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Assessing the long-term impact of COVID-19 in aviation

Post-pandemic series.

Welcome to the Yocova post-pandemic series of articles

2023 is set to be a year like no other for aviation. As the industry accelerates out of the effects of the COVID-19 downturn, this series reflects on how the pandemic's effects — and the years since 2020 — have changed aviation forever.

In this eight-part series we talk with industry leaders, top aviation journalists and inspirational contributors to understand the impact on the future of aviation, from digitalisation on flight and ground operations to maintenance, repair and overhaul (MRO), safety, sustainability and business aviation.

As the Yocova global community continues to accelerate and grow at pace to comprise a long list of aviation stakeholders including airlines, lessors, MROs, OEMs, leading digital and data vendors plus many more, we look forward to covering the challenges and opportunities aviation brings in 2023.

The Yocova team

With special thanks to aviation journalist John Walton for engaging with contributors and writing these articles.

Yocova post-pandemic series article contributors

Our thanks to the professionals, and organisations, who consented to be interviewed by our Yocova journalist and contributed valuable insight to articles within this series

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Do you have something to bring to our growing membership? If you are interested in contributing to articles, insights or group discussions on Yocova please contact members@yocova.com

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Post-pandemic industry

As aviation looks towards a fourth year where the effects of the COVID-19 pandemic continue to be felt, we sat down with a wide variety of industry experts to look back on how aviation has changed since 2019, what challenges remain, what lessons have been learned, and how aviation is continuing its acceleration towards a sustainable future.

Post-pandemic industry

In terms of scale, the industry's position since 2019 is stark, explains Perry Flint from airline trade group IATA, the International Air Transport Association.

"In 2019 the world's airlines earned US$26.4 billion and carried 4.5 billion passengers," Flint tells us. "Over the next two years, the industry lost a combined $179.8 billion, while enplanements for 2020–21 combined fell to around 4 billion. In 2022, airlines' losses are expected to shrink to $9.7 billion while enplanements reach 3.8 billion, so while recovery is underway we are still well below the 2019 figure."

As passenger numbers cratered, the need for cargo carriers to maintain the functioning of global supply chains, distribute critical personal protective equipment, transport lifesaving vaccines and bring the COVID-19 vaccines that saved countless lives across the world was a lifeline — not just for airlines, but for the world.

"Cargo revenues," Flint says, "totaled around $101 billion in 2019 but soared to $138.5 billion in 2020 and $204.1 billion in 2021. They are expected to decline somewhat to around $191 billion this year.

Yet, says Alton Aviation Consultancy's engagement manager Alan Lim, the growth in cargo "has attracted new entrants into the market from outside the industry. One prime example is the entry of maritime shipping companies like Maersk and CMA CGM into the air-freight market through partnerships and acquisitions, to reinforce their shipping network and take advantage of the growing demand for end-to-end logistics."

Key areas of challenge remain as the industry rights itself

The return trajectory to 2019 levels continues to pose a number of challenges, as consultancy AirInsight Group's partner Addison Schonland highlights.

"We see two key items impacting materially: the pilot shortage and rising traffic," Schonland summarises. "Airlines need, a bit desperately, to deploy larger aircraft — it's physics: bigger planes are the solution. Consequently, we also expect to see widebodies be brought back for shorter routes."

Elsewhere, says IATA's Flint, "some airports that downsized staff during the pandemic were not prepared for the rapid recovery in air travel this year. In extreme cases, these airports have actually limited the number of flights airlines can operate."

Flint also cites the supply chain constraints, manufacturing issues, technology problems and related issues that have hit airframers' attempts to return to higher levels of delivering new aircraft — and, crucially, their engines.

And of course, some OEMs have been coping with supply chain shortfalls and manufacturing and technology-related issues that have slowed the delivery of new aircraft and engines.

Alton's Alan Lim also highlights that airline debt is becoming a looming issue: "to ensure their own survival, airlines have taken on significant debt (IATA estimates over US$100 billion) to weather the pandemic, while also deferring many upcoming capital expenditure commitments such as fleet purchases. These would need to be serviced and fulfilled in the coming years, leading to higher cash outflows on average compared to before COVID-19."

"At the same time," Lim notes, "several major airlines have also gone through a restructuring process during the pandemic. This has allowed them to shed less favourable long-term agreements and emerge stronger in the post-COVID world. Regardless of the situation, there has nevertheless been a greater focus on cost management since the pandemic among all players across the value chain."

One key lesson learned — or, more accurately, learned by some and reinforced for others — by the aviation industry is just how beholden it is to externalities. Government actions around closing borders and implementing mandates (for tests, masks, vaccines, quarantine, etc) were taken in a way that many in the industry, including IATA's Perry Flint, would classify as errors.

Governments, Flint argues, "compounded that error by not coordinating among themselves or consulting with industry in restricting travel and imposing various health requirements. At the peak of the crisis, our TIMATIC system was registering hundreds of changes daily to entry restrictions."

TIMATIC is the widely used IATA system designed to manage visa and other entry requirements, and was used to manage pandemic-related requirements including testing, vaccination and isolation.

"How," Flint asks, "could travelers have any confidence when purchasing a ticket when rules were changing literally on a daily basis?"

Post-pandemic industry

As the industry looks to the future, it is an inherently digital one

COVID-19 is often referred to as a great accelerator of technology, as aviation and other industries adopted a range of new digital tech at a speed never before seen. Whether it's hybrid working for corporate staff, remote digital-enabled maintenance oversight, or even just the now-ubiquitous videoconference, the prospects for the industry of 2023 are markedly different from those of 2019.

"Digital transformation also encompasses technical operations," IATA's Flint emphasises. "The pandemic, which dramatically reduced opportunities for face-to-face exchanges, greatly accelerated the drive towards digitalization along with development of innovative data-exchange concepts including such things as digital parts traceability and documentation, digital signatures and electronic maintenance record keeping."

Everyone and everything that travels by air — whether passenger or cargo — will benefit from digital innovation. Passengers will see a streamlined airport experience, with many of the formalities completed over their phone or tablet before they even leave home. Electronic cargo operations like e-freight and e-airway bills will do the same for cargo.

