle GHG emissions intensities of neat SAF and conventional jet fuel, which may vary per production pathway and geographical region.

[3] The number of one-way long haul average passenger flights has been calculated based on the following assumptions, a flight distance between London and New York of 5541km, and an emissions factor for a long-haul flight of 0.102 $kgCO_2e$/passenger-km based on UK DEFRA 2022 emissions factors for corporate reporting.

[4] Airline carriers and corporations who have signed on to Avelia include Alaska Airlines, Amex GBT, Aon, Bank of America, Cathay Pacific Airways, Delta Air Lines, Emirates, Google LLC, Kintetsu World Express, JetBlue Airways, Rolls-Royce, British Cycling and Yokogawa among others.

in Europe. Price sensitivity remains passengers' top priority. And travelers care about sustainability. People want to know companies have credible environmental targets.

Do you think aviation is special, and if so, what does that mean for public policy?

Flying is still astonishing. Every time I board a widebody and feel it lift off, I think: this massive machine will take me safely across continents. That's extraordinary, yet people take it for granted. We need to remind them—and policymakers—what it takes to make that happen.

Air transport is the bridge to the world. Every flight connects cultures, economies, and people. Aviation is globalization in its best sense. But people are starting to see it as a commodity and take it for granted, which really we shouldn't. I think we need to go to governments and explain what we need to have in place so that, for example, people can connect to the world, or indeed order something online and the next day find a package in their mailbox. We need regulators to understand that when they take certain measures that make our business more expensive, it will have a negative social and economic impact. Then they might think twice before burdening our industry more.

We live in a polarized world with declining trust in institutions. Does that make advocacy harder?

It makes education more important. We must keep explaining to governments that some things are non-negotiable—global safety standards, for example. You can debate many aspects of aviation, but safety is sacrosanct. Even regimes with different political systems ultimately respect that.

At ICAO's recent Assembly, accident reporting was a big topic. It needs to become more efficient globally. Aviation is inherently international, so we must double down on global standards and work through organizations like ICAO to make sure people cherish these global standards. Our job is to stick to rational arguments: what it takes to deliver safe, reliable global connectivity. If you disrupt that system, you harm everyone.

You've just returned from the ICAO Assembly. What did you take away from the event?

It was my first Assembly, and I was impressed. The preparation by IATA was immense—papers, positions, coordination. The outcomes were positive. Some say ICAO resolutions aren't binding, but they matter. We use them in advocacy. For example, consumer protection principles were reaffirmed, as was the principle

IMAGES: BRUSSELS AIRLINES/SHUTTERSTOCK

You can debate many aspects of aviation, but **safety is sacrosanct.** Even regimes **with different political** systems ultimately **respect that.**

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against double taxation. When governments pledge these in Montreal but later propose contradictory national policies at home, we can hold them accountable. ICAO is vital, and our team there does a fantastic job maintaining momentum between Assemblies.

You mentioned consumer protection and tax—what are IATA's other advocacy priorities?

We have eight global priorities, reviewed regularly by our Board. Sustainability tops the list—specifically CORSIA and Sustainable Aviation Fuel (SAF). SAF availability and affordability are critical, yet production is lagging worldwide. Without progress, our decarbonization goals are at risk. Then in addition to taxation and consumer regulation, we're also focused on data protection and digital identity, because as travel becomes more digital, privacy matters. Airlines are also concerned about the money that is trapped in certain markets, notably in Africa, so blocked funds is a key priority. And finally we are looking at supply chain resilience, where post-pandemic disruptions persist, affecting operations.

These priorities will be fine-tuned over the coming year but the core themes—sustainability, fairness, and operational viability—won't change.

> **Airline priorities** will be **fine-tuned over 2026** but core themes—**sustainability, fairness,** and **operational viability**—won't change.

What's your approach to advocacy and what does 'success' look like?

