Safely Navigating the Industry Recovery

Considerations for Navigating the Restart and Recovery of Air Traffic

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1.   Background

The operational and financial impact of COVID-19 on the aviation industry is unprecedented. Air travel worldwide almost entirely stopped in April 2020. With air travellers regaining confidence and travel restrictions being eased, the aviation industry is seeing varying and changing traffic levels that are introducing new patterns of activity across the aviation supply chain. The operating and working environments continue to adapt to different factors, from uncertainty related to flight schedules to changing procedures and requirements imposed by governments and regulators. While domestic air travel has recovered to around 65% of pre-crisis levels, international air travel is still down approximately 70% due to travel restrictions. Furthermore, profiles for traffic recovery vary dramatically by region and country.

To better understand the operational impacts of COVID-19 and the challenges that can be faced by airlines and air navigation service providers (ANSPs), the Civil Air Navigation Services Organisation (CANSO), the International Federation of Air Traffic Controllers' Associations (IFATCA), the International Federation of Air Line Pilots' Associations (IFALPA) and the International Air Transport Association (IATA) started an initiative in 2020. The initiative included collaborative safety risk assessments (SRAs) in the context of the COVID-19 environment. The SRAs were used to shape educational webinars that were organized with experts representing the different organizations. This document captures the outcomes of the SRAs and webinars in 2020 and 2021 and provides general considerations for airlines, ANSPs and airports during restart and recovery to normal traffic levels.

2.   COVID-19 and Risk Landscape

Several organizations continue to develop scenarios for recovery of air traffic based on when international borders will open and how travel restrictions will be eased. However, with the resurgence of COVID-19 variants in some regions, there remains uncertainty over how soon international traffic will recover despite the roll out of vaccinations. The exact path (depth, length and shape) of recovery will depend upon various factors, such as the duration of outbreak waves, government protocols, passenger confidence, and economic conditions. While international air traffic remains at low levels, domestic traffic is trending up, but with different profiles depending on the region.

Even with the unrolling of travel restrictions, full recovery of international air travel will take time, and the aviation industry will operate in a very different environment than pre-COVID-19. Uncertainty in terms of travel demand will continue to challenge airlines' ability to accurately plan long term schedules. However, based on trend information, there are instances of traffic spikes after prolonged periods of low traffic, motivated by a substantial surge in demand when travel restrictions are eased in a location. At the same time, constantly changing health measures and testing requirements continue to impact the flying public and operational staff, specifically flight crews. Requirements to ensure the biosafety and health of passengers, crews, and staff add uncertainty to aircraft ground time and impact overall network performance. Additionally, changing conditions at airports, e.g., the high number of parked aircraft that need return to service maintenance, will continue to impact operations. All these factors coupled with the interactions and connections between airlines, the aviation supply chain, and the flying public, have resulted in a different risk landscape, and have introduced new operational challenges that may amplify existing safety hazards.

The disruption in the aviation supply chain caused by COVID-19 highlighted the importance of effective risk management. Therefore, it is important for the different stakeholders across the aviation supply chain to continue reviewing and updating their local risk assessments to address the dynamic operational changes throughout restart and recovery of operations to normal levels.

3.   Considerations for Restarting Operations

3.1 Human Factors during Restart

As a result of COVID-19, the psychosocial climate in ANSPs and airline operators has been highly influenced by concerns about job uncertainty. These concerns have increased the levels of anxiety and stress among staff of airlines, ANSPs and the whole aviation supply chain. Increased levels of anxiety and stress could potentially negatively impact the psychosocial climate in both operational and non-operational functions, which can influence safety critical functions such as air traffic control and aircraft dispatch.

In addition, new stakeholders are now part of operational decision making and tactical strategies, e.g., health authorities. This has led to new interactions, new system interdependencies and additional levels of coordination. New dimensions to operational decision making may limit the degrees of freedom in tactical strategies. Changes in staffing levels and working patterns can have an impact on operational staff and negatively impact system capacity.

Peer support programs provide a useful tool in these conditions. These programs provide confidential peer-based support and assistance where an aviation worker can discuss the challenges that they are facing with someone who understands their context. Often, such a discussion is sufficient for the worker to address the challenges, however the programs also act as a gateway to other resources should they be needed.

