ARGS

AIRLINE ROUTES & GROUND SERVICES

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SPRING 2020

Environmental concerns
Passenger preferences are changing the aviation landscape

Route development
European airlines continue to expand their networks

Technology update
Cyber security and blockchain are high on the agenda

2020 outlook
Perspectives from the ground handling community

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Publisher's Notes

Welcome to the Spring 2020 issue of Airline Routes and Ground Services.

The coronavirus outbreak is, naturally, high on the agenda of those involved in air transport. David Smith examines the impact of this health crisis on aviation in China and the wider Asia region.

Also on a health note, Andrea Tolu discovers what is involved in ensuring food safety in airline catering.

Environmental concerns are another hot topic. Megan Ramsay considers the role of carbon offsetting in the fight against climate change, in the context of changing consumer choices. George Anjaparidze of Veritas Group stresses the importance of collaboration to ensure the sustainable future of aviation.

This issue also contains an outlook including perspectives from several industry figures regarding trends and developments in the face of seemingly relentless challenges. Despite the obstacles, there is a determinedly positive feeing in the air. For instance, many airlines are expanding as passenger demand is set to continue its upward trajectory – as Graham Newton finds in Europe.

Other airlines are faring less well: we provide an update on South African Airways' restructuring. The flag-carrier's future hung in the balance as ARGS went to press.

A key ongoing trend is the rise of technology in its various forms as an integral part of our lives. Martin Courtney investigates how blockchain could revolutionise air transport.

Cyber safety, meanwhile, is the subject of a piece that discusses the impact of cyber threats on airports, aircraft and the aviation industry as a whole.

Finally, following on from last issue's feature on women in the industry, we profile Shahfinaz Abd Wahid, head of quality assurance, safety and security at Malaysia's AeroDarat Services.

With a new editor being lined up for the Summer 2020 edition, we are looking forward to the next step in the development of ARGS. I hope you enjoy this first issue of the new decade.

Parveen Raja

Publisher
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Contents

Spring 2020

Our airport's sustainability efforts are **out of sight.**

DFW International Airport is proud to be the **world's largest carbon neutral airport.**

The results of sustainability initiatives at DFW International Airport may be unseen, but they're there. For over a decade, our steadfast commitment to reducing the airport's environmental impact has reduced expenses and improved operational efficiency as well. Our environmental efforts may be out of sight, but when it comes to innovating large-scale sustainability systems, DFW Airport is the leader. Follow our ongoing journey at **DFWairport.com/sustainability.**

This is DFW Airport's **"Dynamic Glass"** at work. Technology that continuously optimizes window tint — reducing energy use while improving customer comfort.

Finding room to grow

Europe's many challenges have **not yet dented route development** for the determined, writes *Graham Newton*

By 2035 it is estimated that more than a million European flights will have nowhere to go. The region's airports and airspace will be gridlocked.

Most of the main hubs are congested and projects to expand are few and far between. Heathrow and Paris Charles de Gaulle are due to be developed but it has been a painfully slow process to date. Berlin Brandenburg is yet to open, with the end of October 2020 now the proposed date. Most other main hubs are stuck within their existing footprint.

The bright spots are Poland's forthcoming Solidarity Hub in Warsaw, scheduled to be completed in 2027, and Istanbul's new airport (which began operating in 2019) – but these do little to ease the trunk routes crisscrossing European skies.

Already, delays – especially during the busy summer months – have become part and parcel of the European air travel experience. Although 2019 represented a slight bucking of the upward trend that has dominated since 2013, delays still average around 12 minutes per flight over the course of a year. This is significant given that more than 80% of European flights last under three hours.

With air traffic continuing to grow and the Single European Sky seemingly still a distant dream, it is clear that the congestion challenge will not go away.

Moreover, it is far from being the only problem. Costs are high and taxes a burden – ranging from the UK's air passenger duty (APD) to numerous proposals for so-called green taxes. In Germany, Lufthansa anticipates a new aviation tax starting in April 2020 will mean a 74% rise in cost.

Working in conjunction with environmental taxes are the flight shame movement and overall public pressure on environmental responsibility. Despite the industry agreeing to the Carbon Offsetting Reduction Scheme for International Aviation (CORSIA) at ICAO level, environmental concerns may yet temper demand in the years ahead.

Then there are regulations such as EU261 – which dictates passenger compensation – that are considered ripe for reform. There are even concerns over the Worldwide Slot Guidelines, which have guided slot allocation at busy gateways for many years. Airports are pushing for a shift in the parameters of the 80-20 rule that allows an airline to keep a slot if it uses it 80% of the time. Airports think 85% might work better; governments are even wondering about an auction process.

With such a restrictive operating environment, it is no surprise that there were several bankruptcies in Europe last year, most notably Thomas Cook. The number of airlines operating in Europe had dropped from 131 to 107 by mid-2019. Since then, Flybe has failed, the coronavirus pandemic proving too much for the ailing airline despite an earlier bailout from the UK Government.

As IATA's director general, Alexandre de Juniac, notes: "The average profitability of European airlines is about €6 (US$6.6) per passenger, but that is generated by a small number of leading airlines. There is a long list of airlines that are making no money at all. That means they cannot finance new routes, generate more employment, offer


Lufthansa

Ryanair and Wizz Air are two low-cost carriers that continue to grow as passenger numbers rise

"Air transport has been at the heart of European integration"

Alexandre de Juniac
Director General and CEO of IATA

better wages, buy greener aircraft or give returns to investors.

"Airlines sustain 12.2 million jobs across Europe and €750 billion (US$827.4 billion) in GDP. We are the motor of innovation, reducing inequalities and generating life opportunities. We all gain from a sustainable, strong aviation industry."

Ryanair gets legal

Sustainability is certainly the cornerstone of Ryanair's latest marketing campaign as Europe's largest airline continues to expand. Of many new routes, there are three from Manchester to Copenhagen, Kerry and Paris Beauvais from March 2020, bringing the carrier's offering from the north-western UK city to 66 routes.

Ryanair has welcomed the decision of the Hamburg Court to grant interim injunctions against Skyscanner for an alleged hidden mark-up that means it shows higher fares than those displayed on Ryanair.com.

The airline has been engaged in various other legal cases across Europe to prevent

customers from being subjected to excessive unnecessary additional charges from unauthorised screenscraper websites.

"We again urge consumers to avoid screenscrapers such as Skyscanner and book directly on the Ryanair website, the only place to find the lowest Ryanair fares and fully transparent pricing on ancillary products like baggage," said Ryanair's Kenny Jacobs.

Wizz Air accelerates expansion

In Eastern Europe, Wizz Air continues to go from strength to strength. For example, four new services from Saint Petersburg's Pulkovo Airport will take flight this summer, to Bucharest, Sofia, Vilnius and Bratislava.

The carrier will also add another two aircraft to its Vienna base for the summer schedule, enabling Alghero, Corfu, Faro, Podgorica and Suceava to join the Vienna network.

Wizz Air only opened its Austrian base at Vienna International Airport in June 2018, but the operation has grown to serve 2.2 million travellers a year across 49 routes in 27 countries. In 2020, Wizz Air will offer Austrian passengers 4.1 million seats, a 70% year-on-year growth.

Wizz Air's Bucharest base is bigger than Vienna in fleet terms and will also get a new aircraft in summer. New routes to Prague and Seville will become part of the schedule. Paulina Gosk, corporate communications manager at Wizz Air, says the carrier remains "committed to Romania and to providing exciting new travel opportunities to the most attractive destinations across Europe and beyond".

Wizz Air's expansion has been phenomenal and illustrates the boom in air travel brought about by the low-cost model in Europe. The airline will be just 16 years old in May 2020 – yet it serves over 600 routes from 25 bases. It completed an initial public offering over four years ago and was admitted to the London Stock Exchange.

Although initially ultra-low cost in its outlook, it has matured enough to develop seat allocation, priority boarding and other initiatives to boost the passenger experience.

More established players are also finding enough wiggle room to expand. The Lufthansa Group, for example, carried 145 million passengers in 2019, a 2.3% increase on 2018. Zurich (+5.7%), Vienna (+5.1%) and Munich (+2.5%) saw the biggest hikes. The Eurowings, point-to-point, side of the business is offering fewer seats than it did a year ago, but load factors are up.

According to Lufthansa, the future of world air travel lies with about a dozen airline groups and it is determined to be part of that elite.

Efficient skies

Europe clearly needs to find a way to accommodate the demand for air travel in a sustainable manner for airlines and the environment.

More efficient skies hold some of the answers. Better utilisation of airspace could unlock capacity, keep fuel costs down and reduce emissions. There have been many initiatives over the years. The work by Heathrow and UK air navigation service provider (ANSP) NATS to introduce time-based separation is a case in point. This makes better use of scarce runway availability, especially during windy conditions.

More recently, members of the SESAR Deployment Alliance and the EUROCONTROL Network Manager have submitted a joint letter to the European Commission proposing to form a new partnership to manage the modernisation and digitisation of a sustainable European air traffic management (ATM) system.

"I am delighted to have signed a letter to DG MOVE proposing this new partnership between EUROCONTROL and the members of the SESAR Deployment Alliance," says Eamonn Brennan, director general, EUROCONTROL.

"With an ongoing capacity crunch causing air traffic flow management delays that are 53% above those of 2017, it is crucial to accelerate the deployment of new technologies that can modernise and digitise air traffic management. This partnership is the right way forward to enable us to do that."

The integrated Network Manager (iNM) project will be based on an open digital platform to facilitate such innovation as artificial intelligence, robotic process automation, data analytics and more. Lacopo Prissinotti, director network management, calls the project "a significant journey with important deliverables that will happen very quickly".

Those deliverables will not start until 2023, however, and the programme will run until 2029.

IATA's solution to the perceived foot-dragging in harmonising European airspace is its National Airspace Strategies initiative. Bulgaria, Italy and Poland are among the nations working with IATA to develop a system that works for airlines and ANSPs alike.

Whether these schemes will be enough to improve airspace remains to be seen. And in any case, it is runways that Europe needs more. Building a few miles of tarmac is proving an extremely tough challenge, however.

"Air transport has been at the heart of European integration," concludes IATA's de Juniac.

"Europe is now connected by 23,400 daily flights, carrying 1 billion people a year. That should be a cause for celebration, not shame. And the same spirit of optimism of the new Europe that has been forged over the past 30 years should be turned towards conquering the challenge of sustainability. Not in a backwards-looking, negative way, but in a positive way.

"The solutions to sustainably connect this continent and keep it accessible to all its citizens exist," he affirms.

"It is crucial to accelerate the deployment of new technologies that can modernise and digitise air traffic management"

Eamonn Brennan
Director General, EUROCONTROL

Eamonn Brennan, EUROCONTROL

North European Interior Designer smiles
at Athens International Airport
White marble, 2020 A.D.

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SAA set for restructure?

South African Airways is in business rescue, but the **future is still unclear**

These are troubled times for South African Airways (SAA). Once the powerhouse of the continent, the carrier has been reduced to a shell of its former self despite the undoubted potential of the company and the country it serves.

SAA is insolvent, its debts exceeding the value of its assets and revenue. And it would appear that the government, SAA's sole shareholder, has neither the money nor the inclination to solve the crisis.