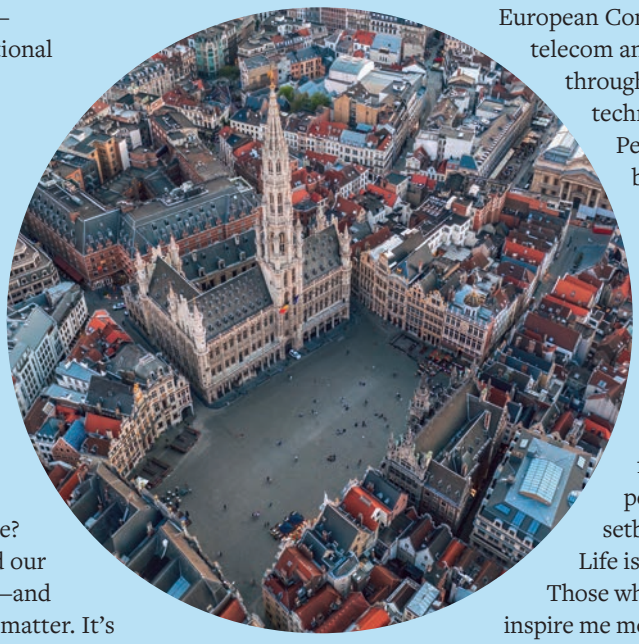
Advocacy is local. Our global priorities guide us, and they are the right priorities at the moment, but regional needs and strategies will vary. So, even though we are a global association, we need to act locally. And we must always bear in mind the business impact for our members. How do we advocate? We must define our objectives and our red lines—what's non-negotiable—and identify partners early. Coalitions matter. It's more effective to approach regulators as a united industry front, provided we don't compromise our core IATA objectives.

I believe that you can have KPIs in government affairs and advocacy. Success can be measured. Sometimes it's as granular as changing an article in legislation. Ultimately, it's about business impact: improving the bottom line for our members. That drives prioritization. We also leverage IATA's strengths—data, technical expertise, and communications. Comms is another pillar of advocacy. Policymakers pay close attention to social media, so we need sharp messaging and the right channels. With the right partnerships and tools, we're powerful.

To conclude, tell us a bit more about you as a person. What has driven your career and what inspires you day-to-day?

I'm Belgian, and I grew up in a traditional Flemish family of doctors, where travel was for medical conferences. I was the outlier, fascinated by languages, cultures, history. That led to studies in applied linguistics and then international politics. My career began at the European Commission, then moved into telecom and aviation. Two threads run through my life: international affairs and technology. Aviation combines both. People see the aircraft and crew, but behind every flight is a world of technology—and that will only grow with digitization.

As for what inspires me, I'm moved by the great aviation pioneers. Think of Leonardo da Vinci's ideas, or the early 20th-century risk-takers. They had courage—and accepted failure as part of progress. I admire people who take risks, admit setbacks, and come back stronger. Life is about winning and losing a little. Those who share lessons from failure inspire me most.



Nevra Onursal Karaağaç, CEO, Hitit

EMBRACE CHANGE TODAY TO BECOME THE AIRLINE OF TOMORROW

Nevra Onursal Karaağaç, CEO, Hitit, says transformation doesn't have to be hard

The airline industry is undergoing a large-scale, radical transformation, driven by the principles in the Business Reference Architecture for Modern Airline Retailing (RP1786a). The shift from static fares, booking classes, and a limited number of ancillaries toward expanded revenue streams and customer-centric retailing practices with the power of big data is going to redefine how airlines design, manage, and deliver their products. It will also simplify the complex structures of today, resulting in significant cost savings.

This strategic overhaul will certainly not happen overnight. Airlines will need to embrace well-structured transition plans to achieve 100% Offers and Orders, supported by capable partners and future-ready platforms.

Hitit Oxygen: One Breath Ahead

Hitit, dedicated to driving the digital transformation of airlines for over three decades, has been working on this compelling topic that holds a prominent place on the airline technology agenda. As a result of these efforts, we launched Hitit Oxygen, showing that the airline of the future is just One Breath Ahead.