In this near-term digital future, says Alton's Alan Lim, "from the passenger perspective, such initiatives would include the push towards personalisation, with the aid of analytics, in order to deliver the right offer at the right time to the right customer, the use of AI-based chatbots to relieve the workload of human call agents, and the use of mobile and biometric-based tools to simplify the passenger's airport journey."

More widely, as more and more aircraft are sensor-enabled, and more systems interact with each other to create yet more data, the sheer size and scale of this data opportunity is almost immeasurable. A key challenge for aviation is understanding, processing, analysing and acting on this massive amount of data.

As some of the early wins here, says Lim, "Examples of such initiatives would be driving maintenance to be more real-time and predictive, to allow for proactive maintenance to reduce aircraft downtime and lower maintenance costs. In addition, the use of historical, and increasingly real-time data, to optimise flight planning both before and during the flight, will enable both fuel and cost savings for airlines. These are but a few of the many use cases where data can be used to improve operations, reduce costs, and achieve the sustainability goals that the industry has set for itself."

Those sustainability goals, too, are a critical — indeed existential — goal for aviation to reach. The industry has much work ahead of it as it focuses on becoming a net zero carbon emitter over the next three decades to 2050, but with a variety of new technologies at its disposal and an immense amount of will, aviation's future is a bright one.

Digitalising businesses across aviation is the future of the industry

The way people in aviation work has been transformed by the effects of the COVID-19 pandemic, like almost every other industry worldwide. But more than just swapping Zoom and Teams for conference room spiderphones, aviation has transformed the way it works throughout the supply and production chain. New digital ways of doing business — and new digital businesses — will be the future of aviation.

Digitalising businesses across aviation is the future of the industry

“The last three years have had a long-lasting impact on the aviation industry,” Sebastian Blumberger, senior vice president for strategy at German supplier Diehl Aviation tells us.

“The importance of the long-range aircraft is decreasing compared to the focus on single aisle production. Most companies in the industry need financial support, which makes large investments more difficult. In addition, in times of crisis, the resilience of supply chains becomes more important. Climate-efficient flying and sustainability are moving strongly into the foreground of perception and require a high willingness to change and invest from all stakeholders.”

Diehl’s Carsten Laufs, senior vice president for innovation and digitalisation, explains that “digital innovation is an opportunity to optimise our end-to-end process with digital continuity across the entire product lifecycle, creating value at the same time. Our customers will benefit from digitally enhanced, shorter development cycles as well as smart technologies and connected products in the aircraft cabin and beyond. This will enable them to offer a more personalised flight experience and higher service reliability.”

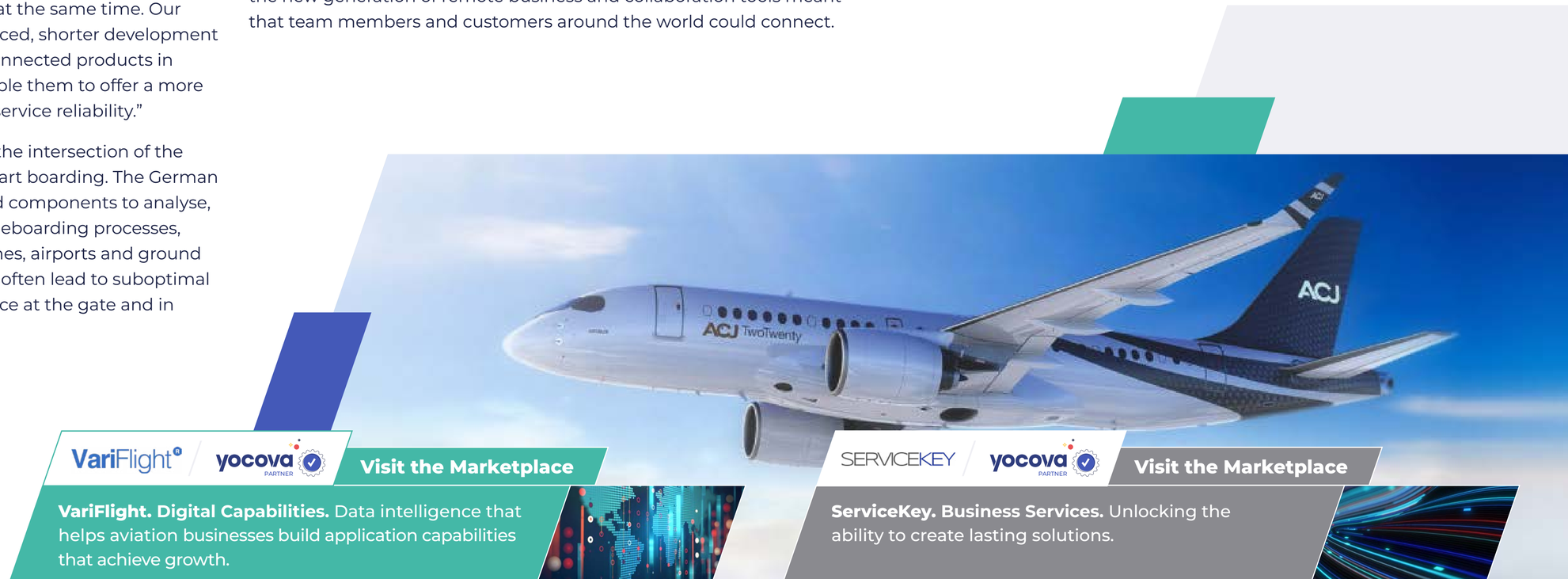
A particular focus for Diehl at present is at the intersection of the airline and the airport, and in particular smart boarding. The German supplier is developing digital processes and components to analyse, monitor and accelerate the boarding and deboarding processes, perennially a topic of much interest to airlines, airports and ground services, where gaps in organisational silos often lead to suboptimal operations — and poor passenger experience at the gate and in the cabin.