In December 2019, it did at least put SAA into business rescue, a reasonably new South African device akin to Chapter 11 in the US. The intention is to provide a degree of wiggle room for SAA so it can attempt to restructure its operations, finance, labour agreements and so forth.

There is one major difference between business rescue and Chapter 11. In the US, company executives continue to make the decisions and are responsible for turning around the company. In South Africa, business rescue means getting court-appointed officials to run the company.

In SAA's case, it is Les Matuson and Siviwe Dongwana, very much business rescue practitioners rather than airline gurus. The provisional judgement, delivered after a couple of weeks at SAA, was that there is a reasonable prospect of successfully rescuing the carrier.

But Matuson warned in a statement: "Our primary objective of the business rescue process is to either rescue SAA through restructuring its affairs, business, property, debt and other liabilities and equity that maximises the likelihood of the company continuing on a solvent basis, or develop a plan that results in a better return for the company's creditors or shareholders than would result from the immediate liquidation of SAA. A vast majority of business rescue proceedings in South Africa have followed the second outcome."

Government woes

SAA turned 86 years old on 1 February 2020. Reaching 87 relies on South Africa's National Treasury coming up with ZAR2 billion (US$128 million) in bridging finance. It is reported that airline costs run to ZAR70-75 million (US$4.5-4.8 million) a day and it has already spent an initial business rescue loan. Furthermore, it is unlikely that any banks will extend credit due to the carrier's insolvency.

Aircraft have gone on sale and routes have been cut, the latest being Johannesburg flights to Cape Town, Munich and Frankfurt.

At the latest ANC meeting, plans to liquidate SAA were reputedly defeated with the ruling party's executive instead opting for the airline to be restructured, probably based heavily on the low-cost business model and with the international network severely curtailed. It is estimated this would cost in the region of ZAR8 billion (US$511 million), on top of the anticipated ZAR2 billion (US$128 million) loan from the National Treasury.

Finding that level of investment will be difficult, however. The fact is that South Africa is struggling economically, with the country subject to rolling blackouts that are predicted to last for at least another five years. A distressed airline is way down the pecking order of financial priorities.

There is also a possibility the country will have its sovereign credit rating downgraded to junk status by the international ratings agencies. A one-fifth devaluation of the rand is thought likely if this happens.

Where it all went wrong

Not surprisingly, the root of SAA's crisis seems to be the failure of successive governments to capitalise SAA adequately. Most solutions have been short term, allowing the airline to overcome its immediate shortfalls but leading to an almost insurmountable mountain of debt

piling up over the past 35 years.

Commentators have also pointed to a host of contributing factors. Government policies on visas and the new carbon tax are only the tip of a difficult regulatory iceberg.

The airline is also exposed to a foreign exchange gap even before the potential devaluation of the rand. SAA generates the majority of its revenue in rand but incurs a significant portion of its costs in US dollars and euros. Every time the rand loses value, the costs go up.

Hiking fares is not an option as South Africa has had a deregulated domestic market for almost 30 years. Low-cost carriers are proving successful and SAA is just about the most expensive ticket around.

The authorities have taken a liberal approach to the long-haul market, providing travellers with an array of options in terms of price and routings. SAA has reduced its capacity and frequencies on many routes and in some cases is not even exercising its traffic rights.

And then there are evergreen contracts, which could be the subject of further investigation by the government. Such contracts automatically renew.

"The root of SAA's crisis seems to be the failure of successive governments to capitalise SAA adequately"

Silver lining

Matuson and Dongwana can at least point to some positive news. There is enough cash to pay January salaries, they have said. Moreover, the new government is finding its feet and its economic and fiscal reforms are starting to gain some traction. Investor confidence in the country is improving despite the problems, most likely the result of a focus on fighting corruption.

Air traffic numbers are equally positive. Low-cost domestic air travel is in high demand. Airlink, an SAA franchise partner for now, has more than 50 aircraft in its fleet. And Comair has been consistently profitable for a number of years. In the last financial year (2018-2019), it posted a 9% increase in airline revenue compared with the previous year and a 2% increase in combined sundry, ancillary and non-airline revenue proving that it is possible to make the balance sheet work.

Of course, these silver linings are hard to see given the heavy cloud hovering over SAA. As *ARGS* went to press, Matuson and Dongwana were granted a month-long extension on the publication of their rescue plan, delaying it until 31 March. Their report, for good or ill, will ripple across the continent.

A CRISIS OF CONTAGION

The coronavirus (COVID-19) is **wreaking havoc** on Chinese airlines – and there are major repercussions for the entire Asian aviation market, writes *David Smith*

The impact of the coronavirus means that Chinese carriers will inevitably face a tough six months. Within a few weeks of the first case, China plunged from its position as the world's third-biggest aviation market to the 16th-largest. And China's crisis is having a ripple effect, especially on countries like Japan, Thailand, Vietnam and Korea, where airlines depend on Chinese tourists.

"The next six months, at least, will be dismal and the question is whether or not the recovery will be fast enough for profits to return in 2020," says Brendan Sobie, former chief analyst of CAPA (Centre for Aviation) and the founder of the consultancy Sobie Aviation, in Singapore.

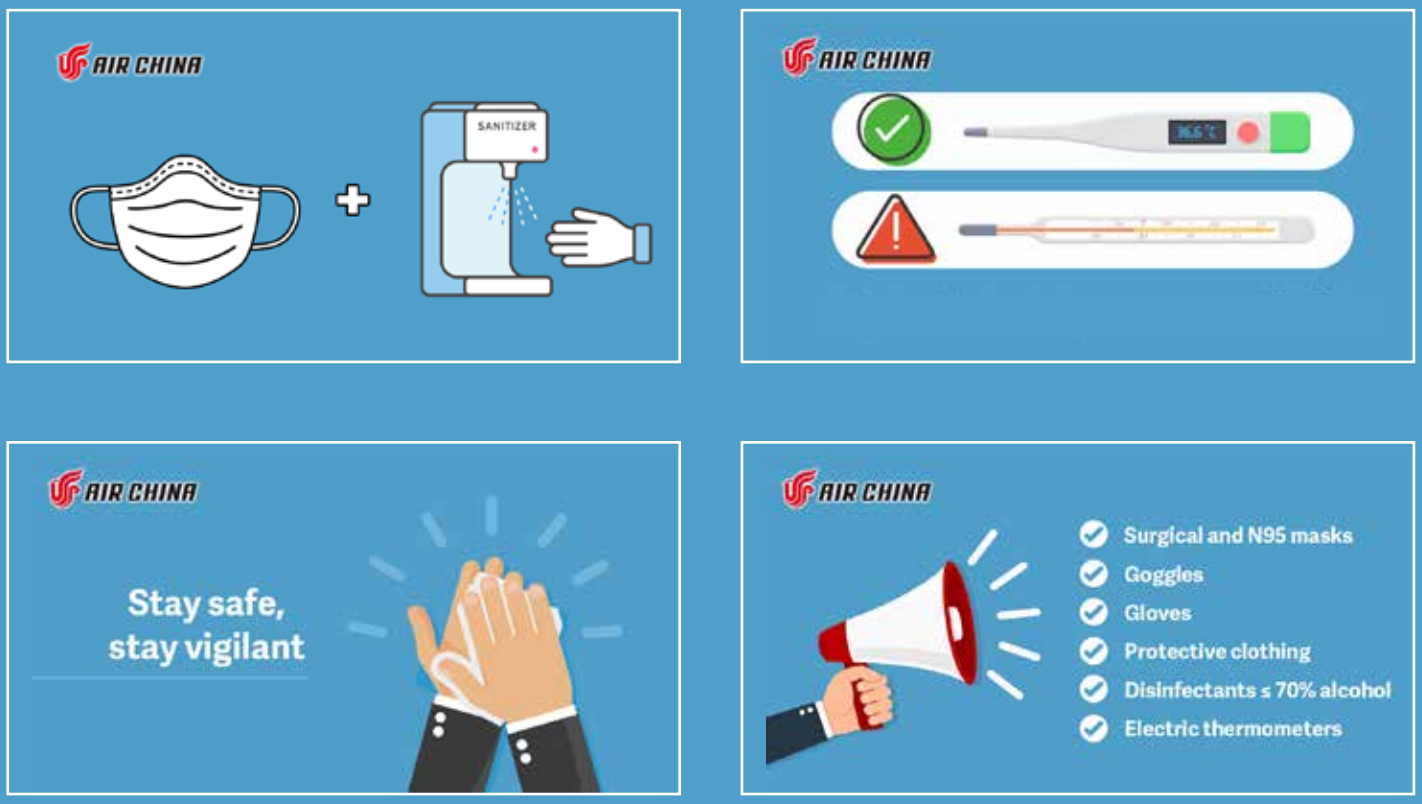
"We saw after the SARS virus outbreak in 2002-3 that it took months for confidence to return to markets. We could see faster growth by the end of 2020, but there are so many unknown factors. If the virus has a big impact on airlines in North America and Europe, and national governments introduce similar policies to China, the effect on the entire global market will be severe."

Sobie says the crisis has struck the Chinese sector at a particularly vulnerable time. Despite record profits across the global aviation industry, the profits of Asian airlines have been slim for some time. According to China Air Transportation data, China's aviation sector racked up losses of 21.9 billion yuan (US$3.23 billion) between 2017 and 2019. Back in December, IATA predicted a modest 2.2 per cent net margin on US$6 billion profits in 2020, but those figures will have to be steeply downgraded and big losses are likely.

Even before the coronavirus forced airlines to cancel flights, there was a large profit gap between China's operators and their competitors in Europe and North America.

"Asia is a story of rapid growth, but also of intense competition, which has impacted profits," says Sobie. "We haven't seen the consolidation and

"The timing of the coronavirus outbreak could not have been worse for Asian tourism"



Air China advice for travellers during the coronavirus outbreak

rationalisation of the market that has happened in Europe and North America.

"In Europe, especially, we've seen lots of buy-outs and mergers, whereas in Asia old airlines have pursued rapid expansion and new airlines have launched. When that happens, you have downward pressure on yields and profitability."

China's international market is dominated by outbound traffic. In 2019, flights in and out of China exceeded 160 million passengers – including Hong Kong and Macau – and the market recorded double-digit growth.

To some extent, during the crisis period, the large domestic market could continue to prop up the Chinese airlines. Last year, there were 586 million domestic passengers and most of these internal flights are likely to continue operating, depending on how the virus spreads to other parts of China. In the early stages, the Chinese government focused on virtually cutting off the virus-hit state of Wuhan from the rest of the country.

The drastic fall in China's outbound traffic will send reverberations through airlines and economies everywhere in Asia. IATA was projecting a 2.2% net margin for Asia Pacific airlines overall in 2020, a slight rise on 2019, but this is unlikely now.

For many countries, their gargantuan neighbour has become the largest supplier of tourists and a lynchpin for major airlines. For example, Thailand received 11 million Chinese visitors in 2019, around 28% of the nation's total number, and Japan attracted 10 million tourists, 30% of its total. This dependency is vastly greater than at the time of the SARS virus in 2003, when there were 450,000 Chinese visitors to Japan.

In addition, the timing of the coronavirus outbreak during the Chinese Lunar New Year could not have been worse for Asian tourism.

This is traditionally the period when hundreds of millions of Chinese people take holidays abroad, or return home to see their families. The China Outbound Tourism Research Institute said that 6.3 million Chinese tourists travelled abroad

last year during the period, generating travel revenue of around 513.9 billion yuan (US$73 billion). The Institute had predicted the numbers would rise to 7 million this year.

