

# A SAFER JOURNEY:

## Leveraging New Technologies for Post-Pandemic Air Travel

The COVID-19 crisis has shaken the air travel industry to its core and will leave a long-lasting impact on the entire ecosystem. Central to this are airports, many of which have been operating with marginal revenue in the past months.

For all the chaos it has brought, the disruption has also presented an opportunity to create a more resilient, innovative, and passenger-centric industry. Airports worldwide have undertaken massive efforts to review existing procedures and practices and accelerate the adoption of better design and technology features. *Aerospace Singapore* examines the changes that are being anticipated in the post-pandemic air travel landscape and explores how Singapore's Changi Airport is preparing for recovery and the future.



Photo: Changi Airport Group

The COVID-19 pandemic has had a catastrophic and lasting impact on the aviation industry. With international border restrictions severely weakening air travel demand, the number of global passenger flights in 2020 was reduced to a fraction of the preceding year. So bad, in fact, that the International Air Transport Association (IATA) declared it "The Worst Year in History for Air Travel Demand", revealing that total international passenger demand in 2020 had tumbled by 75.6% compared to 2019.

### AN ABRUPT HALT

Just prior to the virus outbreak, the outlook for the global aviation industry was bright, and the world was preparing for a "new Golden Age" of air travel. The Asia Pacific region, in particular, experienced tremendous progress and was projected to lead air travel demand with rapid growth of new air passengers. In a bid to capture market share and bolster their positions as regional hubs, several terminal expansion and mega airport projects were announced. These included Hong Kong International

Airport's Three-Runway System, plans for a third runway at Japan's Narita airport, and multi-billion-dollar airport expansion projects in New Zealand's Auckland airport and Singapore's Changi airport.

By the end of 2020, however, air travel had been decimated and much of these plans upended. The sudden drop in air traffic had led to almost complete paralysis of both aeronautical and non-aeronautical revenues for airport operators. At the same time, associated costs have continued growing to cover precautionary measures, including enhanced cleaning and disinfection, temperature screening equipment, installation of safe-distancing and protective barriers at counters, as well as sensor-activated technologies. As a result, airports worldwide have had to close terminals, scale back operations, and defer other large investments and capital projects to contain costs.

Singapore's usually bustling Changi Airport was not spared. In the absence of a domestic market,

**QUARTERLY TOTAL AIRPORT REVENUES IN 2020 BY REGION:  
FORECASTED (PRE-COVID-19) VS. ESTIMATED UNDER (COVID-19) (MILLION USD)**

	Forecasted (pre-COVID-19)	Estimated under (COVID-19)	% Change
Africa	4,300	2,100	-51.2%
Asia-Pacific	49,900	20,500	-58.9%
Europe	59,300	22,200	-62.6%
Latin America-Caribbean	10,500	5,200	-50.5%
Middle East	13,200	6,200	-53.0%
North America	34,700	18,300	-47.3%
World	171,900	74,500	-56.7%

Source: Airport Council International

Changi's passenger traffic plunged from a record high of 68.3 million in 2019 to 11.8 million in 2020, a 82.7% decline year-on-year. When it became apparent that it would take a while for air travel to resume to pre-COVID-19 levels, the Changi Airport Group (CAG) moved to suspend operations at Terminal 2 and 4. This enabled the operator and its partners to save on running costs, such as utilities and cleaning. More importantly, it enabled the operator to optimise resources

across the airport's terminals to better match the lower passenger traffic and sustain operations for the longer run. The 1,080 hectares Changi East project – encompassing a new Terminal 5, a third runway, new cargo complexes and other supporting infrastructure – was also suspended for review.