Diehl is also working on autolocation as part of the i+sCabin2.0 programme, and prospects include whether a specific passenger service unit can be assigned to a specific seating group as part of cabin digitalisation. In addition, Diehl and Thales Avionics are working together on a cabin projection system they call the In-Cabin-Experience-Enhancer. Beyond allowing branding messages, this kind of system can improve operations: options mooted have included large row numbers projected onto bins, live information display, and much more.

At Airbus, the European — and part-Canadian — airframer ended developing a digital launch, sales and customisation process at speed during the COVID-19 pandemic for its latest aircraft. The ACJ TwoTwenty, the business aviation version of the capable A220 single-aisle small airliner that started its life as the Bombardier C Series, came to market during the height of the pandemic. Fast adoption of the new generation of remote business and collaboration tools meant that team members and customers around the world could connect.

As travel ramps up, Chadi Saade, vice president commercial for the ACJ programme, tells us, the new normal of videoconferencing means that the industry is getting used to a new dynamic around in-person meetings: getting right down to the contractual sales nitty-gritty and having meetings that are more productive, but fewer of them and later in the process.

Also driven by the pandemic, Airbus created an entire digital, virtual and augmented suite of tools to sell the aircraft to customers and enable them to add their own customisations.



Saade explains that the goal was to attempt to replicate the TwoTwenty Creative Studio in Toulouse remotely, to the maximum extent possible with current technology.

The creative studio itself is an impressive balance of leading-edge visualisation technology and the need to ensure that the technology works for discerning clients who may not be as technologically enthusiastic as the studio's tech integrators.

In Toulouse, "there is a whole system of projection on the floor, in real size, of the whole layout that you're going to get, and you can walk through," Saade explains. "There are the materials that you can touch and feel."

Adding a full system of cameras, vision mixer technicians and technologically equipped staff means that a remote customer can get almost the same experience, with a remote 'cabin suitcase' of materials that can be couriered around the world to give the real-world look and feel of leather X with fabric Y and wood Z.

At Safran, senior manager for UX design and innovation connectivity Ron Verweij tells us that the very business model of aviation is changing.

"One of those new business models is found in SOPHY, the winner of a Crystal Cabin Award in 2021," he explains. "This is a fleet management solution to manage the airlines' catering equipment fleet and optimising ground processes, and is the first stepping stone towards the connected interior. In the value proposition design process, we created a system to support airlines to optimise the balancing of their fleet and reduce the overstock of catering equipment on the ground, while collecting process data to optimise ground and turnaround processes."

Safran is spreading internal best practice across its operation, with technologies like augmented reality first used on engines now making its way to other parts of the business: training electrical riggers to assemble incredibly intricate six-figure business class mini-suites, for example.

Fundamentally, says Verweij, "technologies today are able to do everything and we can see many examples around us — the key is finding the right value propositions. Next generation technologies I am very excited about include AI empowered sensors that monitor, process data input and support real time processes: [these] will enable efficiencies we cannot imagine."

The future is ripe with opportunity. Apps turning into AI-powered personal assistants, the growth of self-service and autonomy, machine learning analysis of the inconceivable amount of data that will be produced — all of it is the growth medium for a new digital aviation industry that has never needed to innovate more than it does now.

MRO in the post-pandemic world: opportunities, challenges and innovation

As the maintenance, repair and overhaul (MRO) industry looks towards the acceleration out of COVID travel restrictions, we sat down with Brett Levanto, vice president of operations at the Aeronautical Repair Station Association (ARSA), the trade body for the civil aviation maintenance, repair and overhaul industry, for a big-picture view on how the industry is changing — and what comes next.

Since 2019, “the primary change for the industry isn’t really a change, but an acceleration of a trend: the increasing challenge of finding and retaining technical talent,” Levanto says. “Career development has been a growing crisis for my entire decade working in the industry — and even before that.”

This is a common theme across aviation: airlines, airports, ground handlers, and many more of the industry’s sub-sectors are all telling us similar stories. Given that a substantial part of the industry’s workforce can seek jobs between parts of the industry, or head out the door with their technical skills, this attractivity gap needs to be filled.

Within the MRO world, Levanto explains, “the pandemic created a whirlwind through which aviation businesses were losing employees while trying to keep their doors open. Those employees often found other work or took the opportunity to retire, so when repair stations saw their order books rebound there weren’t people on the floor to get the work done. Filling vacancies has become daunting, let alone trying to construct a workforce strategically that will help businesses grow into the future.”

There was a time where in-house maintenance at an airline meant that technical employees had access to some of the airline benefits that have kept other kinds of industry jobs attractive even through tight labour markets. Is it time to return to insourcing, or will we see some larger MROs offer benefits with airlines, either within larger corporate groupings or as a bilateral deal?

Fundamentally, he notes, “across our membership we’ve seen the importance of balance. The companies that fared best during the downturn either were already in industry segments that remained bullish — cargo or business aviation — or were able to lean on those areas of an already diverse business portfolio. The repair station industry was incredibly resilient during the downturn, often because their specialties were broadly applicable.”

Remote work, connectivity and communication bring benefits and risks

The technological acceleration effect of COVID lockdowns has been substantial across industry. In aviation, some areas have even seen de-digitalisation and re-digitalisation as processes that had been automated suddenly had to be done manually. But what are the top three best new business practices, tools, or methodologies across the activities of MRO organisations that are available now, which weren’t in 2019?

“For ARSA, numbers one, two and three are all remote connectivity,” Levanto says. “We’ve been pressing the issue since 2018, when the FAA [Federal Aviation Administration] was incredibly reluctant to allow virtual communications to be used for oversight and inspections. The pandemic created the perfect scenario for sudden action in the form of agency acknowledgement that the rules didn’t prohibit such communications, so they were therefore allowed.”

However, he notes, “as the government has embraced telework and allowed more and more dispersion in its workforce, we’re hearing from members that key regulatory functions are getting dramatically slowed down. Not just in the FAA, though we heard a lot about the challenges of managing a more-mobile workforce during our fall roundtables this year. Other government functions like customs inspections for parts delivery are slowing down to a crawl.”