Officials in Thailand, for example, estimated lost revenue of 50 billion baht (US$1.6 billion) over the 2020 Chinese Lunar New Year.

The special administrative region of Hong Kong has become a favourite destination for the Chinese. China provided 44 million of the city's 56 million visitors last year. This year had already seen dramatic falls after the city's riots. Now, the cancellation of flights, trains and Lunar New Year celebrations has landed a near knockout blow. Hong Kong's flag carrier, Cathay Pacific, has borne the brunt.

"All Asian airlines are affected by the coronavirus, but Cathay is the most badly affected," says Sobie. "It is 20% exposed in terms of capacity to and from China, and there are also the network impacts when Cathay loses passengers from China who are heading elsewhere. Coming on top of the riots and the resignation of its CEO in August, Cathay has slashed its mainland China capacity by 90% through at least March and cut global capacity by 30%.

"The situation is so desperate the new boss this month asked employees to take weeks of unpaid leave."

After Cathay, AirAsia has the biggest exposure to China and is also in a fragile state. Even before the virus, AirAsia was wrestling with a decline in profitability which saw financial losses in 2019 at virtually all nine of its airlines and a corruption scandal which forced its two top executives to step down temporarily. Other major airlines with a lot of Chinese traffic (at least 5% of their total volumes) are Asiana, Korean Air and Singapore Airlines groups – the latter including SilkAir and Scoot.

One country in Asia that is potentially more protected from the fallout is India, the second-largest aviation market in the region. Sobie says India is somewhat shielded because there are so few flights to and from China.

"It's surprising how few flights there are between Asia's two largest economies. There have been attempts to increase economic ties, but they've not taken off yet. Having said that, there are lots of concerns about going to South East Asian countries right now and that will impact the Indian market," he remarks.

Indian airlines have been struggling for profitability despite experiencing five years of double-digit growth in air passenger traffic from 2014 to 2018, although the growth slowed to 3.74% in 2019, according to ratings agency ICRA. In 2020, ICRA has predicted "muted domestic capacity growth" of 3%. The agency says two budget carriers – Indigo and Go Air – need to resolve engine issues and a third one, SpiceJet, is awaiting clearance for the B737 Max aircraft. A lot of the Indian airlines are focusing on expanding their international routes. The main lever to increase traffic is the

"The next six months, at least, will be dismal"

Brendan Sobie
Former Chief Analyst of CAPA (Centre for Aviation) and the Founder of the consultancy Sobie Aviation, in Singapore.

proposed development of 100 greenfield airports by 2024, which was announced in February this year.

The plans have led analysts to predict massive expansion of international routes, especially between India and the busy destinations in the Gulf. (Dubai and Abu Dhabi are the major transit points for Indians on their way to Europe and the US.)

The Indian Government has also attempted to boost overseas investment by announcing that investments by international sovereign funds in India's infrastructure will be exempt from taxes.

"India has traditionally been an unprofitable market, but when Jet Airways collapsed in April last year, it started performing a bit better. Other airlines, such as IndiGo, which carries around one in every two passengers domestically, benefited," Sobie says.

Wider impact

The effects of the coronavirus on airlines outside Asia are harder to predict. Undoubtedly, China's aviation market and economy are both vastly larger and more interconnected than during the SARS outbreak in 2002-2003. In 2019, 750 million passengers either flew in and out of China, or internally, accounting for 16 per cent of the global total of 4.6 billion passengers, according to IATA. A majority of international airlines have ceased flying to China and the few that remain have reduced services to 20% or less.

Sobie expects the health crisis to have a much bigger global impact than the SARS virus, partly because the Chinese economy has quadrupled in size. He says it will severely dent IATA's "optimistic" December prediction for 2020 of net profits of US$29.3 billion.

"There are far more cases and deaths than with SARS and China's market is now bigger, but I still expect the impact to be much less in Europe, North America, and South America," he says. "Whereas airlines in several Asian countries have between 10% and 20% exposure to China, in North America it's much closer to 2%. It will hit profits, but the gap in profitability with their Chinese counterparts is likely to widen."

Back in China, the long term, once the virus is tamed, will be "bright", Sobie believes. Leading airframer Boeing predicts that the Chinese aviation market will become the world's largest by 2028. Expansions include eight new airports by 2023 in cities such as Dalian, Chengdu, and Xiamen. China is also set to build nine new runways at existing airports such as Shanghai and Shenzhen by 2030.

"Aviation faces periodic crises when unexpected external events see major short-term setbacks, but they're part of the DNA of the industry and it always bounces back stronger than before," Sobie says.

"Whereas airlines in several Asian countries have between 10% and 20% exposure to China, in North America it's much closer to 2%"

A woman on a mission

Described as "a strong-willed lady" known amongst the Kuala Lumpur International Airport community as **"the anchor of safety"** at AeroDarat Services (ADS), Shahfinaz Abd Wahid has played a key role in improving the handler's safety record

Since she took over the helm of ADS' Quality Assurance Safety and Security (QASS) department in September 2015, Wahid has spearheaded efforts to improve the working environment, turning safety into a culture for all staff to live and breathe whilst on duty.

In 2018, her pet project was to ensure that ADS obtain the ATA Safety Audit for Ground Operations (ISAGO) certification. In order to do that, she worked to ensure that all necessary tools and facilities were assessed and, where they were lacking, procured. She also made sure that all processes were in line with the best industry standards. All that hard work paid off: ADS successfully obtained the certification in 2019.

Most importantly, Wahid made it her mission to ensure strict compliance at all times with standard operating procedures.

Under her guidance, QASS and other business units continue to work together to address any safety gaps, while simultaneously instilling safety behavior amongst ADS staff.

Strategy

Beefing up safety awareness and changing the working culture of the company was by no means stress-free but Wahid "bulldozed forward and never looked back". She has designed and developed safety programmes and coordinated safety activities to continuously promote, motivate and enhance staff safety awareness.

She began by appointing a safety anchor person in each business unit to ensure safety awareness is cascaded to all staff in a focused and consistent manner. She coordinated safety campaigns across all business units and collaborated with third-party establishments such as airport authorities, customer airlines and business partners or subcontractors.

Despite successfully meeting all her initial objectives, she did not stop there. Wahid is eager to work with other airport tenants, whether airlines or ground handlers, to address safety issues in a holistic manner.

Besides conducting monthly staff safety engagement sessions, where employees are given the opportunity to share and discuss safety issues and concerns, Wahid also got the management team involved. They began to visit operational areas, carrying out unscheduled walkabouts to show their commitment and support in improving the safety culture and staff welfare.

Wahid has also personally conducted numerous safety briefings and engagements as a platform to share her knowledge beyond educating ADS staff on safety and security matters.

Another practice that she has put in place is monthly safety action group meetings with all business units to review and assess the effectiveness of current safety performance,

safety issues and quality lapses. The aim is to identify opportunities for improvement to ensure a safe working environment for staff.

Wahid has also enforced daily safety briefings by all duty managers and duty supervisors – including subcontractors – as part of the handler's initiative to continuously promote and enhance staff's safety awareness. It is mandatory for each subcontractor to keep her, as well as the QASS team, updated on the outcome of their daily briefings via a WhatsApp group as a way of monitoring and documenting evidence.

Reporting

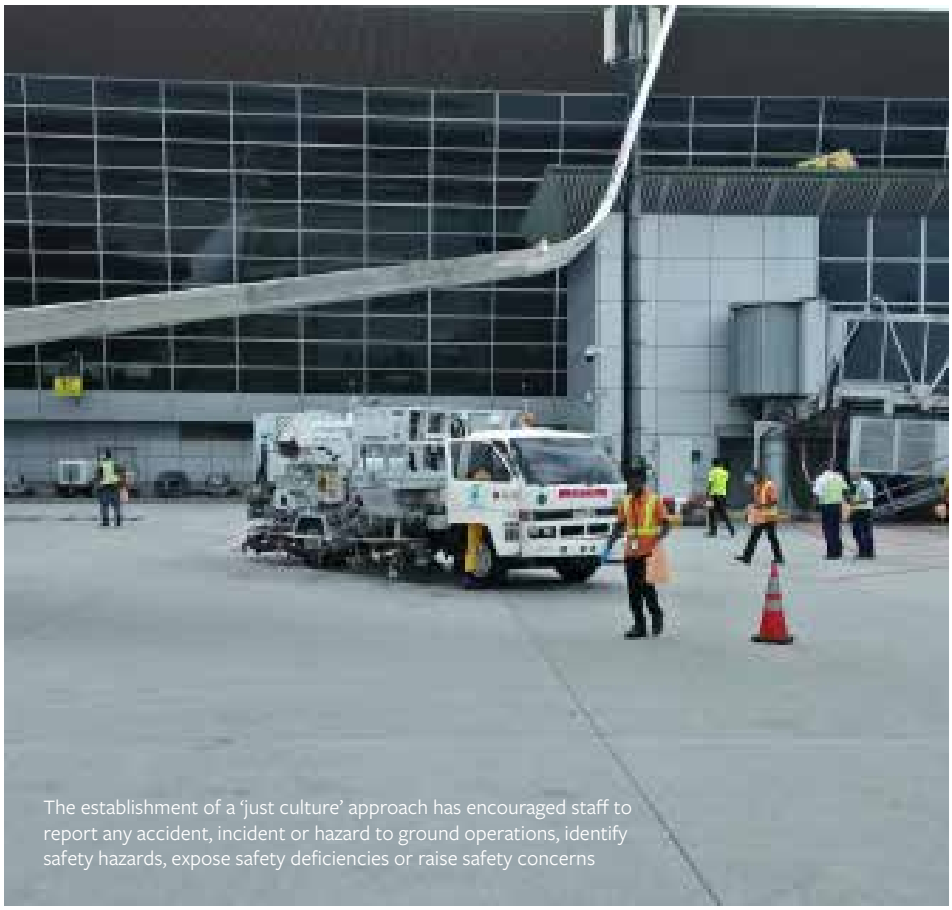
The establishment of a commitment to a 'just culture' approach – where staff are assured that reporting errors will not result in disciplinary or punitive action being taken against the reporter or other individuals involved – has encouraged staff to report any accident, incident or hazard to ground operations, identify safety hazards, expose safety deficiencies or raise safety concerns.

Besides improving attitudes to safety in the workplace, this has also provided opportunities for management to review any safety deficiencies that have been identified and, subsequently, to address these.

As a result of Wahid's efforts, in 2019 ADS recorded a huge 91% reduction in ground accidents and incident occurrences (demonstrating conformance to standard operating procedures) and a 21% increase in the total number of safety reports, indicating a significant increase in safety awareness.

Mission accomplished? Not really – maintaining and improving safety is always a work in progress, and Wahid remains committed to the cause.

• AeroDarat is the ground handling sister company of Malaysia Airlines.



The establishment of a 'just culture' approach has encouraged staff to report any accident, incident or hazard to ground operations, identify safety hazards, expose safety deficiencies or raise safety concerns

In-flight food safety

Airline caterers' understanding of best practice to prevent incidents of food-related illness among passengers has changed over the years but the need for **constant vigilance** remains as vital as ever, as *Andrea Tolu* discovers

In an article published in 1945 in *Coronet* magazine, Sky Chef's founder and airline catering pioneer Newt Wilson explains that what prompted him to completely revamp in-flight menus was how the time between preparation and serving affected quality.