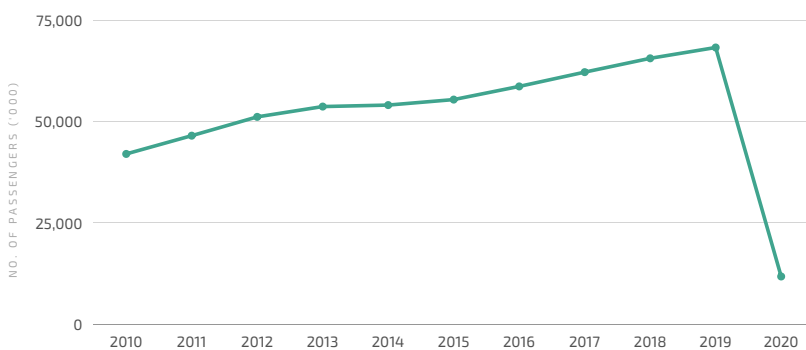
**AN EMERGING, CHANGED LANDSCAPE**

Even as they deal with a very fluid environment and adjust their operations to address the realities of pandemic-era travel, Changi and other airports will have to rethink their strategies as a new picture for air travel emerges. Several key trends are expected in the runway to recovery:

**Reduced Passenger Traffic**

Analysts are largely predicting that passenger volumes might never return to pre-COVID-19 levels. The business travel segment, for example, is expected to shrink as a result of the proliferation of remote working and the uptake of teleconferencing by executives worldwide. A study by Oliver Wyman in October 2020, found that 43% of all respondents who travel for business plan to travel less in the future. This was up from 27% in a

**YEARLY PASSENGER MOVEMENTS  
CHANGI AIRPORT  
2010-2020**



Source: Changi Airport Group



is also concerned about the health and safety of air travel and navigating the restrictions they will be subjected to. A November 2020 study by Inmarsat of some 10,000 frequent fliers found that 93% of airline passengers from the Asia Pacific region were not expecting to return to their previous travel routines once the COVID-19 pandemic is over. Globally, 31% of respondents indicated that they would travel less frequently by air and 55% were worried about catching the virus at the airport or on the plane.

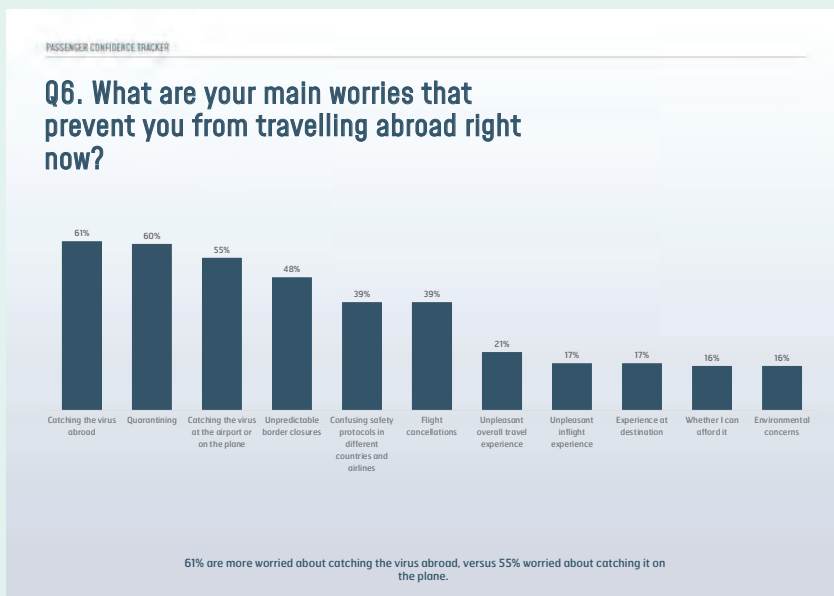
### Structural Changes

Airlines are also making profound, long-term decisions that will directly influence demand for airport services. This will involve, to a large extent, optimising their fleet and flight schedules. With a significant reduction in long haul and international flights, airlines have sent many aircraft, especially wide body types, to retirement or storage. This has resulted

similar survey performed in May that year – an indication that respondents were increasingly comfortable with remote working. Considering this, as well as other factors, such as an interest in reducing carbon footprint and cost cutting by businesses, the Global Business Travel Association estimated that worldwide spending on business travel would not recover to its pre-pandemic peak until 2025.