MRO in the post-pandemic world: opportunities, challenges and innovation

Digital innovation in the regulatory space is already reaping rewards

Compliance with regulatory requirements is a critical part of MRO operations, and here two new digital innovations are, even in their early iterations, bringing benefits to repair shops.

When it comes to a question about what the most impactful digital changes have been within the industry, Levanto answers thoughtfully: “Remembering that ‘impactful’ doesn’t necessarily mean positive or negative — and the jury is often still out — I want to call out two key digital changes by the FAA in the past two years.

“The first,” he says, “is the migration of the online rules at eCFR.gov to a new platform. After traveling the learning curve, the new system is intuitive to navigate, has better search functions than the previous platform and allows you to link directly to a sub paragraph… something very important to building useful manuals and digital documents.”

The eCFR is the continually updated electronic version of the Code of Federal Regulations, the official print publication that codifies all the general and permanent rules laid down via publication in the Federal Register by federal government departments and agencies. It is composed of XML files that are updated, tracked and available via API for revision tracking, search and metadata.

Returning to the benefits, Levanto says that “the second is the rollout of the Dynamic Regulatory System [DRS]. The jury is definitely still out on the DRS — searching and referencing specific sources can be tough — but the goal of getting all regulatory compliance content into a single, searchable interface is certainly laudable. From an association that urges its members to go and read primary sources every time there’s a question, this is important.”

The DRS consolidates information and guidance material from the FAA’s Office of Aviation Safety into a single point of reference. This material includes airworthiness directives, advisory circulars, design and production approvals, advisory and rulemaking committee documents, and much more. The DRS’ information sources include the Regulatory Guidance System, Flight Standards Information System, and a dozen other repositories of information.

As the industry looks towards 2025 and beyond, Levanto flags that “what’s most important is how the industry — and its regulators — react to innovations. We’re fond of pointing out that most ‘emerging technologies’ we celebrate in aviation have darn well ‘emerged’ in countless other places before they end up on an aircraft.

“Our industry tends to wring its hands over safety implications and oversight impacts when the approach is right in front of us,” Levanto concludes, suggesting that the industry “rely on the performance-based nature of the rules and incorporate whatever’s ‘new’ into existing systems.”

Evolving safety and regulatory approaches since the start of pandemic travel restrictions

How do you safely shut down entire sections of one of the world's largest, most complex and most safety-oriented industries during a global pandemic — and how do you start it up again when it's appropriate to do so?

Evolving safety and regulatory approaches since the start of pandemic travel restrictions

What lessons have been learned from the experience, and how, over the past three years of learning to deal with the effects of COVID-19, are regulators approaching safety in new and different ways? We sat down with spokespeople for the US and European regulators, the Federal Aviation Administration (FAA) and the European Union Aviation Safety Agency (EASA), who collated responses to technical questions on behalf of their respective experts.

"The COVID-19 crisis accelerated digitalisation initiatives within regulators as well as for industry," EASA tells us. To take one example of change that occurred, remote oversight was born out of necessity, but proved to be quite effective."

Indeed, the scale of the challenge for EASA was unusually vast: unlike the FAA or, say, other regulators in jurisdictions such as Singapore or Japan, EASA oversees more than two dozen national jurisdictions, many of which implemented their own restrictions on travel at a national level.

Here, EASA took a pragmatic, risk-based approach to on-site oversight visits, establishing two principles in particular:

1. *EASA is supporting the organisations wherever they can – with guidance, advice and flexibility in their approach.*
2. *The difficulty in performing on-site visits will not in itself trigger any suspension or limitation on certificates. The agency will use adapted procedures to maintain the oversight level necessary for safe operations during these unprecedented conditions.*

EASA, its spokesperson tells us, "is clear that it [remote auditing] will not fully replace on-site audits, but the two methods can, and should, co-exist and complement each other. Finding the right balance is key as the economics of each type of audit may invite excessive use of remote audits. This is something we are working on."

It's informative to note the differences — and indeed the similarities — between EASA's initial June 2020 Review of Aviation Safety Issues Arising from the COVID-19 Pandemic report [PDF] and the subsequent version from April 2021 [PDF]. EASA was very clear early on that it was leveraging the European Safety Risk Management process to identify and prioritise issues as they arose.

The full list of risks identified, and when they were identified, is a fascinating read, and indeed a valuable one as we look back over the last three years to see how aviation safety management evolved over time. Risks new to the 2021 version included an increased risk of cyber security issues owing to the changing way businesses (including aviation) work and reductions in administrative staff, transfers of pilots from one fleet to another resulting in low type hours, the rapid growth in cargo organisations during the pandemic, and the risks of carrying potentially flammable hand sanitisers in substantial quantities within the cabin.

More widely, EASA notes that aviation's reliance on digital data before the pandemic threw up a number of issues during it.

"The industry, and EASA, are becoming more data driven and increasingly data rich. This meant we had to cope with a situation where data was no longer so abundant: no more flights, or a severe reduction in flights, equals less data," the regulator says. "We need to make sure that our analytic capabilities allow for decision making also in situations like this. This is a valid observation for regulators and especially for industry. Safety Management Systems proved to be a key enabler of resilience."

Indeed, regulators leaned hard on these systems, usually referred to by the acronym SMS, and in many ways the reliance on the robustness of the programme's methodologies was a very positive sign for aviation. As these systems continue to evolve, work is ongoing to learn the lessons of the pandemic in how they worked — and, in the spirit of continuous improvement, what could be done better.

Across the Atlantic, the US FAA tells us it "issued extensive regulatory relief and guidance, which included working with the Commercial Aviation Safety Team to develop a comprehensive checklist of factors the industry should monitor due to dynamic changes resulting from the pandemic."

This included its COVID-19 information hub, which includes regulatory updates, guidance and resources on a variety of topics: from slot usage to in-cabin cargo transport, pilot training, flight attendant exemptions and the CARES pandemic assistance act, all the way through to the carriage — and administration to flight crew — of COVID-19 vaccines, and much more.

A reading in reverse chronological order of the agency's coronavirus-related updates is an informative insight into the agency's priorities, as well as how thinking on a variety of issues evolved.