On some trips, [air meals] must stay in their containers for several hours," reports the writer.

In Wilson's revised menu, stuffed peppers are only cooked for five minutes so they will not get mushy, and steaks are served medium or well done to preserve the heat. Some foods should not be served to airline passengers at all. Omelettes, for example, would lose their shape and fish would be too smelly.

What the article does not mention is that, if stuffed peppers are left in a container for several hours, they may also become unsafe to eat.

The omission is understandable. Knowledge about microbiological hazards in food was very limited in the 1940s. Indeed, it would be more than 15 years before the US National Aeronautics and Space Administration – NASA – developed its systematic food safety approach, now known as HACCP (Hazard Analysis And Critical Control Points).

Thanks to HACCP, food safety practices have definitely improved. Serving food on aircraft, however, remains quite a logistical feat.

Control is crucial

The airline industry has its own adaptation of HACCP, developed by the International Flight Services Association (IFSA). Other than hygiene practices, one of the tenets of these guidelines is temperature control.

"What makes or breaks food is at what temperature it's been held and for how long," says flying crews food safety trainer Jean Dible. "The temperature danger zone is between 5° C and 57° C. Four hours in that range and it will be completely unsafe to eat."

Any place where food is produced can be vulnerable to contamination. In-flight menus, however, come with extra challenges.

Airline catering kitchens prepare high quantities of ready-to-eat meals that need to be assembled. For example, explains Dible, kitchen staff could spread out enough bread on tables to make 25-30 sandwiches at one time, and then put luncheon meat, sliced tomatoes, lettuce and cheese on all of them.

"During all this time, those sandwiches would remain at room temperature," Dible says. "The problem is, kitchens are warm, so food would be already picking up bacteria."

After it is assembled and packaged, food is sent from the kitchen to the aircraft. Just as in Newt Wilson's times, this step can be accomplished fast and without incidents – or riddled with unpredictable stops and delays. Although catering trucks today are much better equipped than ever before, food may still be exposed to dangerous temperatures during this journey.

Once they arrive at their destination, meals should be immediately put in galleys that keep it warm or cold until it is served. However, Dible says, "not all aircraft are equal. Brand-new models have better galleys, but some of the old ones still in use have no way to keep that food cold or hot. It comes in on carts and stays there until it's served."

The last link of this logistic chain is the

hands of flight attendants serving food to passengers. By their very nature, aircraft are places with a high concentration of people and objects where bacteria could spread quickly, so personal hygiene is one of the prerequisites of HACCP.

Reporting

Despite these many critical points, reported incidents of airline food-related illness are few and far between.
This is thanks to controls by food safety authorities and catering companies, and the effective application of HACCP measures. However, it also has to do with the typical challenges of collecting data about food-borne outbreaks and tracing their origin.

Luckily, most food-borne illnesses only produce mild symptoms, like diarrhoea or

vomiting; they are often unreported. For those that are reported, the incubation period puts food safety authorities at a disadvantage. It can take up to 72 hours for Salmonella, four days for E. coli and 70 days for Listeria to result in any symptoms. By that time, patients will have eaten many different types of food in different places, making the exact cause of the illness difficult to identify.

Pinpointing an outbreak to its ground zero requires an approach akin to police investigation. Detectives may have to fingerprint the pathogen's DNA to verify that the offender is the same in each case, and then find out whether victims ate the same product and brand, or dined at the same restaurant, or on the same flight.

And while supermarkets and restaurants tend to serve customers in relatively small areas, airline passengers go in all sorts of different directions once they leave the plane, Dible points out.

Risk

Although the number of incidents is low, the risk of contamination for in-flight food is always present. The purpose of controls and procedures is to reduce that risk to the lowest level possible. In cases where pathogens can find a favourable environment in which to multiply, these procedures must be particularly accurate.

In IFSA's guidelines the group of high-risk foods includes fruits and vegetables that are eaten raw, as they may be contaminated right from the time they are harvested.

The worst offenders are sliced tomatoes, freshly-cut melon, leafy salad greens, and any type of bean sprouts, says Dible. "People tend to think that they're safe, but they can be dangerous if they're not kept very cold. Once they're cut, there's a chance for bacteria to get inside."

The other high-risk group includes all foods made from meat, fish, milk and eggs. These need constant temperature control before and after they are cooked or processed.

Sushi is under special surveillance

Sushi is under special surveillance, as both of its main ingredients are high-risk: "If you eat contaminated seafood, you can become very sick very fast, within an hour or less. The same goes for rice, which can harbour a toxic bacterium called Bacillus Cereus," Dible observes.

At the lowest end of the risk spectrum are foods that do not require temperature control at all, such as bread, sweets, pastries or canned foods.

Ultimately: "The safest kind of food to eat aboard an aircraft," says Dible, "is food that has been cooked and is still served hot. If it's not, that's a red flag, because it has probably fallen into the temperature danger zone."

"What makes or breaks food is at what temperature it's been held and for how long"

Jean Dible
Flying Crews Food Safety Trainer

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A flying shame?

Carbon offsetting is gaining momentum as a way for businesses – and individuals – to **minimise their environmental impact**. But is it enough, *Megan Ramsay* asks

Johan Lundgren
CEO Easyjet

An easyJet spokesperson says: "We recognise that carbon emissions from air travel contribute to climate change, so we have a responsibility to minimise the impact of our flights – it's the right thing to do".

There is certainly a widespread consensus on that point. But some individuals believe 'the right thing to do' is rather more radical: a reduction in aviation activity itself.

The so-called 'flight shaming' movement aims to persuade the travelling public to use alternative modes of transport that have a lower environmental impact, or to travel less far or less often – or not at all.

From video conferencing to 'stay-cations' to near-sourcing of goods and materials, there are certainly options that could cut aviation-related emissions at a stroke if sufficient numbers of individuals and businesses were to change their habits.

But International Air Transport Association (IATA) director general and CEO Alexandre de Juniac says: "I don't believe that there is shame in flying. I do believe that we must reduce emissions to make flying sustainable."

easyJet CEO Johan Lundgren is keen to emphasise that people have a choice regarding how they travel. While passengers are now thinking about the potential carbon impact of different types of transport, many still opt for air over other modes – "and if people choose to fly we want to be one of the best choices they can make", he says.

According to Karima Delli, Member of the European Parliament and Chair of Committee on Transport and Tourism, "aviation currently accounts for 3% of global carbon emissions and long-term forecasts indicate that air traffic is expected to continue increasing" despite the flight shaming movement.

Other commentators put that figure at 2%. Either way: "Science clearly tells us that of all the greenhouse gases, CO_2 is the top contributor to climate change," says de Juniac. "And that is why it has been the focus of aviation's climate action."

IATA's commitments include improving the industry's fuel efficiency by 1.5% annually to 2020; capping emissions with carbon neutral growth from 2020; and cutting net emissions to half 2005 levels by 2050.

Offsetting

easyJet is among the airlines working towards those targets. In November 2019, the low-cost carrier became the world's first major airline to operate net-zero carbon flights across its entire network, by offsetting the carbon emissions from the fuel used for all of its flights – approximately 3.157kg of CO_2 for every kilogram of aviation fuel used.

According to easyJet: "By funding projects which directly reduce carbon dioxide from the atmosphere, we compensate for the CO_2 easyJet emits into the atmosphere. This is done either by reducing CO_2 by physically removing it from the air (eg, by planting more trees) or by avoiding the release of CO_2 that would have otherwise been emitted were it not for the project."

Elsewhere, International Airline Group's (IAG)

> **"We must reduce emissions to make flying sustainable"**
>
> **Alexandre de Juniac**
> director general and CEO, IATA

The all-electric Wright 1 could enter service by 2030

ambition to achieve net-zero carbon emissions by 2050 involves several initiatives, including British Airways investing in carbon reduction projects – such as solar energy projects and forestation programmes – in order to offset the carbon emissions from all of its UK domestic flights from the start of 2020.

Of course, airlines do not operate in isolation. Willie Walsh, still chief executive at IAG at the time of writing, remarks: "In addition to our own initiatives, there must be a global solution and we're participating in the new United Nations' aviation offsetting scheme which allows our industry to invest in carbon reduction in other sectors."

That scheme, named CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation), will enable the global aviation industry to cut its CO_2 emissions by 2.5 billion tonnes between 2020 and 2035 through US$40 billion investment in carbon reduction projects, IAG says.

According to de Juniac, CORSIA is crucial to achieving carbon-neutral growth in the aviation industry. Although there have been "tremendous efficiency improvements" he concedes that "the increase in flights due to the demand to fly has outstripped these efficiency gains" – but adds: "Through offsetting, the industry can cap its net emissions at 2020 levels, until technology levels create the conditions to reduce aircraft emissions at source."

BA introduced carbon offsetting on all UK domestic flights in January 2020

Concerns

While carbon offsetting is a popular means for businesses to fulfil their corporate social responsibilities, the approach is not without its critics. It has been described as 'greenwashing' or a 'band-aid' that allows the root problem of CO_2 emissions to continue unchecked.

There are concerns over how meaningful it is to compare long-term projects such as reforestation with the more immediate effects of the flights they are intended to offset. Plus, it is possible that such projects might reduce biodiversity – also a worry with regard to cultivating plants for the production of biofuels.

In addition, there are a multitude of criteria for calculating the quantity of carbon emitted on any given flight taking a particular route using a certain type of aircraft, making this a potentially inexact science.

And while CO_2 is the most problematic greenhouse gas, it is not the only harmful substance produced by aviation operations.

In its European Aviation Environmental Report

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2019, the European Union Aviation Safety Agency (EASA) says that besides CO_2, the main pollutants emitted by aircraft engines are nitrogen oxides (NOX), sulphur oxides (SOX), unburnt hydrocarbons (HC), carbon monoxide (CO), particulate matter (PM) and soot.

Offsetting or reducing CO_2 does not necessarily reduce these other emissions at the same time.

Interim measure

Given the shortcomings of offsetting, Forum for the Future co-founder Jonathon Porritt says that "it will be important to seek out each and every way of reducing carbon emissions".

Lundgren agrees. "Carbon offsetting is only an interim measure while new technologies are developed, so easyJet will continue to support innovative technology, including the development of hybrid and electric planes, working with others across the industry to reinvent and decarbonise aviation over the long term."

Examples of new technology available right now to airlines include more efficient aircraft. IAG, for instance, will replace older aircraft in its fleet with 142 new planes over the next five years. "These [aircraft] are up to 25% more carbon efficient than those they replace," the group says.

New York-based JetBlue has 85 new Airbus A321neo aircraft on order, which will help reduce the airline's carbon emissions through improved fuel economy.

Flying existing equipment more efficiently can also reduce emissions. IATA's Turbulence Aware data sharing programme, launched in December 2018, helps airlines avoid turbulence. This makes for a safer, smoother flight – as well as optimising fuel efficiency.

Chris Goater, assistant director, corporate communications at IATA, explains: "A study by Embry-Riddle Aeronautical University reported that turbulence results in an additional 160 million gallons of fuel per year for US carriers alone. So there would seem to be a clear environmental benefit from adopting Turbulence Aware or similar systems.