### Shifting Passenger Behaviour

Recreational travellers have also acquired new habits and behaviours during COVID-19. After more than a year of being cooped up at home, there is potential pent-up demand for air travel. However, the general populace



Source: Inmarsat Passenger Confidence Tracker report (November 2020)



in the reduction of the global aircraft fleet and a shift in the narrow body/widebody mix. Airlines have also trimmed their flight frequencies and routes significantly. It is estimated that about a third of global air routes have been wiped out since the start of the pandemic. Only 33,416 routes were on global schedules by November 2020 compared to 47,756 operational routes in January, according to OAG Aviation Worldwide. "It will take a good four or five years for connectivity to return to the same level we saw at the end of 2019," said Subhas Menon, director general of the Association of Asia

site. Ontario International in California, USA, operated a drive-in cinema in a parking lot for two months, while Edmonton International in Alberta, Canada, announced plans to open a 627-acre, 120-megawatt solar farm.

At the same time, airports are playing a significant role in restarting air travel, working together with other stakeholders to rebuild the confidence of passengers. In doing so, airport operators are embracing innovative solutions and leveraging on data, digitalisation, and new technologies, to mitigate health and safety risks and assure passengers that it is safe

to fly. Passenger experience is also being enhanced in various ways to make flying simpler, seamless, and more personalised.

#### MAKING AIR TRAVEL SAFER

Air travel in the post-pandemic era will be defined by attention to health and safety. Singapore's Minister for Transport Ong Ye Kung summed it

best in a speech in November 2020 on the future of travel and the need for reinvention. He said, "The outbreak of COVID-19 has not only accelerated the two driving forces of digitalisation and sustainability, it has also added a third – the need for health security, over and above physical security and comfort." Mr Ong further added, "Whoever can ensure visitors' health security in a faster and better way will gain a competitive advantage. Singapore recognises this and has every intention to be amongst

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Photo: Changi Airport Group

Pacific Airlines.

A smaller global fleet and reduced passenger traffic will impact airports not only in terms of proceeds from landing, parking, and other charges, but also airport retail and food and beverage revenue streams. As they await a rebound, some airports have sought alternate ways to generate revenues. Changi, for example, has been actively encouraging stay-at-home Singaporeans to shop tax-free at its struggling retailers via the iShopChangi





Photo: Changi Airport Group (2017)

the leading lights in this area. If we are able to build and operationalise these capabilities, it will set us apart from the competition.”

#### **Health, Safety & Security Protocols**

Towards this end, Singapore has put in place safe travel protocols, which involves combining pre-departure Polymerase Chain Reaction (PCR) tests, with on-arrival and periodic antigen tests. Changi Airport opened a new Covid-19 testing lab in early 2021, which will enable incoming passengers to undergo necessary tests right after they disembark and clear arrival immigration. The lab uses a test kit that shortens the time needed for results from 2.5 hours to 1.5 hours. CAG has also developed the Safe Travel Concierge prototype, which is an online tool that provides travellers with a customised travel

checklist for pre-entry requirements that they need to fulfil before entering Singapore.

Establishing secure solutions to verify the health credentials of travellers will be critical in facilitating smooth air travel and safeguarding public health. From 1 May 2021, passengers traveling to Singapore will be able to use IATA’s Travel Pass to share their pre-departure COVID-19 PCR test results upon check-in with their airline, as well as on-arrival at the immigration checkpoints at Changi Airport. The IATA Travel Pass is a personal secure digital wallet solution that can be used by passengers to obtain and store their COVID-19 test results from accredited laboratories. The information presented on the IATA Travel Pass will be in a format that satisfies Singapore’s prevailing

COVID-19 pre-departure test requirements for entry into Singapore.

#### **Seamless and contactless passenger experience**

Creating a seamless and contactless experience has been widely discussed as being vitally important to getting the industry back on its feet and encouraging people to fly. The goal is to enable air travel passengers to move through the whole process of check-in to boarding a plane without touching a single surface.