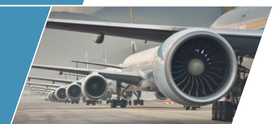
As a result, the agency's spokesperson sums up, "this focus ensured the aviation system remained safe, resilient, and open for business and was able to rebound successfully when air travel returned to pre-pandemic levels."

The FAA uses a number of digital systems, programmes and methodologies, many of which have evolved during the pandemic, including its Aviation Safety Information Analysis and Sharing (ASIAS) data-driven programme, the Aviation Safety InfoShare event, the Commercial Aviation Safety Team (CAST), its Safety Assurance System (SAS), SMS requirements and voluntary reporting programmes.

"In recent years, the FAA has successfully accommodated a tremendous growth in drone operations and commercial space launches, and is actively preparing for the certification and integration of Advanced Air Mobility aircraft," the agency says.

Within the commercial context, it is also working to scale availability, production and use of sustainable aviation fuels.

"We are continuing to evolve our proactive and predictive safety oversight system, which has led to the safest period in world transportation history," the FAA sums up. "We are expanding our portfolio of data collection and analytics tools, and improving our sharing of safety data within the FAA and with industry stakeholders and international partners."



Digitalisation opportunities and ESG threats will make a challenging 2023 for business aviation

Business aviation saw a massive surge in operations during the first years of the COVID-19 pandemic, but the nuances in the industry's boom show gaps in technology and operations that need to be filled. We spoke with Christopher Marich, cofounder and global strategy director of AI-powered private aviation spend management platform MySky, and Alan Lim, engagement manager at Alton Aviation Consultancy, for a strategic view of the challenges that the industry is facing.

Digitalisation opportunities and ESG threats will make a challenging 2023 for business aviation

“The COVID-19 pandemic brought a wave of new aircraft owners and charter passengers to the market,” Marich tells us. “In the midst of border closures and travel restrictions in 2020, pandemic travellers looked for easier and safer modes of travel and began to view private flying as a viable alternative to commercial airline flights.”

Indeed, he continues, “this trend continued into 2021 with many finding that once they’d flown privately, they didn’t want to look back. For charter passengers, taking flights to less crowded destinations became a must. For corporate flight departments, the speed and convenience of private travel yielded a level of productivity and efficiency for company executives to which even the best airlines could not compare.”

2022 full-year data is not in, but growth compared with 2019 for the first half of the year looks to be roughly 20%, depending on the data source. While the growth is good news for the private aviation industry, it has thrown up capacity issues, and “has placed tremendous pressure on back office processes such as charter quoting and invoicing,” Marich says. “As it stands, most charter operators receive up to a thousand charter requests per day with only 1% actually being quoted.”

The industry may also not have completely stabilised post-COVID, and some of the demand may have changed in unexpected ways. This is especially true when considering the demand levels from specific customer groups, whether high net worth individuals or those passengers for whom fractional ownership and chartering has opened up private aviation.

Indeed, says Alan Lim from Alton, there may be some softness in the market. “While leisure demand has contributed greatly to business aviation demand during the pandemic, business demand has yet to demonstrate a sustained recovery. The charter market has ‘traded suits for shorts’, as seen in the aircraft mix — greater light jet activity — and destination mix: strong leisure destination trips, weaker at urban business destinations. There will be some time to go before we can see a sustainable full return of business demand to pre-COVID levels.”

Moreover, he notes, the spikes in some parts of business aviation have not entirely spread across to the rest of the industry: “it is estimated that from 2018–2021, fractional and charter business jet departures had grown at 7.8%, more than double the growth in business jet departures over the same period. This was mainly driven by a confluence of one-off factors such as the lack of commercial aviation flights and an increased focus on health and hygiene,” Lim explains.

And, of course, there is the wider economic situation. Ensuring that private aviation has the management information that is responsive enough to monitor and adapt to rapidly changing economic conditions — and the way they change demand — will be vital.

“For aircraft owners, macroeconomic conditions including rising fuel prices and inflation in both Europe and North America continue to drive up operating costs, making financial management of aircraft assets more important than ever,” says Marich. “These costs are also felt by customers at the end of the line when prices rise as a result.”

Digitalisation opportunities and ESG threats will make a challenging 2023 for business aviation

Business process improvements remain relatively low-hanging fruit

Business process improvement — principally around digitalisation — is critical to removing blockers from the industry's growth and to convert customers who perhaps tried private aviation at the height of the pandemic into long-term users of the industry's services.

The bedrock on which this is built, Marich says, is "the digitisation of so many other areas of the industry including navigation, flight operations and aircraft purchasing. Business aviation is largely digital now, so those who don't adapt and modernise their processes run the risk of being left behind because customers now expect a standard of instant results and information."

From on-the-ground technology, like automated optical character recognition (OCR) scanning for invoices and receipts, to real-time back-office spending analytics with key performance indicator (KPI) tracking, business aviation does not operate in a vacuum: owners, operators and clients all see these improvements elsewhere in their lives and expect them within the industry too.

"Some of the most striking transformations in day-to-day work have occurred through new digital tools introduced to charter operations," Marich says. Whether it's automating dynamic cost calculation including time-specific landing fees, crew accommodation, overflight fees or other operational costs, he notes, "having access to this kind of technology completely changes the way charter offices run internally. The new speed and accuracy found for charter operators means passengers will benefit from clearer and reliable prices. The many people who have chosen to join the market in the last three years as a result of the pandemic or otherwise will see the faster and convenient option they turned to become even more fast and convenient."

Digitalisation opportunities and ESG threats will make a challenging 2023 for business aviation

Environmental, social and governance risks may require swift pivots and new technology adoption

The speed and volume with which societies and their governments are responding to climate change poses a substantial threat to private aviation. Changes in taxation structure to disincentivise use, or even outright bans, have been mooted within Europe.

“Changes in society – particularly with regards to ESG sensibility – have begun to force a re-think on how the business aviation sector would position itself both publicly and as an industry, as well as how it may decarbonise as political and social scrutiny become more intense,” says Alton’s Lim. “Today, industry surveys have shown that there is less pressure for the business aviation community to decarbonise as compared to commercial aviation and that ESG is not as pressing a concern to business aviation stakeholders.”