The mission we have set for Hitit Oxygen, unveiled with Pegasus Airlines at the IATA Offers and Orders Forum in June 2025, is to guide airlines through this modernization journey at their own pace and with confidence, regardless of their scale or business model. Oxygen is the largest scale Offers and Orders system currently in production mode, and a joint case study with Pegasus is available on hitit.com.

Take a behind-the-scenes look

The transformation with Hitit Oxygen starts with New Distribution Capability (NDC), enabling airlines to create personalized offers with rich content in real time. Hitit Oxygen supports dynamic pricing and integrates flights, ancillaries, and third-party services across all channels. These capabilities unlock immediate commercial benefits while laying the groundwork for long-term retailing success.

The Order Management System (OMS) takes center stage once an offer is accepted. It replaces legacy records like passenger name records (PNRs), e-tickets and electronic miscellaneous documents (EMDs) with a unified Order ID. The Order is the star that streamlines the entire lifecycle, from booking to delivery and settlement, enhancing the customer experience and operational efficiency. Hitit Oxygen ensures compatibility with legacy systems, allowing airlines to manage both channels in harmony during the transformation.

Hitit's leadership in this field is recognized by the IATA Airline Retailing Maturity (ARM) Index, with the company having the highest number of capabilities in shopping, payment, and order management as a global provider. Our solution suite is already serving over 70 airline partners across six continents, supporting more than 100 million passengers and facilitating over $8 billion in transactions annually.

Recognizing that each airline has unique needs, we offer tailored roadmaps to support their priorities. Network carriers may prefer phased integration to maintain operational and commercial commitments while low-cost airlines can focus on rapid deployment for quick wins. Hitit Oxygen's modular platform and strategic guidance enable airlines to implement features at their pace.

Modern Airline Retailing is the foundation for advanced, digital-first airline business. Airlines embracing this shift today are not just keeping pace, they are shaping the future of travel retailing for decades to come. We are proud to be powering this evolution.

Challenges in air cargo liability

Unclear processes surrounding the workings of Air Waybills can pose significant problems for carriers

WORDS: GRAHAM NEWTON

The ever-changing dynamics in the booking of air cargo have made assigning liability an increasingly complex area. The story begins with the air cargo agency program. At that time, a freight forwarder acted as a carrier's agent and sold the carrier's air cargo transport services to shippers.

As agents of the airline, the freight forwarders were entitled to a commission based on the rate set by airlines, and the Air Waybill (AWB)—the air cargo chain's critical document that constitutes the contract of carriage between the airline and the shipper—reflected this allocation of responsibility with separate fields for the shipper's name and carrier's agent name on the face of the AWB. On the reverse side, the conditions of contract and applicable international liability conventions identified the obligations and conditions assumed by the shipper and the carrier.

The responsibilities of the freight forwarder as the cargo agent were also set forth clearly in the IATA Cargo Agency Agreement and corresponding IATA resolutions. The airlines had a direct commercial relationship with shippers, and the roles of shipper, carrier, and carrier's agent were un-ambiguous and evident to all parties.

By the 1990s, however, forwarders had largely abandoned the agent role and were reinventing themselves as customers and resellers of the airlines by taking over many of the supply chain roles, including logistics and warehousing. Crucially, forwarders also assumed the commercial relationship with shippers, setting their own rates and block booking cargo space with carriers.

This market consolidation was welcomed by airlines, which were generally happy with the simplification and the selling of space at volume. In theory, the move meant forwarders took on most of the responsibility across the end-to-end journey. Although they were no longer acting as agents on behalf of the airlines and showed themselves in the shipper's box of the AWB, they continued to fill in their name in the agent field.

High risk

But this realignment of responsibility that made forwarders liable as shippers was soon put under strain. "There were issues from the start with high-risk shipments, such as dangerous goods," says Carlos Tornero, IATA's

IMAGES: ISTOCK

Director of Legal Services. "And this has reached a new level with the proliferation of new shippers in e-commerce and, especially, lithium batteries.