"It's important to note that the system does not route aircraft around turbulence – it enables aircraft to fly at an optimum flight level more often, avoiding constant changes in flight level to avoid turbulence," Goater points out.

Delta Air Lines has reported that its own turbulence awareness system has led to a reduction in carbon emissions of around 80,000 metric tons in a year.

In a similar vein, Airbus has unveiled fello'fly, a project inspired by biomimicry that aims to demonstrate the technical, operational and commercial viability of two aircraft flying together for long-haul flights.

"Through fello'fly, a follower aircraft will retrieve the energy lost by the wake of a leader aircraft,

"Aviation will have to reinvent itself as quickly as it can"

Johan Lundgren,
CEO Easyjet

Aviation accounts for 2-3% of global CO_2 emissions

UK zero carbon aviation plan gets off the ground

New York-based JetBlue has 85 new, efficient A321neo aircraft on order

On 4 February 2020, UK aviation industry executives signed a pledge to cut CO_2 emissions from 30 million tonnes per year to zero by 2050 – whilst accommodating a predicted rise in passenger numbers of 70% over the same period.

Members of the UK Sustainable Aviation coalition urged the government to lend its support in establishing the country as a global hub for green aviation technologies, including sustainable aviation fuels and electric flight.

The pledge is central to the coalition's 'Decarbonisation Road-Map: A Path to Net Zero', which advocates smarter flight operations, new aircraft and engine technology, modernising UK airspace, the use of sustainable aviation fuels, and policy measures as ways to reduce CO_2 emissions.

A 'Sustainable Aviation Fuels Road-Map', meanwhile, forecasts that the UK could become a world leader in developing sustainable aviation fuels, which could meet 32% of the nation's demand for aviation fuel by 2050.

Neil Robinson, chair of Sustainable Aviation, comments: "The UK is well positioned to become one of the leaders in the green technologies of the future, including sustainable aviation fuels and electric flight, creating highly skilled and well-paid jobs in the process, and we look forward to working in partnership with Ministers to help realise these opportunities."

by flying in the smooth updraft of air it creates. This provides lift to the follower aircraft allowing it to decrease engine thrust and therefore reduce fuel consumption in the range of 5-10% per trip," Airbus says.

The airframe manufacturer is due to commence flight tests with two of its A350 aircraft in 2020.

Reducing weight onboard also makes a difference to fuel burn. easyJet's Recaro seats, for example, are 26% lighter than previous seats. Plus, its pilots use Panasonic Toughpads rather than laptops and printed navigational charts. This switch has removed 27kg of paper from each aircraft, delivering a reduction of over 2,000 tonnes of carbon emissions for easyJet each year.

And then there is alternative fuel. JetBlue – which is to offset the CO_2 emissions of its domestic flights from July 2020 – will begin flying with sustainable fuels out of San Francisco International Airport later this year.

The carrier will use Neste MY Renewable Jet Fuel, which is produced from waste and residue raw materials. Over its lifecycle, its carbon footprint is up to 80% smaller compared to fossil jet fuel.

JetBlue views SAF as a critical part of the industry's transition to a lower carbon model and hopes its decision to use Neste's fuel will help "to kick-start the SAF market and lead the economics on these lower carbon fuels".

AirBP, the aviation fuel division of petroleum giant BP, notes that the challenge is to increase the scale and efficiency of production of SAF. Its BP Biojet fuel, made from sustainable feedstocks such as waste oils or biomass, is available at 15 airports around the world. AirBP was the first operator to supply SAF in 2016 (at Oslo airport).

IAG, meanwhile, is to invest US$400 million in SAF over the next 20 years. This includes British Airways' partnership with Velocys to build Europe's first household waste to jet fuel plant in the UK. Starting operations in 2024, the plant will produce sustainable fuel that emits 70% less CO_2 than fossil fuel.

Electric dreams

Aircraft manufacturers are already working on developing hybrid and electric aircraft to enable a move away from fossil fuel dependency.

Start-up Wright Electric is working with easyjet to produce an all-electric 186-seater aircraft. Wright 1 could be used for short-haul flights by 2030.

easyJet has also entered into a partnership with Airbus to identify the technical challenges and requirements for electric and electric hybrid planes when deployed for short-haul flying around Europe.

"We hope this will be an important step towards making electric planes a reality," says Lundgren, noting that battery technology is advancing rapidly.

For now, with aviation still dependent on fossil fuels, government support for decarbonisation is a must.

In particular, governments must reform aviation taxes to incentivise efficient behaviour, fund research and development in new technology and ensure that early movers such as easyJet are not penalised, Lundgren says.

Airlines and their partners are clearly aware that the current stop-gap of carbon offsetting is less than satisfactory, and are pulling out all the stops to cut CO_2 emissions.

Some are even exploring new carbon capture technology. IAG is partnering with US company Mosaic Materials via the group's start-up accelerator, Hangar 51. The start-up has created an innovative adsorbent material to remove CO_2 emissions directly from the atmosphere.

Ultimately, if it is to persuade an increasingly environmentally conscious customer base to keep flying, "Aviation will have to reinvent itself as quickly as it can," Lundgren says.

easyJet announced a network-wide carbon offsetting scheme in November 2019

Outlook 2020

Future focus

The aviation industry managed to hold steady in 2019 – but as the challenges of last year remain unresolved and new threats emerge, how might 2020 turn out?

Orlando International Airport is expanding as passenger numbers increase

The International Air Transport Association (IATA) says that passenger demand rose by 4.2% year on year in 2019 – rather less than in the previous 12-month period – but an achievement given the challenges it faced.

Economic uncertainty, weak global trade and (geo)political tensions all affected demand.

Nor has the start of 2020 been much easier, with the shooting down of PS 752 in January and the outbreak of the coronavirus around Chinese New Year.

ACI World director Angela Gittens points out: "With ongoing trade wars and rising geopolitical tension in the Middle East, the developing situation may not be a momentary shock to the air transport industry; rather it has the potential to produce a significant shift in this year's global economic growth trend," while the coronavirus health crisis could also contribute significantly to a "volatile" year.

Despite the immediate difficulties, demand for air transport is still expected to rise in the coming decades.

The addition of a third runway to London's Heathrow airport has just

hit an obstacle, but other gateways are expanding in anticipation of that growth – for instance, Orlando International Airport in Florida is building a new South Terminal, due to open in 2021. Elsewhere, Istanbul's new airport was inaugurated in October 2018 and has attracted several new airlines, while numerous brand-new gateways are under construction across China.

Some trends that have developed in recent years will continue to make their effects felt in 2020 and beyond. According to a spokesperson at Turkish ground handler Çelebi, the two main shifts relate to reduced handling rates and sustainability.

"We are constantly challenged for the rates in turnaround handling," he says. "Many low-cost airlines are considering going with self-handling, as they believe they will save on costs. We have to adapt to this challenge. Ground handlers need to see how they can still run a profitable, quality-oriented business, while maintaining a safe environment."

As regards sustainability, the trend in ground handling is for increased investment with the goal of cutting carbon emissions.

Indeed, Groundforce Portugal commercial director Catarina Mota points out that aviation is still one of the world's most polluting industries.

"Turning into a carbon neutral industry will be very challenging, but if the problem is actively addressed it can be transformed into a competitive advantage as environmental awareness is growing significantly, particularly among the millennial generation," she observes.

Mota suggests that a shared strategy between aviation stakeholders, including passengers, where incentives are applied to the pricing structure, could accelerate the reduction of the carbon emissions.

Individual stakeholders are already doing what they can to improve their environmental performance. For example, Çelebi is lowering its carbon footprint in India by introducing an advanced taxiing solution, Taxibot, across key airports in the country.

The pilot-controlled semi-robotic Taxibots are designed to reduce fuel consumption by 85% and foreign object debris by 50%, ensuring safety and reducing congestion at the airport, Çelebi says.

"The use of Taxibots will also bring down the emission of CO_2 and other noxious gases by 85%, and cut noise pollution at the airports by 60%," the spokesperson adds.

Angela Gittens, ACI World

Catarina Mota, Groundforce Portugal

"Ground handlers need to see how they can still run a profitable, quality-oriented business"

Investments in other ground handling services, such as lounges, are also set to take place this year as Çelebi focuses on extending its services beyond its core products. A focus for 2020 is its premium service, Çelebi Platinum.

Tech trends

Ayah Abdelhamid, marketing manager at Egypt-based ASE Group, says that "it is undeniable that we are moving, at a fast pace, into a digitalised era; and the key to not only keeping up but moving ahead is the innovation you will bring to your product."

For the past decade, ASE has been working on techniques to maximise revenue for airlines through ancillary services. Today, there is also an increasing need to reduce costs.

Abdelhamid points out: "New technology is constantly being developed in attempts to reduce costs for airlines in a harshly competitive market in which prominent names are shutting down and ceasing operations overnight. However, in order to achieve maximum results, all stakeholders must develop, innovate and even revolutionise their infrastructure, protocols and processes.

"For example, the introduction of online visas was mainly implemented for security purposes; nevertheless in order to make the ultimate use of it, we need to integrate the border system (for e-visas) with departure control systems for a quicker processing of passengers."

This, in turn, will speed up the overall handling time per passenger, reduce disruptions, reduce turnaround time, increase on-time performance – and thus reduce costs for airlines.

"In 2020, I expect to see a ground handling market with no room for a traditional entity. Automation, accuracy, and speed will be imperative keywords for the industry's upcoming performance," Abdelhamid sums up.

Stephan Hirmer, head of passenger processing services, airport IT product management at Amadeus Airport IT in Germany, outlines several key areas where technological developments are likely to gain ground.
First: "Over the next year, we expect to see an increase in 'off-airport activities' enabled by cloud technology," he says. "As outlined in IATA's NEXTT vision for the future, off-airport activities will help airports to unlock capacity without the need for new infrastructure investment, by moving essential passenger handling tasks outside the airport."

Like many handlers, Çelebi is investing to reduce its carbon footprint

For passengers, off-airport activities mean greater choice and convenience. Ground handler Off Airport Check In Solutions (OACIS) has made this a reality in Australia, using the cloud to offer 'pop-up' check-in and bag-drop from virtually anywhere.

Elsewhere, Hong Kong International Airport is leveraging the cloud to offer mobile check-in kiosks at off-site locations such as the Hong Kong-Zhuhai-Macao Bridge border-crossing facilities. With flexible and mobile technology such as this, airports can add capacity on demand, scaling up and down as needed.

Hirmer predicts: "When off-site passenger handling becomes the

"We are moving, at a fast pace, into a digitalised era"

Ayah Abdelhamid, marketing manager, ASE

norm, airports can repurpose areas previously reserved for check-in, expanding revenue-generating shops and restaurants, making the airport more experiential, rather than purely functional."

The second area of innovation that he identifies is biometrics. This technology is already removing friction at every touchpoint in the passenger journey.

"Imagine being able to pass through the airport without ever presenting a passport or boarding pass," Hirmer posits. "Instead, your face is your passport. A simple scan is all that's required to check in, board, or access the airport lounge."

For passengers, biometrics mean a simplified, streamlined experience; for airports they mean fewer bottlenecks and increased speed of passenger handling.

For example, in a recent pilot at Fraport Slovenija Airport in Ljubljana, the use of biometrics cut boarding times by 75% per passenger.