The industry may well be behind the curve on this one, since it has so far seen only limited regulatory pressure to lower carbon and carbon-equivalent emissions, and a different cost–benefit profile compared with commercial aviation owing to the substantially different utilisation profiles. Nonetheless, offsetting, voluntary carbon taxation and the use of more sustainable aviation fuels have been introduced by some operators and fixed-base operators (FBOs). More coordinated action is needed here — as it is when it comes to technical improvements to decarbonise the industry.

“To fully implement long-term decarbonisation goals,” Lim says, “will require technological advancements in airframe and propulsion systems, such as Bombardier’s blended wing body business jet concept, as well as greater adoption of flight and fuel optimisation tools. The wheels for such concepts and solutions have been set in motion, and will soon make their mark on the industry.”

New tech — and new collaborations — are driving the future of flight operations

The future of flight operations is a more efficient, more technological, and more collaborative world than three years ago. The COVID-19 pandemic changed this part of the industry fundamentally, and we sat down to discuss its prospects with Simon Hocquard, director general of air traffic management industry association CANSO, European Regions Airline Association director general Montserrat Barriga, and Andy Taylor, chief solution officer for digital towers at air traffic management specialists NATS.

New tech — and new collaborations — are driving the future of flight operations

The impact of the pandemic, lockdowns and travel restrictions affected the aviation industry in ways innumerable, some of which continue today. NATS' Taylor tells us that, in the flight operations world, "it particularly has affected the way that people see aviation and the way that people use aviation. So it's having a huge impact on air traffic service provision.

We're seeing significant growth now at a lot of airports," he says. "This is the sort of growth where major hubs, which have seen it organically grow for many years previously, are now experiencing the kind of boom that, say, regional airports did in the early 2000s with the low cost carriers. We're also seeing airports having different patterns of traffic, different operators, different frequencies."

With overflight bans, regional disparities in travel restrictions, conflict zones, air traffic management staffing, plus new and differently shaped capacity and demand, the upswing in flight operations in 2023 is its own beast.

"It's not even necessarily an exact return to 2019," Taylor says. "It's something similar, but different."

CANSO head Simon Hocquard concurs. "Some things have returned back to where they were, with passengers' desire to fly very strong in many parts of the world. Some of the global air traffic flows are still slow to return, for example to and from the Asia Pacific region to the rest of the world," he tells us.

New systems, technologies and processes are improving flight operations

Managing this return — or rather the growth to a new normal — is requiring not just the development and application of new technologies, but the wider adoption of pre-pandemic processes and working with other parts of the industry in new ways.

When it comes to technologies and processes, CANSO's Hocquard says, "one great example is flow management which enables airports, ANSPs [air navigation service providers], and airlines to work together to optimise flights by sharing information on potential inefficiencies and delays on the runway and in the air, saving airlines from wasting unnecessary time and fuel burn."

"Collaboration between ANSPs and the military has also been a key focus since the pandemic," he notes. "Outstanding civil-military collaboration identified flexible solutions to the new security reality in Europe, ensuring an efficient balance between Security and Commercial interests and minimising the impact of airspace closures on civil air traffic flows. CANSO is focused on strengthening collaborations like these by engaging with organisations like NATO to determine how best to manage our airspace, ensure standards are harmonised, interoperability enhanced and facilitating the real time exchange of data and information between military and civil service providers."

A return to air routes that in some cases resemble those of the Cold War — when was the last time a Tokyo–London flight flew east over the United States? — is not the only political reality with which aviation must engage.

Montserrat Barriga, director general of the European Regions Airline Association, tells us that, "for some time, regional aviation has been finding itself at a crossroads between innovation and the political and public pressure to reduce passenger volumes."

To that end, the recent approval by the European Commission of France's bans on shorthaul flights where a train journey of less than two and a half hours exists means that some routes — Paris to Lyon for example — may only be sold as part of a connecting journey, and presently affects only flights from Paris to Nantes, Lyon and Bordeaux.

As a result, Barriga says, "the regional sector is finding itself justifying its very purpose of existence: providing connectivity."

With its typically shorter flights and often smaller aircraft, it is also serving as a testbed for new green technologies.

"Our members have embraced this full-heartedly, with many companies leading the way in future technologies that will achieve zero-emission aviation, such as manufacturers AURA AERO, ZeroAvia, Universal Hydrogen, and Heart Aerospace," Barriga tells us. "Hybrid electric technology is now being used today for test flights, with commercial use of electric or hybrid-electric passenger aircraft expected in the next decade. Additionally, SAF [more sustainable aviation fuel] is being used commercially, and synthetic jet fuel made from CO2 is currently being developed, which would use carbon captured from the air, making it carbon neutral. In June 2022, regional aircraft manufacturer ATR and Swedish airline Braathens Regional Airlines — both ERA members — collaborated to enable the first ever 100 per cent SAF-powered test flight on a commercial aircraft."

Collaboration and new ways of thinking are also vital

It is a rare week that goes by in aviation without multiple announcements where airline X or airframer Y is working with new fuel technology Z, or has agreed to purchase so many million litres of a more sustainable fuel. The trends from this collaboration remain fascinating to observe.

"One of the most significant positive changes that emerged during the pandemic and is continuing at pace, is that the whole of the aviation ecosystem collectively decided to work together on a sustainable future for aviation," CANSO's Simon Hocquard emphasises. "We recognise that we all need to improve the efficiency of aviation in the face of growing traditional traffic levels as well as the emergence of a high number of new airspace users, all requiring different services. This was the catalyst for CANSO creating the Complete Air Traffic System Global Council — an innovation forum with leaders from 70 global organisations including Airbus, Boeing, Wing and NASA, which recently launched its vision and roadmap for the skies of 2045."

"One of the key lessons learned during the pandemic," Hocquard observes, "was that those organisations that proved to be scalable on the downside of the traffic downturn didn't turn out to be scalable on the upside too. We must not lose sight of this. We need to develop a future airspace system that is fully scalable and that can flex up or down according to demand."