From a forwarder's perspective, building high risk into their pricing model was challenging. This led to the rise of so-called direct AWBs, where, rather than the forwarder's name appearing as the shipper, the originating shipper's name is typically inserted in the shipper field for any shipment deemed to be high-risk.

In effect, for these high-risk goods, the forwarders step out of the shipper role and tender cargo to the airlines on behalf of the shipper. The forwarders are, in essence, now acting as agents of the shippers and not agents of the airlines.

This creates a dilemma for carriers. They no longer have a direct commercial relationship with the original shipper, yet they accept these high-risk shipments from the forwarder under a direct AWB that makes it appear as though they do have a contractual relationship with the original shipper.

"Airlines have essentially entered into a contract with an entity they do not know and have not performed due diligence, anti-money laundering or sanctions and embargo compliance checks," explains Tornero. "Importantly, they have not negotiated a rate prior to having a shipment land on their warehouse floor."

But the direct AWB implies that forwarders are merely the shipper's agent and so if things go wrong, such as a lithium battery fire, airlines must seek recourse against the original shipper—effectively, an unknown party.

The way forward

To date, it's unclear whether a major incident has involved a direct AWB. Airlines have usually settled claims as the most expedient way forward.

In any case, given the nature of cargo claims, it's often difficult to pinpoint blame should an incident involve dangerous goods being mis-labeled or mishandled, especially considering the growing number of e-commerce and co-loaded shipment.

Tornero stresses, however, that airlines already have the tools to challenge liability in forwarder/agent situations. "The IATA resolutions provide explicit wording that clarifies matters," he reveals.

IATA Cargo Services Conference (CSC) Resolution 600a, which outlines the AWB completion instructions, states that the "shipper or the shipper's agent shall indemnify the carrier against all damage suffered by it, or by any other person to whom the carrier is liable, by reason of the irregularity, incorrectness or incompleteness of the particulars and statements furnished by the shipper or on the shipper's behalf."

Other IATA resolutions make clear the forwarder's responsibilities and set forth obligations to indemnify airlines, including CSC Resolution 672, the IATA Multi-Lateral e-AWB, and the Cargo Agency Conference (CAC) Resolution 801a(ii), known as the Cargo Agency Agreement.

Tornero says airlines should study these resolutions and be fully aware of the language on the AWB. "Carriers should verify whether they are accepting direct AWBs from forwarders and, if so, have conversations with them so that the commercial and legal liability obligations of all parties are clearly understood," he recommends.

Modification of the AWB is also being explored to reflect the existing practice.

"If a forwarder does not wish to be the shipper on a high-risk shipment, then airlines should be able to have a direct, commercial relationship with that the original shipper," Tornero concludes. "That would enable them to set an appropriate rate that accounts for the risk they are accepting. If a forwarder is the shipper—and CSC resolutions, which cover all goods carried by air, make it clear that is the case—then we need to find a better way forward before there is a major incident."

What is the Air Waybill?

The Air Waybill (AWB) is a critical air cargo document that constitutes the contract of carriage between the "shipper" and the "carrier" (airline). The Electronic Air Waybill Resolution 672 (MeA) removes the requirement for a paper AWB. There is therefore no longer a need to print, handle or archive the paper, largely simplifying the air cargo process.