Right now, the barrier to a truly frictionless passenger experience enabled by biometrics is that there is no standard, according to Hirmer.

"Each system is different, with little integration between systems. This means passengers need to register and re-register at each destination. The solution to siloed biometrics is a common standard for the industry that works across borders, airlines, and airports."

The final key development is personalisation. Noting that passengers now expect convenience at every touchpoint in their journey through an airport, and services which are tailored to their exact requirements, Hirmer says: "Flexible modern technology is enabling airports to serve passengers according to their needs.

"For example, hybrid automated devices allow airports to offer self-service and full-service in the same footprint. You can see these types of devices in action at Singapore Changi Airport's 'Jewel' complex where ICM Airport Technics, an Amadeus Company, has deployed its Hybrid Auto Bag Drop units.

"So, whether it's a solo business traveller who prefers an automated self-service journey, or a family travelling for leisure who prefer a full-service experience, airports can cater to both, offering self-service and agent-service from the very same device," Hirmer sums up.

Mota, meanwhile, highlights the integration of the passenger journey as a defining trait of the coming decade.

"The passenger journey is not fully controlled by the airline, since it goes beyond the flight. While ground services can be influenced by the airline, other services are completely outside its control.

There is increasing downward pressure on ground handling rates


Passenger numbers – and demands – are on the rise

"However, the passenger has the perception of taking a single journey, not recognising the different providers intervening in the process," Mota continues. "Although business specialisation is important, establishing partnerships along the value chain will be key to provide the seamless experience expected.

"At Groundforce Portugal, we establish partnerships with our customers where expectations are clearly defined in order to assure alignment with the service provided. The emergence of IT solutions consolidating all the information from different players is challenging, but it will provide a better travel experience," she states.

For instance, an integrated system offering to each passenger information regarding traffic on the route to the airport, the status of the check-in queue, wait times at security or the path through the airport to the boarding gate, would increase the quality of the travel experience.

Mota considers that as the industry moves forward and seeks to implement new initiatives, benchmarking of other industries may be helpful.

"The underestimation of technology disruption, or having a silo mentality, can seriously affect the sustainability of the business model as other industries [have] found out by adopting a reactive approach regarding dramatic changes that were occurring in their environment," she says.

Competition

One of the drivers of innovation in the aviation industry is the low-cost carrier (LCC) segment, according to Harald Eisenaecher, chief commercial officer at airfare benchmarking data firm Infare.

He explains: "The already fierce competition between airlines is set to intensify driven mostly by the rise of the LCCs. At Infare we've been closely following the development of this market, which now drives around 33% of global airline traffic.

"The leanness of the LCC business model means that margins are razor-thin and, as such, big data has been employed forensically to keep carriers ahead of competitors."

Infare predicts that the traditional airlines will look to replicate this model, particularly when it comes to personalisation and the selling of ancillary services.

"Personalisation is increasingly a 'must-have' for all airlines," Eisenaecher says, echoing Hirmer's point.

"Passenger demands are on the rise and with more ancillary options to choose from than ever before, airlines that offer tiered services – business class and economy – as rigid structures, will become a thing of the past.

Traditional airlines recognise that LCCs have been more successful at making the most from big data."

Indeed, Eisenaecher describes data as "the new oil", continuing: "It is the lifeblood of the digital economy. Online e-retailers such as Amazon, with their customer-centric business models, have been highly successful in using data to keep ahead of competition. Airlines will look to replicate this model, offering price points that respond dynamically to customer demand."

Infare has seen demand for data increase dramatically in recent years, both from LCCs and from more traditional players.

Isabella Nagel, PDC

Despite a challenging environment, many ground handlers are optimistic

In particular, Eisenaecher believes airfare data will be crucial for airlines when it comes to route development. Ryanair, for instance, uses customer and fare data to determine which of its routes are least cost-effective for its passengers. The carrier can then revise its pricing strategies and provide customers with the most attractive and affordable routes.

Infare also anticipates a greater uptake in artificial intelligence (AI) and machine learning.

"This technology will revolutionise data – and it will be industries with high levels of competition, such as aviation, that will be the quickest to adopt it.

"AI will be a game changer when it comes to big data. In developing new routes, airlines will be able to make long-term forecasts, marrying the technology with complex data sets," Eisenaecher predicts.

There are ways to apply technology to the day-to-day running of a business at the administrative level, too. Isabella Nagel is responsible for strategic business development at PDC, a provider of decision support software for resource planning and scheduling.

She says: "Today, new technologies enable transparent breakdown of costs and automatic invoice control. These technologies have been developed to heighten digital collaboration between airlines, ground handlers and airports.

"We are definitely moving towards a new era of digital collaboration and numerous opportunities for streamlined processes between stakeholders."

PDC estimates that up to 10% of invoices contain mistakes. In cooperation with Aegean Airlines, the company has developed a tool for contract management and invoice control to identify incorrect invoices: PDC GroundCost.

According to Nagel: "Aegean Airlines is now able to check most of its invoices in just a few minutes. This means that it now thoroughly checks all invoices rather than resorting to spot checking.

"Furthermore, as suppliers introduce invoices in IS-XML format – the newest IATA standard format for machine-readable ground handling invoices – invoices without mistakes can be entirely automatically approved for payment," she adds.

Harald Eisenaecher, Infare


Havaş is continuing to follow up opportunities to grow its network

Problems and potential

Havaş sales and marketing assistant general manager Mete Erna says: "So far, the start of

"There is growing demand for air travel thanks to the global increase in income per capita"

Mete Erna,
Havas


Mete Erna, Havaş

2020 has involved military escalation between the US and Iran, followed by the downing of a Ukraine International Airlines flight, huge fires in Australia and the new coronavirus epidemic in China. All these factors have contributed to the existing pressure on the aviation industry due to the grounding of B737 Max aircraft and the escalation of the tensions over international trade between the US and China.

"Despite all of this, we still see growing demand for air travel thanks to the global increase in income per capita (especially in developing countries), and air travel becoming more affordable. If the effects of the new coronavirus epidemic can be contained, we expect to achieve a growth percentage close to double digits in our business in 2020 in line with the general forecast about the markets we operate."

Link Aero Trading CEO Amir Samir sees a "booming future" in Africa and in the Middle East. Growth in air travel in the region will have a knock-on effect on the ground handling sector, ground support equipment (GSE) sales, manpower and airport infrastructure.

Samir sees great potential across eastern Africa in countries that have been "starved for decades of a spark of modernisation, investment and tourism".
"The more these countries' own laws, local regulations and investment constraints are liberalised, the more passenger and cargo traffic will grow," he says. "This will lead to accelerated modernisation of GSE fleets, creation of up-to-standards training centres, development of qualified, skilled manpower, job creation and improved standard of living."

Abdelhamid at ASE Group notes that four of the company's locations were ranked as the top four fastest-growing airports in Africa in 2019: Sharm El Sheikh, Marrakech, Hurghada and Casablanca.

She says: "Egypt is coping with the rising passenger figures by opening three new international airports: Sphinx International Airport, New Cairo Capital Airport and Berenice International Airport. Another major event for Egypt in 2020 is the eventual return of UK flights to Sharm El Sheikh.

"Meanwhile, new carriers are entering or re-entering the market with us like Air Astana, Privilege Style and FlyBaghdad."


Keith Purdom, Rsmart

Havaş is also continuing to follow up opportunities to grow its network – and Erna expects major ground handling companies to keep consolidating (in a recent example, Avia Solutions Group acquired Aviator in February)

Staff mismatch

Erna expects digitalisation and automation to continue to gain momentum in 2020, with increasing emphasis on automated passenger and baggage processing services. Developments in this area should ease the challenges in the labour market in some countries in the medium term.

However: "Attracting talent still remains an issue due to the mismatch between the expectations of potential employees and the wages, as well as the prospects, that the industry can offer to its people," he says.

Keith Purdom, responsible for business development at Rsmart Software Solutions in Finland, agrees. "High staff turnover and the resultant loss of experience – and the costs of recruitment and training – have been a constant topic and it seems to affect ground handling agents worldwide."

Many industry conferences have discussed reducing this staff churn through better leadership, better working conditions and pay increases. Purdom says this is "all laudable and necessary but there is little focus on gaining better efficiency from those same increasingly costly staff".

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One solution is the Rsmart Roster Management Service (RMS), which automates roster preparation, offers dynamic on-the-day staff deployment and can highlight where too many (or too few) staff, or particular skillsets, are available as well as capturing data to help manage costs and contracts.

Purdom says: "We are live on three continents to date and especially relevant where handlers are under cost pressure or coping with the growing pains of rapid expansion."

A dynamic and unpredictable market

Axel Feil, vice president sales and marketing and business development at AeroGround Flughafen München, states that the main focus for 2020 will be dealing with the increasing labour costs and the lack of skilled employees in an unstable market.

In a dynamic and unpredictable market further challenges faced by the ground handlers include insolvencies within the customer portfolio which are, unfortunately, predicted to continue in the coming years.

It is apparent that due to the changes in airline business models, there is now less planning of security for ground handlers worldwide. High profile topics such as the coronavirus and the Boeing 737 Max disaster also affect the entire aviation industry.

High tariff claims and wage agreements are expected to increase the financial pressure on both handlers and airlines.

The focus on trial operations and the opening of BER airport is difficult, Feil continues. New processes and procedures must be tested, and the need to split traffic moving to BER and SXF airports is also challenging.

Working in ground handling is not as appealing as alternative sectors within the industry (such as security or logistics). Low margins leave little financial leeway to increase the appeal to potential employees.

In order to digitalise processes and improve efficiency, AeroGround is investing time and money in a number of new technologies and activities.

Together with Fraport, a virtual reality training program was created, the content being shared via an 'Aviation VR Training Hub' to be used by new and previously trained employees.

Axel Feil, AeroGround

Michael Bar-on, Trilogical

Maintaining a high-quality workforce is essential

It has also been showcased at recruitment events to give candidates a first impression of workplace and ramp activities.

It has also introduced a mobile app specifically for employees' internal communications including shift timetables, corporate and industry news as well as contact and chat functions.

Other initiatives include tests, feasibility studies and co-operation in safety awareness, apron accident prevention, labour protection and collaborations in external projects to improve punctuality and quality; and the implementation of a system based on Artificial Intelligence in order to optimise ground handling processes.

Ramp safety

"We can definitely see the industry challenges (coronavirus aside) involved in keeping ground operations safe, maintaining a high-quality workforce and being competitive," says Michael Bar-on, vice president product management at Trilogical, which develops ground mobile asset management solutions for the aviation market.

In particular: "Due to the increase in the use of composite material aircraft, together with the new IATA 'No Touch Policy' standard, more and more airlines are requesting that their ground handlers find technological solutions to safeguard their aircraft.

"In 2020 we see these requests becoming mandatory and a factor when selecting a ground service provider. In 2019 we have seen this mainly in Europe and Asia, but in 2020 the demand will spread to the US market.

"Furthermore, our view is that we will see insurance companies getting into the game and providing incentives in the form of partial financing or reduced premiums, much like we have seen in the automotive industry, where new technology was adopted to reduce the risk of accidents," Bar-on adds.