Changi has had a headstart in this aspect. When it opened in late 2017, Terminal 4 introduced a fully automated departure process for passengers. Through its Fast and Seamless Travel (FAST) system which leverages facial recognition and biometric technology, passengers can print their own boarding passes and bag tags, and drop their bags at an automated bag drop machine. The FAST process also allows for immigration verification to be fully automated via fingerprint and facial data, without the need for manual verification by the officers. At the boarding gate, passengers who have used the automated immigration gate can simply scan their boarding pass at the boarding gate and authenticate their identity with the facial recognition system.

Taking this further, CAG will be rolling out enhancements to convert surfaces with high touchpoints to non-touch surfaces. More than 160 automated kiosks at Changi Airport will be fitted with proximity touch screens, with infrared sensors to track finger movements. Passengers just need to hover their fingers above the screens for a contactless check-in and bag-drop process.

Auto-clearance immigration

lanes will also be upgraded with a new biometric system that uses iris recognition technology, replacing the need for traditional fingerprint-scanning. At these lanes, passengers who have enrolled their iris and facial biometrics will be prompted to look into the iris and facial scan cameras after scanning their passport, for identity verification.

### **Ensuring a Clean, Sanitised Facility**

CAG is also utilising technology to clean and disinfect the airport grounds. For instance, autonomous cleaning robots in the terminals have been upgraded with a nozzle that sprays a light disinfecting mist for added protection on carpets and floors during cleaning. CAG is also testing the use of ultraviolet-C (UV-C) LEDs to disinfect the handrails of escalators and travelators in a safe way. A trial is also being conducted on the use of contactless infrared technology for passenger lifts, where travellers just need to hover their finger over the lift button to activate it.

Such new contactless and cleaning innovations build on previously introduced precautionary measures against Covid-19. These include temperature screening at key points, safe distancing, use of masks by all passengers and staff, vaccination of all airport personnel, widespread introduction of sensor-activated “auto” hand sanitisers and the use of a longlasting antimicrobial spray on frequently touched surfaces.

### **HOPE ON THE HORIZON**

The successful development and global distribution of vaccines in recent months has brought hope for an end to the pandemic, and the eventual recovery of aviation. In preparing for the restart of air travel, airports play a critical role and must be adequately prepared to deliver high standards of health security, safety and hygiene to entice passengers to take to the skies again.

To further boost confidence in flying, stakeholders across the globe must find ways to work together to

harmonise procedures and processes for passengers. Clearer information about border restrictions, standardised practices across all airlines and a consistent worldwide set of safety standards are particular areas for improvement that can give passengers peace of mind.

Even as it goes through the darkest storm, the aviation industry remembers how it has overcome many crises before, such as SARS, 9/11, and the global financial crisis. While the landscape might change, the long-term prospects for air travel remains positive. With the right innovations in place, we can all look forward to better seamlessness, safety and security as we go into a new normal for air travel.

### **TRAVELLING TO SINGAPORE?**

Here are the health protocols to note:

**U**pon arrival in Singapore, you will have to present all the necessary documents such as a valid Safe Travel Pass, a negative PCR test result (taken 72 hours before departure to Singapore), a return air ticket and a valid visa (if applicable) to arrival immigration.

Apart from children aged 3 and below, it is mandatory for all arriving passengers to take a post-arrival Covid-19 PCR test at Changi Airport. You must book and make payment for this the Covid-19 PCR test on [safetravel.changiairport.com](https://safetravel.changiairport.com) before you arrive in Singapore. You will be guided by airport staff to the testing site.

Travellers from very high-risk countries/regions must undergo on-arrival Antigen Rapid Tests (ART), on top of PCR tests.

Source: Changi Airport Group (The information provided is correct at the time of printing.)



Autonomous cleaning robots used in Changi Airport's terminals have been equipped with a misting attachment that disinfects the carpets immediately after cleaning. Photo: Changi Airport Group