"Carriers should verify whether they are accepting **direct AWBs from forwarders** and, if so, have **conversations** with them so that the **commercial and legal liability obligations** of all parties are **clearly understood."**

Carlos Tornero, IATA's Director of Legal Services

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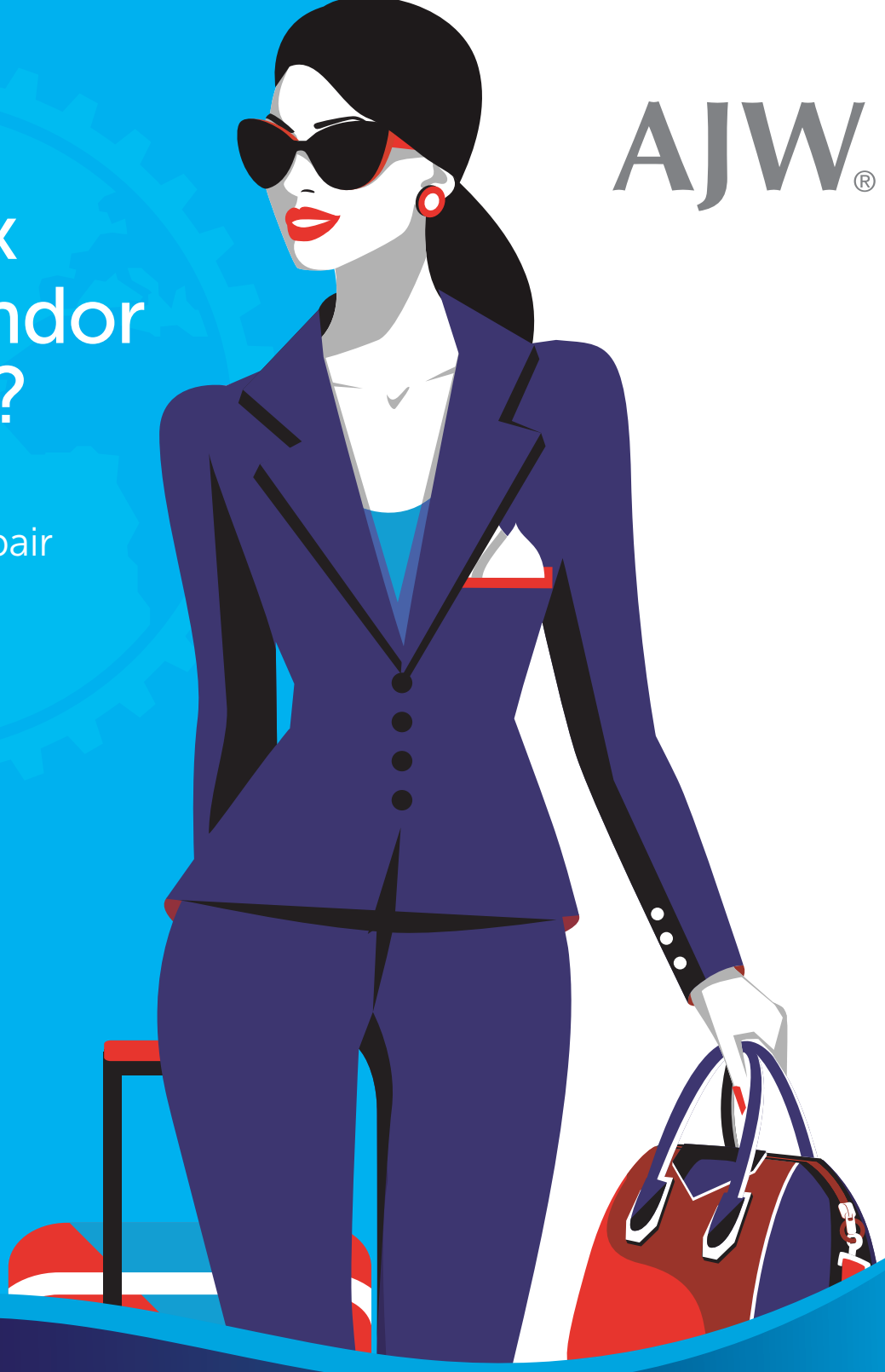

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Toward a more efficient online shopping search

Creating a superior experience for customers is a never-ending process for the airline industry, as **Graham Newton** explains

WORDS: GRAHAM NEWTON

Improving the customer shopping experience is a constant industry focus. An IATA industry whitepaper explores the challenges posed by the high volume of flight search requests and highlights opportunities to enhance the quality and delivery of offers made available to customers.