Developing this flexibility within an industry with a strong safety and regulatory background will be as complex as it will be critical. It will require a new way of thinking strategically about the industry and how it adjusts to externalities.

During the pandemic, NATS' Taylor says, "while I think businesses, airports, and the industry have had time to reflect, there has been a switch in reflection from managing today and firefighting, to actually having a chance to think about what they need for the future. With that new mindset — it may not be continuous growth forever, it may actually be booms and busts, it may be all sorts of things — I think businesses, airports, and airlines are trying to prepare themselves to be more flexible in future as well."

New technologies and processes steer ground operations as it accelerates out of the pandemic

What happens when your industry stops — almost overnight — and what's left is the sort of operation that you've almost never done before? That was the unprecedented experience of the ground handling sector during the height of the COVID-19 pandemic.

New technologies and processes steer ground operations as it accelerates out of the pandemic

As the industry accelerates into a new normal, we sat down with Fabio Gamba, director general of ground handler trade body the Airport Services Association, and with Guillaume Crozier, senior vice president for UAE cargo at dnata, to develop a real picture of the situation within the ground operations sector, and to learn from key developments since the start of the pandemic.

When COVID hit, Gamba tells us, “for two years, we couldn’t operate: we were barely operating at 20% of our previous capacity. And then suddenly, when all the bans [were lifted], we found ourselves with huge peaks in demand, and as much as we wished we could have anticipated things and we could have accommodated demands, we didn’t have the people — as simple as that.”

The staffing crisis has been a common theme throughout aviation, but in the ground handling sector where much activity was outsourced, and in some cases thus ineligible for aviation protection and recovery funding, this was particularly complex.

For ground handlers, Gamba says, “for the last two and a half years, the point of stress has been for them to keep their job. In Europe, I think up to 60% of them did lose their job. For a part of the time, they were on furlough schemes: most of the cases, their salary was being taken over by the state. That only applies to a majority of countries, but at the same time not everywhere, first, and second, not for the whole duration.”

Gamba highlights a key strategic risk to the ground handling industry: the way that the pandemic emphasised a certain lack of attractiveness of key on-the-apron jobs.

“I think the pandemic was a revelator of something more profound: the loss of the attraction of the sector to the people,” he explains. “I think with the new generations coming up, we’re becoming less and less attractive. It’s up to the sector to reinvent itself, to find a way to to really become attractive to these new generations. So, what are we talking about? We’re talking about, obviously, low salaries, difficult working conditions, and what have you.”

Aviation has always been cyclical, but the disruption from the way travel essentially ceased during the pandemic was more than that. “We’ve lost a lot of our skilled workforce to other sectors,” Gamba notes, “and that’s the first time that it really happened so quickly.”

Yet ground handlers still had to deliver skeleton services as cargo requirements changed dramatically: not only did online shopping boom but pandemic cargo delivery — all the way down to vaccine shipment — was all new to the industry.

“One of the big changes,” dnata’s Guillaume Crozier tells us, “was the delivering of volume: the number of passengers dropped and number of turnarounds dropped. Cargo really increased, interestingly, and that was one of the golden years for e-commerce. We did see a huge increase of volume — and also the processes have changed. PACO flights, passenger aircraft carrying cargo only, because of lack of belly capacity: we had to find other ways with our customers to actually carry cargo. New standard operating procedures, new training — that was definitely a big, big shift.”

New technologies and processes steer ground operations as it accelerates out of the pandemic

Ground handling technology and processes saw a major acceleration during COVID

To deal with this shift, many ground handlers sped up their development, adoption and maturation when it came to digitalising their businesses.

Crozier starts from the brass tacks: “recording is step one, then it’s about computing the data together. And then because you record the right data, because you have the right data touchpoints, and you compute all the data together in the right place — data warehouses and data infrastructure — then you can start thinking about semi-automation, potentially automation. And then you can potentially think about artificial intelligence, which triggers machine learning and then a PDCA [Plan Do Check Act] wave, which is quite basic, but very powerful. With all of this, you can really improve your processes and formally digitalise your business.”

Ground handlers use a variety of tools within this digitalisation toolkit. Modern turnaround applications timestamp every step, comparing it against pre-digital plans, service level agreements and creating a precision time schedule for analysis, revision, implementation and potential iteration.

On the tech side, Crozier says, “telematics is a big thing, because it is all about utilisation. You can imagine in a very volatile and uncertain environment, you want to make sure you really deploy your equipment, your resources, as you need, delivering the promises to the customer as per your vision, mission and values. Telematics is really useful to understand utilisation of ground service equipment. That was planned before, but we just accelerated the implementation during COVID.”

As one example, a cloud-based appointment and dock management system gives visibility and predictability to the approach of an incoming truck to the ground side of a cargo facility. For exports, this allows faster unloading, greater truck dock utilisation, and optimised preparation of ULDs (Unit Load Devices). For imports, knowing which trucks are arriving in what order means that ULDs can be unloaded for transshipment in the most efficient way.

Dnata also accelerated development of its trading portal, Calogi, in partnership with Kale Logistics Solutions. Initially launched in 2008 and aimed primarily to digitalise the cargo process for the SME market, the new Calogi enables real-time information sharing, as well as API integrations with both users’ own systems and other dnata platforms.

In some cases, integrating new hardware can be relatively simple, Crozier says, such as “equipping our ground service equipment with 360-degree cameras: we did that in the USA, for all the fleets to really increase the focus on safety, on awareness, and give us a very good opportunity to increase safety behaviour.”

But when it comes to hardware, “what we look for is something that is quite hardware-agnostic, where actually you can have multiple applications in the same hardware,” Crozier explains. “If not, it becomes very difficult for our staff to handle all the applications.”

On the software side, he notes, “we have a strong group with huge capability in terms of data infrastructure, in terms of data warehouse — working with Snowflake as we speak — and we have a lot of competent and skilled resource in terms of data scientists and enterprise analytics capability, which helps us to work on all of this.”