Time for action

George Anjaparidze, CEO and founder of Swiss economics and strategy think tank and advisory service Veritas Global, explains why a **collaborative approach is urgently needed** to ensure a sustainable future for aviation

We expect the impact of the coronavirus (COVID-19) will result in negative passenger air traffic growth in 2020 compared to 2019. This is despite a favorable global macroeconomic backdrop at the start of 2020. Our expectations are consistent with scenario 1 of the March 5 update by IATA on Financial Impacts of COVID-19, which estimates a loss in worldwide passenger revenue of 11%.

There are further risks to our outlook due to persistence of trade tensions and geopolitical risks as well as the possibility that COVID-19 epidemic worsens more than expected. Furthermore, in early 2020, some central banks chose to pursue less loose monetary policy, which could also be cause for concern. More broadly, we expect non-economic factors to increasingly influence performance of the aviation sector.

Coronavirus stings

2020 kicked off to a difficult start. According to the World Health Organization, as of March 4, COVID-19 claimed the lives of 3,198 people worldwide. The virus has also disrupted air transport networks and created an overall fear of traveling by air. As a result, this will be the first time the industry will post negative growth in passenger air traffic since the Global Financial Crisis.

Although we are in the early stages of outbreaks, we don't expect the fear to persist in the medium to long term. Authorities are taking the necessary steps to contain outbreaks. Our most likely scenario assumes the epidemic of COVID-19 will be over in China by the end of April and by July in the rest of the world.

Nevertheless, the coronavirus will continue to be a major concern in the first half of 2020 but by the end of the year we don't expect it to be on people's minds.

Depressed growth

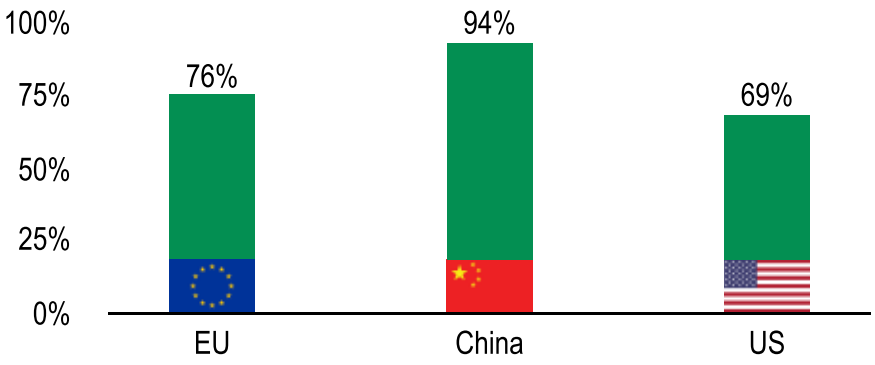
Unlike the coronavirus, climate change-related concerns will have a more lasting impact on air travel demand. A recent survey conducted by the European Investment Bank found that drastic and immediate shifts in consumer sentiment can be expected in 2020.

The survey found that 76% of Europeans, 94% of Chinese and 69% of Americans intend to fly less for holidays in 2020 as a way to help in the fight against climate change. These figures represent a significant boost to the 'no fly' movement.

The same survey identified that only about 36% of Europeans had reduced air travel in 2019 for climate change reasons.

Would you fly less for holidays to fight climate change?

Yes - most respondents intend to fly less in 2020



Source: Veritas Global using data from European Investment Bank Climate Survey 2020

Flight shaming movements are growing in momentum. Climate activists, like Greta Thunberg, are targeting flying with a ferocity not seen before. Many now consider aviation to be a dirty business. The green tide will continue to wash away demand unless industry becomes more proactive about strengthening its sustainability credentials.

The Carbon Offset and Reduction Scheme for International Aviation (CORSIA) offers some solutions. CORSIA is a global scheme that aims to address the growth from 2020 of airline CO_2 emissions from international flights.

However, from the point of view of consumers there are two main concerns. One is that consumers are skeptical about the scheme – either because they don't believe that it will be implemented, or they don't understand (or agree with) carbon offsetting.

The second issue is that consumer concerns go well beyond the boundaries of airlines. Many consumers now expect to be informed of the sustainability credentials of the services they use throughout their journey. They want to experience sustainability as part of the travel experience.

To address the first concern of CORSIA skepticism, industry needs to make a concerted effort to fully implement CORSIA by launching ambitious within-sector emission reduction programmes as well as operationalising model offset projects.

In 2020, ICAO will be providing greater clarity on which offset mechanisms can be used for CORSIA compliance.

Industry should take this opportunity and showcase projects that can be used to demonstrate the practicalities of sourcing offsets compliant with ICAO criteria and identified mechanisms.

In addition, there is a need for an education campaign that explains how offsetting works and why it is beneficial.

Addressing the second concern related to the desire of consumers to experience sustainability requires better climate disclosure practices and broader cooperation across the air transport supply chain. The physical journey starts and ends at an airport, where there are significant opportunities to do more to improve sustainability credentials.

One such opportunity is to do a better job at deploying renewable energy, in particular solar power. The airport industry should work together with key stakeholders, such as the International Solar Alliance, to identify the mix of policy incentives needed to better deploy solar power in a way that does not impose excessive financial burdens on airports while reducing their carbon footprint.

Ground handlers and other indirect service providers also need to provide greater visibility to consumers on their sustainability credentials.

Giving more information to consumers, combined with strengthening aviation's sustainability credentials, should help improve consumer sentiment and restore confidence. It is time for the aviation industry to take a more proactive stance in 2020.

"Many consumers now expect to be informed of the sustainability credentials of the services they use throughout their journey"

Cyber safety

The aviation industry is renowned for its intense focus on safe working practices and is frequently held up as an example to be emulated. But in an increasingly digitised world, there are **new challenges to overcome**

"Statistically speaking, flying as a passenger on a commercial flight is one of the safest ways to travel," says Nigel Stanley, chief technology officer at Cologne-headquartered technical services company TUV Rheinland.

In 2017 there were no fatalities on passenger jet flights. According to the International Air Transport Association's (IATA) Annual Review 2018, the likelihood of a fatal accident is one in every 6.7 million flights.

"That is a quite an achievement – especially for an industry facing tremendous growth in demand for commercial flights," Stanley observes.

But although its safety standards are high, unfortunately (like every other industry), the aviation sector is facing cybersecurity challenges as it moves away from isolated, bespoke solutions, and becomes increasingly connected and digitally enabled.

Airport cybersecurity

Airports have become complex mini-cities that operate around the clock, 365 days a year. Accommodating thousands of passengers and hundreds of flight movements requires logistical perfection, as even a small delay can have significant international ramifications.

In December 2018, for instance, the apparent sighting of drones (unmanned aerial vehicles) near London's Gatwick Airport triggered the diversion or cancelation of more than 1,000 flights during a single 36-hour period.

Stanley points out: "Innovations are being designed to offer advanced solutions for passenger and baggage check-in, document checking, flight rebooking, boarding and bag recovery. This is taking place alongside developments in smart, risk-based security solutions, designed to be as hassle-free as possible for passengers.

"All of these innovations come with an associated risk: for anything that becomes connected to the Internet, digitised, or automated, a new avenue of attack opens up for cybercriminals looking to cause havoc."

Physical security has always been a high priority for airports, and it is clearly visible to any traveller. Yet ironically, the addition and interconnection of more systems, such as CCTV, building management, power, runway lighting and door controls, has increased the

opportunity for digital incursions and disruption.

Some airports are evaluating the use of Remote Tower Services (RTS). Relying on very high-definition cameras and imaging equipment, coupled with additional radios and sensors, they replace the traditional control tower with one located many miles away.

According to Stanley: "From a business point of view, enabling air traffic controllers to conduct operations from a remote site offers potential savings, especially for less busy airports who may not need full-time staff.

"But, RTS also creates new challenges when it comes to ensuring that cybersecurity risk is well managed. Existing controls and measures, that may have adequately addressed localised risk, will need to be re-examined in the light of an RTS deployment."

Stanley feels that cyber-attacks in sensitive locations like airports tend to be under-reported to the media, but they are happening, and some stories do emerge. For example, in 2016 cyber attackers managed to compromise Hanoi's Noi Bai and Ho Chi Minh City's Tan Son Nhat airports in Vietnam, where they hijacked flight information screens and sound systems.

"So, while innovation improves efficiency, we must ensure that the drive to modernise is matched by an equal effort to design security measures into new technology from the start," he stresses.

Aircraft cybersecurity

Also in 2016, a team from the US government, industry and academia demonstrated that a commercial aircraft could be remotely hacked.

Although the aircraft used in the test was a legacy Boeing 757, such airframes make up around 90% of the current worldwide commercial fleet. More modern airliners, such as Boeing's 787 and the Airbus A350, have been designed with security in mind, so similar attacks should be harder to execute.

But while these aircrafts may be significantly more secure, substantial security challenges need to remain at the forefront of manufacturers and airlines, and should remain a top concern during both in the design and maintenance phases.

Modern aircraft are already huge, technically advanced systems, and they are becoming even more complex, Stanley says. Innovations such as 'fly-by-wire', which embeds computers in the control chain, have reduced pilot workload and improved aircraft safety. Boeing's current issues with the 737-MAX series have highlighted the problems this may create.

At the same time, passengers are now demanding internet connectivity and multi-channel entertainment systems that would have not been possible 20 years ago, further increasing the complexity of the technology on today's airplanes.

To cope, onboard networks have moved away from serial-based, industrial type installations, and are now increasingly TCP/IP-based. They are normally segregated, so each handles one of three key areas:

- Aircraft control systems that enable the aircraft to fly safely
- Aircraft information systems for non-critical aircraft services
- Passenger information and entertainment systems (PIESD)

Stanley considers: "For safety and security reasons, these networks should be designed to operate completely independently, so that accessing or transferring data between them is impossible. After all, why would the PIESD ever need to connect to the aircraft control network?

"Operationally speaking, the answer is never. However, from a practical perspective, if such interconnectivity were possible, a hacker, cyber-criminal or terrorist could conceivably exploit it as a potential attack route."

While airport security routinely searches for physical weapons or explosives that could be used to attack an aircraft, authorities never check electronic devices for logical weapons. A bad actor with a fully loaded 'hacking' laptop has plenty of time to experiment on a long flight, Stanley suggests.

He goes on: "In theory if they were able to compromise the PIESD, the hacker could then move laterally to other systems. Or attempt to escalate their privileges, from humble passenger access to systems administrator, and wreak havoc."

Proactive network monitoring during flights is possible, but it raises an important question. If a cyber event was detected at 36,000 feet, what action would or could the crew take?

The risks are not entirely theoretical, as Stanley notes. "In February 2019 it was discovered that the built-in USB charging/data-transfer interface in an entertainment system installed on a British Airways Boeing 777-36N(ER), and possibly other aircraft, also supported USB keyboards and mouse devices. This was demonstrated by using mouse copy-and-paste actions to trigger a chat buffer overflow or possibly have an unspecified other impact.

"As a result, any attacker onboard could conduct unanticipated attacks against entertainment applications. This was subsequently highlighted as a vulnerability in the Mitre Corporation's common vulnerabilities and exposures (CVE) list."

Aircraft management and health systems monitor complex processes that produce large amounts of data. This information may be stored for later retrieval by engineers conducting routine maintenance or break-fix repairs, or captured in real time by one of the airline's business partners, such as engine manufacturers as part of an engine lease programme.