Take a simple request for a return flight between Paris and the United States with a few days' leeway in dates and a similar, limited flexibility in the destination airport. Using a metasearch platform, a customer could be faced with hundreds of thousands of options with numerous routings and wide-ranging prices.

As Olivier Hours, IATA's Head of Distribution Strategy, puts it: "Customers aren't searching for masses of answers. They just want a few, accurate ones."

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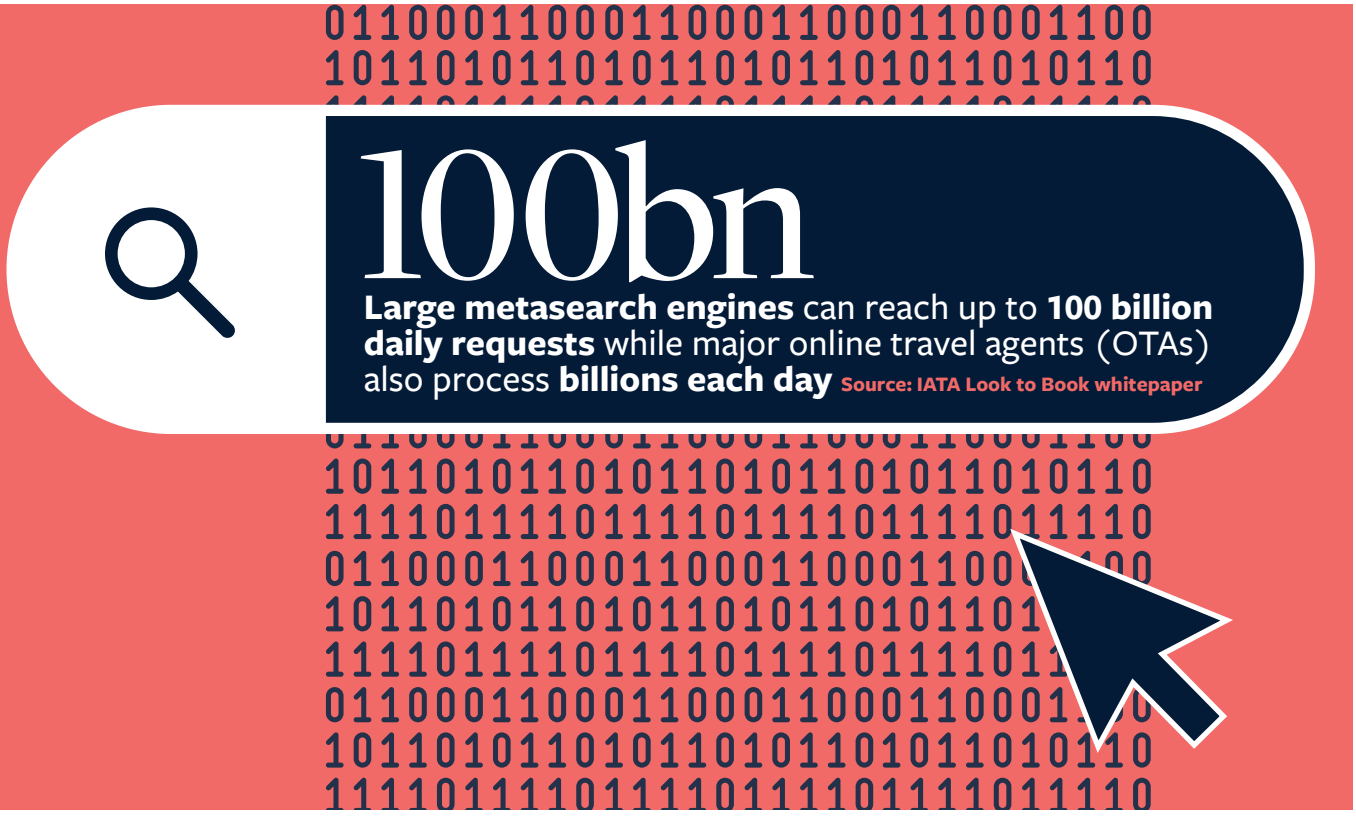

Reducing the system payload

The industry's aim is to deliver better quality search results for the customer and transition airlines from unproductive Look to Book to a highly efficient Offer-to-Order conversion.