Yet even with the resource-multiplying benefits of a digitalised business and new technologies, sometimes the most powerful action that can be taken is to stop activity within an area of business, even one newly developed.

Crozier explains that dnata was among the first service providers with remote robotic UV sanitisation of aircraft, working with a Swiss startup. Airlines, he says, “wanted something safe, which could actually trigger the confidence again so everyone feels safe travelling.”

Yet, surprising many, UV cleaning did not take off in a meaningful way. “We realised this is not something that we could push further, so we parked it,” Crozier says frankly. “Sometimes you have very, very high momentum on something, with high profile requirements — we want to deliver the best to our customers for them to deliver on their promises.”

But, he explains: “we did that, it’s not working, we stopped it: if it’s not what the market wants — or the customer wants — any longer, then you stop it. What a learning curve from an innovation cultural viewpoint!”

Aviation faces strategic externalities as sustainability challenge grows

The future of aviation is a greener, more sustainable industry than ever before. But beyond the technical advances, what are the strategic issues facing the industry? We talked with Austrian Airlines, KLM and Professor Richard Anderson from Embry-Riddle Aeronautical University to get a feel for some of the big-picture discussions going on within aviation.

Aviation faces strategic externalities as sustainability challenge grows

“On the customer side,” Austrian Airlines’ Anna Pachinger tells us, “the biggest behavioral change might be in business travel. Since COVID-19 many companies question whether certain business trips are necessary or not. The reasoning is threefold: health, financial resources and ecologic impact are to be considered.”

As a result, she says, “in May this year [2022] we have introduced the possibility for our clients to buy sustainable aviation fuel [SAF] directly in the booking process and thus make their own ticket carbon neutral. Also, we have introduced initiatives to tackle food waste by introducing attractive on board and preorder services. Lastly, operational efficiency measures have [been] further developed. Changes such as the change to ejournals save tons of carbon dioxide due to reduced weight.”

Austrian Airlines’ pilots are also using flight profile optimisation tools to reduce both emissions and costs during operations.

At KLM, in addition to committing to a climate reduction path verified by the Science Based Targets initiative, the airline employees’ Sustainable Flight Challenge initiative expanded to 16 of its SkyTeam partners in 2022 and will continue in 2023.

“In addition,” Hedwig Sietsma, director for climate policy at KLM, tells us, “we have now introduced a standard SAF surcharge on tickets of 0.5% for flights departing from Amsterdam and it is possible for passengers to purchase an extra amount of SAF when booking.”

Fundamentally, says Sietsma, “digital innovations are very important — reporting, eco-piloting — and also operational decision support systems, but the biggest innovations are in aircraft, fuel and making our operation more efficient.”

External pressures mean that aviation needs to rethink its sustainability communications

“The social pressure on this subject and on us has increased significantly,” Sietsma tells us. “The COVID-19 pandemic has also given us time to reflect and conclude that sustainability is our license to operate. Throughout the airline industry you see that goals are being set, more and more responsibility is being taken and activities to reduce CO2 reduction step by step.”

A key topic of discussion — and no little external criticism, including with a prominent lawsuit in 2022 — has been the aviation industry’s use and planned use of climate offsetting, also known as carbon compensation.

“CO2 compensation is an important part of our climate action plan. Of course, our primary focus is on reducing CO2 emissions, but what cannot yet be compensated for can be compensated through reforestation,” Sietsma says. “However, we see increasing pressure — on communication — on reforestation as an instrument. We are following this and the discussions about greenwashing carefully because campaigners have voiced concerns and complaints about this.”

“At KLM,” Sietsma continues, “we’re committed to communicating with our stakeholders transparently and honestly about our approach to sustainability. It would certainly not be in our interests to misinform our customers. It’s our responsibility to make future travel as sustainable as possible and it’s just as important to be transparent about this. Despite believing our statements to be based on solid arguments, we think it is important to discuss this with them.”

This approach seems sensible and pragmatic. Customers and prospective customers, as well as regulators, governments and other stakeholders, want different information than they did previously. In many ways, this information is more detailed than before, and airlines need to meet these needs.

Referring back to the current greenwashing lawsuit, Sietsma explains, “we hope that a court ruling in this case will clarify how best to shape our communications policy.”

Aviation faces strategic externalities as sustainability challenge grows

Aviation is looking at a startup-consolidation period

During the pandemic, cash-flow issues meant that many existing organisations — from airframers to suppliers and throughout the industry value chain — tightened their R&D belts. At the same time, a new generation of startups developing solutions for more sustainable aviation, as well as many looking at the challenges of advanced air mobility and sub-regional flights, are coming to maturity.

Richard Anderson, professor of aerospace engineering at Embry-Riddle Aeronautical University, and previously the director of its flight test facility the Eagle Flight Research Center, calls it “the golden age of electric propulsion and sustainability in aviation.”

“You see literally hundreds of companies coming forward, moving quickly and nimbly, where the OEMs were hamstrung by cashflow issues, and so there’s a lot of interesting technology out there,” Anderson tells us. “There’s also a lot of stuff that won’t make it — out of 400 companies we’re going to see the necking down of the really good ideas, the ones that will carry through. I think that you’re seeing companies like Raytheon and Boeing… starting to really eye those companies and technologies to try and catch back up over that ‘loss of R&D’ period that was caused by the cash flow in the airline industry.”

To a certain extent, there is an ‘acquihire’ dynamic at work here too: for some of these technologies, aviation has not historically had either knowledge or experience here. For others there’s an argument that allowing more nimble startups to work essentially as mini-skunkworks operations for both the technology and the technologists.

But the R&D departments of the existing big players in the industry are also likely to be a major source of innovation, Anderson says, especially as thinking moves beyond the tube-with-wings model for fixed-wing aircraft.

“We’re in the third revolution — not an incremental step, but a revolution — of aircraft propulsion, where we start to fold electric propulsion into it. It might be hybrid at the smaller end, it might be battery electric, or combinations of all of those things. I think what you’re going to see is that the engine manufacturers will come up with novel designs that will then feed into the airframers designing completely different airframes around those.”

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