Such a mass of data could also be a liability, if not protected appropriately. "Rolls-Royce recently announced that it would soon be receiving more than 70 trillion data points each year from its in-service fleet of commercial aircraft engines," Stanley says.

"There is a good chance that, along with engineering telemetry, this mass of data could also contain indicators of compromise that could help avert a targeted cyber-attack. The problem is finding them, and then deciding what action to take – i.e. divert the aircraft or make an emergency landing?"

The risks extend far beyond the airframe. Aircraft design and production is dominated by complex international supply chains. As well as leaking intellectual property, these extended supply chains can act as a conduit into an aircraft manufacturer for a targeted cyber-attack.

Smaller and less cyber-savvy suppliers or third parties may not even have considered cybersecurity risk in their plants or services – an oversight which could result in a security incident


Nigel Stanley, Chief Technology Officer at TUV Rheinland

further up the supply chain. Many major manufacturers are now aware of this problem and enforce cybersecurity rigour in their supply chain contracts.

Cyber threats to the industry

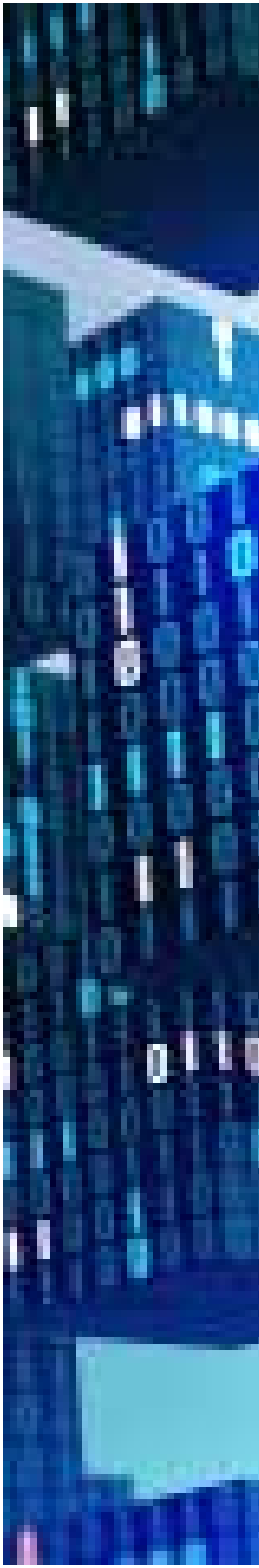
"Everyone in the aviation industry should now be at least peripherally aware of cybersecurity threats and dangers," Stanley says. "Separating key systems with 'air gaps' is no longer enough to prevent attackers accessing a system.

"For this reason, cybersecurity risk must be a major part of business planning, resilience and risk register programmes. This must include training and awareness for all employees, at all stages of the supply chain, as well as airport staff, pilots and airplane crews.

"Only with a concerted effort from the industry as a whole will the aviation sector remain an example of safety and security, and continue to thrive in an ever-more connected world, both digitally and geographically," Stanley concludes.

Blockchain primed for aviation industry take-off

A new approach to data sharing will help airlines, airports and ground handling companies **streamline their operations**. *Martin Courtney* reports



Blockchain is the record-keeping technology behind the bitcoin crypto currency, but it has potential use cases that go far beyond the banking and financial services sector.

In the aviation industry, for example, the commercial value chain often involves anything up to a dozen different organisations – including aircraft manufacturers, airlines, travel agents and ground handlers – that depend upon and closely interact with each other to deliver products and services to passengers.

Many believe that blockchain could prove instrumental in orchestrating a new era of co-operation and collaboration between those stakeholders, so long hampered by largely incompatible information repositories that make fast and effective data sharing difficult, if not impossible.

"The biggest obstacles standing in the way of a seamless passenger journey and truly efficient air travel, are the siloed processes across the many stakeholders, including airlines, airports, ground handlers and control authorities," Barry McLaughlin, Lead Architect for SITA Lab tells *ARGS*.

As a decentralised ledger that securely records transactions and data transfers across a distributed peer-to-peer network of participants, blockchain could allow organisations to streamline their partner billing operations, for example, making it easier and faster to facilitate payments between the various entities involved in customer transactions.

In the digital world, an electronic ticket (e-ticket) is fundamentally little more than a database entry with a print option that can easily be shared between customers and partners. Blockchain offers the ability to add business logic and terms and conditions around how the e-ticket is sold and used, providing greater flexibility in how it is sold by different partners in the value chain from anywhere in the world.

The technology can also provide a secure and convenient method of recording events. This can be applied to tracking the status and location of valuable assets that are transferred from one custodian to another on a relatively frequent basis – such as passenger bags, cargo, spare parts and even aircraft themselves.

And the same techniques used to underpin financial transaction security can be applied to the personal information of passengers and crew to enable compliance with data protection regulation and harden access policy management, through the creation and certification of digital identities that guarantee the integrity of the people and organisations involved in the commercial chain.

Aviation use cases

Although the technology remains in the early phase of adoption in almost every industry vertical, some aviation companies are already starting to experiment with blockchain. For instance, multinational professional IT services company Accenture has worked on a proof of concept (PoC) with French aerospace manufacturing and services company Thales in the UK to develop a blockchain solution that helps stakeholders verify the authenticity of parts and their associated documentation, and to understand aircraft and asset configuration.

Accenture research estimates that approximately six in seven aerospace/defence companies expect to integrate blockchain into their corporate systems within three years to help reduce maintenance costs, increase aircraft availability and minimise errors in tracking aircraft parts, among other functions.

"The area where we see big pickup right now is among stakeholders with unique assets in the supply chain," says Craig Gottlieb, who is responsible for innovation and thought leadership for Accenture's Aerospace and Defense Practice in North America, with a particular focus on supply chain and aftermarket services.

In its study "Future of the Airline Industry 2035" the International Air Transport Association (IATA) also sees blockchain as one of the technologies set to have a major

Barry McLaughlin, Lead Architect for SITA Lab

impact on the future of aviation. IATA has conducted years of research and development into blockchain, starting with prototypes and testing in production environments in tandem with several airlines and their partners.

It has identified tokenisation and smart contracts as leading use cases. Smart contracts are defined as those that are self-verifying, self-executing and autonomous. They allow companies to exchange terms, events and information throughout the lifecycle of the contract without having to rely on brokers or middlemen ¬– which often introduce extra costs and transactional delays.

"Smart contracts have high potential to enable streamlining of business-to-business interactions ... such as invoicing, reconciliation, settlement and accounting," writes Eric Léopold, director of transformation at IATA's financial and distribution services arm.

SITA has already developed FlightChain, a smart contract that contains what it terms a single source of truth for real-time flight information, and provides shared control of the data being collected and updated. The project – which originally started with the participation of British Airways, Heathrow Airport, Geneva Airport and Miami International Airport and has supported the active exchange of data between up to 12 participants – stores flight information on either Ethereum or Hyperledger blockchains to provide easy access to flight status data.

The concept of 'Blockchain as a Service' too – a model that allows developers to use cloud-hosted services to build, use and host blockchain apps, functions and smart contracts – is also gaining support, largely because expecting any one stakeholder to implement a specific solution on their own infrastructure is complicated and error prone.

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Cathay Pacific and Accenture have developed a blockchain-based loyalty scheme

February 2020, meanwhile, saw the launch of the Maintenance, Repair and Overhaul (MRO) Alliance, dedicated to defining a PoC that uses blockchain to track, trace and record aircraft parts. Members currently include Bolloré Logistics, Cathay Pacific, FLYdocs, HAECO Group, Ramco Systems, SITA, and Willis Lease Finance Corporation, supported by Clyde & Co.

German airline Lufthansa is experimenting with blockchain for use in flight maintenance, creating the Blockchain for Aviation (BC4A) initiative to bring together software developers, aircraft manufacturers, MRO and logistics service providers, lessors and regulators in an attempt to use the technology to verify the source and certification of parts and job technicians.

PwC estimates that the use of blockchain could increase aerospace industry revenue by as much as 4% (or US$40 billion) while cutting global MRO costs by around 5% (US$3.5bn) through savings derived from secure document storage, improved data privacy, better insight into repair times and inventory, automated workflows and more efficient record reconciliation.

Elsewhere British Airways has tested VChain's blockchain check-in service as a means to reduce queues. The system works by checking the validity and reputation of travel documents against a distributed database without the need to share passengers' personal information with third parties.

Safety is another use case, with the Aeron blockchain project initially recording flight logs and aircraft maintenance data for operators and owners before extending the remit of its ARN token to a loyalty programme compatible with various different crypto currencies.

Loyalty programmes set to benefit

Loyalty point programmes, too, are set to benefit, as tokenisation circumvents limitations in how fast points can be collected and where they can be accepted as a form of currency across a broad marketplace of providers. The tokenisation of assets within blockchain can also prevent frequent flyer points, or compensation vouchers, from being double spent.

Blockchain is at the heart of a new loyalty platform and mobile application launched by Cathay Pacific in 2018. Jointly conceived and developed with the help of Accenture, the Asia Miles programme provides the loyalty scheme partners with a single data source for customer account management, which can be accessed and updated in near real time to credit members with points almost immediately.

Emirates Skywards (the loyalty programme of Emirates Airlines) completed a successful pilot of Loyyal's proprietary blockchain platform in 2019, designed to deliver real-time visibility into partner transactions. Loyyal has since revealed that an airline alliance with more than 500 million passengers is another of its customers.

It's not all plain sailing for the fledgling

"The biggest obstacles standing in the way of a seamless passenger journey are the siloed processes

It is necessary to develop commercial and governance paradigms to support the use of blockchain platforms

technology, though. Insurance company AXA terminated its blockchain experiment (dubbed 'fizzy') last year, citing lack of demand for its platform. This was a parametric insurance solution for delayed flights intended to automate the claims process with smart contracts built on open source Ethereum blockchain software.

Barriers to blockchain

Accenture points to multiple data challenges that blockchain could address, including verifying information accuracy and dealing with the risks of fake data, data manipulation and data bias thrown up by the increased use of automated systems. But it also notes factors that could prove detrimental to its development and deployment in the aviation industry as a whole.

"Aviation is definitely behind in terms of the number of blockchain use cases that have been put forward," says Gottlieb. "Although if you think of the industry as a whole, that is not terribly different when it comes to the introduction of any new technology, particularly when we get to stuff like [aircraft] parts and engineering – lest we forget the amount of regulation that goes into making planes fly safely."

SITA's McGlaughlin believes major blockchain platforms have matured sufficiently to be ready for production environments.

"The barriers now are not so much technical limitations but rather figuring out new commercial and governance models to support this new paradigm," he says. "Our [SITA's] view is that we will see the first commercial deployments in the industry in the next few years."

Some form of aviation industry standardisation around blockchain is, however, both necessary and inevitable, whether that comes from IATA or somewhere else.

"Things will go one of two ways," says Gottlieb. "Either folks will get together and define standards how they want blockchain to work, or there will be players with enough centre of gravity in the industry to say, 'I am doing it this way and everyone is welcome to join me' – which means we will get a de facto standard anyway."

Any widespread adoption of smart contracts would also involve the addition of multiple airlines and airports to provide a richer, more complete data set, and the identification of a feasible business model to fund its development. With over 50 industry partners (airlines, airports, ground handlers, manufacturers and more) expressing interest in SITA's Aviation Blockchain sandbox project, achieving that ambition does not seem too far away.

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