A huge amount of computing power is consumed to provide an excessive number of offers for a single customer search. There is a wide range of choice in airline, route, and price thanks to a highly competitive market. And though traditional content Offers via Global Distribution Systems (GDS) or airline websites limited search volumes, new models enabled by New Distribution Capability (NDC) are increasing traffic on airline systems.

The whitepaper reveals that "leading IT providers handle between 3 and 13 billion requests per day. Large metasearch engines can reach up to 100 billion daily requests while major online travel agents (OTAs) also process billions each day." Along with bots, agentic artificial intelligence will add to the problem, potentially continually modifying searches to seek the best deal.

Moreover, customers often shop anonymously making it difficult to assess their intent to purchase. Most e-commerce platforms generate rich behavioural data from frequent, logged-in users but this is not the case for most flight searches. The offers can be outdated too. Simply, the only way to deal with the search volume in near real-time is to cache, or store, results. A price may therefore change slightly after the click-through—a potential pain point for the customer.

In theory, scaling up is possible given today's technology, but Hours insists that there are better options than merely adding servers.

"The vast amount of data being passed back and forth for a single booking happens because there is a lack of transparency in the ecosystem," he says. "Customers are never sure that they

"**We need to be more efficient**—This is about **creating value**. The **conversation** between airline and customer, travel seller and customer, or airline and travel seller **must be enriched**." **Olivier Hours, IATA's Head of Distribution Strategy**

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Other specific propositions in the industry whitepaper include:

Airline Profile implementation: This provides sellers with standardized access to airline schedules.

Light Shopping messages: This simplifies the initial steps for basic pricing for specific use cases.

Search-origin Identifier per request: This identifies similar requests across multiple sellers

Product Management: A consistent taxonomy is needed across airlines and for search by attributes to ensure scalability.

Offer creation simplification: This creates an end state of offer management with no reservation booking designators or fare rules.

have found the best deal and sellers present all possible offers to show that they have done an extensive search for the best price. Airlines, similarly, tend to push multiple offers to attract business. Understanding business objectives, workflows, and content strategies will translate to a much better result for the customer."

> "Customers aren't **searching for masses** of answers—They just **want a few, accurate ones.**"
>
> **Olivier Hours, IATA's Head of Distribution Strategy**

Propositions for success

In the industry whitepaper, IATA, airlines, IT providers, and sellers outline multiple propositions to improve the situation. Broadly, a framework guided by key performance indicators (KPI) will allow airlines and other content distributors to have an informed discussion about Look to Book. The framework would be non-binding but could at least reduce the system payload in a manner acceptable to all parties.

Such KPIs might include the response time of the airline application programming interface (API) and the number of offers sent to the seller per look. Any discussions would further be helped by a shared understanding of caching, architecture, and the data shared during the workflow (see box p42). IATA has issued a call to action for all stakeholders to review and discuss the propositions.

An enriched conversation

Hours concludes that the existing Look-to-Book ratio—which is estimated at tens of thousands to one—is unsustainable. Several solutions are within reach that would reduce system payload and provide a superior customer experience. Most importantly, Modern Airline Retailing is a future-proof transformation for the industry, enabling better conversion rates through personalized offers and smarter pricing.

"We need to be more efficient," he says. "This is about creating value. The conversation between airline and customer, travel seller and customer, or airline and travel seller must be enriched. We are clear on the challenge, opportunities, and solutions and we hope this clarity inspires stakeholders to implement at least some of the propositions."

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