Increasing Levels of Stress, Anxiety and External Distractions Affecting Human Performance

With all the changes brought to industries, economies, and societies at the start of the outbreak of COVID-19 in 2020, keeping track of how the pandemic is affecting organizations and individuals proved to be overwhelming. Because of COVID-19, external stressors and sources of anxiety were significantly higher, for example family situation, local economy, etc. In regions that are still not able to contain the outbreak of the new variants, the emotional and psychological impact of such distractions can lead to a human factors dimension on staff carrying out safety critical as well as non-safety functions. Organizations need to maintain a collaborative work environment that can address the consequences of the uncertainty and anxieties.

Corporate wellbeing and mental health programs which contribute to a supportive psychosocial climate offer many tangible and intangible benefits to both the employees and the organization, especially during periods of dynamic change. A corporate level approach continues to be needed to sustain or create a psychosocial climate that supports human factors challenges that aviation operational staff could face. As the industry recovers from an unprecedented global crisis, empathy will be key for a safe restart of the aviation industry.

As air traffic volume increases, ATCOs and airline operational staff (dispatchers and crews) will experience sustained pressure to maintain on time performance in a new and continuously changing operational environment. Turnaround times are expected to increase due to additional safety and health measures associated with COVID-19 operations. However, there could be many factors and unknowns impacting operational performance, from additional ground time at a stop, to reductions in airport capacity due to parked aircraft.

COVID Additional Mitigations
Perform risk assessments, taking into account pandemic impacts of human performance.
Make available or extend appropriate resources and tools to minimize the mental health impact of COVID-19.
Educate operational staff on fitness for duty, self-care, and the availability of support programs.
Where required, establish a fit for duty policy.
Raise awareness among leadership and management to support wellbeing for aviation personnel.
Ensure sufficient safety promotion.
Ensure dynamic shift and breaks/holiday scheduling to ensure physical and mental well-being.

Continued Change in Health and Operational Environment

The financial impact of COVID-19 on airlines and the aviation supply chain drove many companies and organizations to implement cost cutting measures. Most of these measures included reduction in staff, whether in the form of staff furlough or early retirements. In addition to this having a negative impact on staff morale, it has changed the working environment for crews, ATCOs and dispatchers.

The loss of senior staff has an impact on corporate and operational memory, as well as the re-distribution of work among personnel on a shift. It also has an impact on the composition of the teams. Loss of experienced staff or "go-to" colleagues can impact the level of service or performance as well as other team members who lost not only a colleague but a mentor or a reference.

To ensure that a diversity of expertise is constituted during restart of operations, organizations may wish to consider shift rotations of ATCOs or dispatchers that consider balancing experience and skillsets. In cases where there can be a potential impact on service level, some operational measures may be applied as a mitigation.

In different regions, local regulation is still requiring crews and other aviation professionals to wear masks while working operational positions. Removal of health protocols, like the requirement for proof of negative COVID-19 test result, or social distancing will most likely be done in phases and may not be aligned between regions. This will be particularly challenging for dispatchers to keep track of all requirements and for air crews to ensure compliance with different and changing protocols. Additionally, aviation professionals have not been able to socialize and connect with each other or with people in their social circles as they did before COVID-19. This has affected the dynamic of teams as well as the morale of individuals.

As air traffic levels and complexity trend upwards, maintaining cognitive engagement will be required in all safety critical functions. Organizations should recognize that many individuals may have adjusted to lifestyle changes and developed new habits since the outbreak of the pandemic. Therefore, pre-COVID-19 work patterns, assumptions and expectations may no longer be viable in the new normal. New dimensions to operational decision-making may limit the degrees of freedom in tactical strategies. Changes in staffing levels and working patterns can have an impact on operational staff and potentially negatively impact system capacity.

COVID Additional Mitigations
Increase frequency of internal briefings and communications to ensure that all aviation professionals are aware of changes in health protocols.
Increase awareness and understanding of challenges other stakeholders are facing (upstream or downstream the aviation supply chain).
Create a positive safety culture through the promotion of personal well-being and public safety.
Raise awareness among leadership and management to support well-being among aviation personnel, e.g. by encouraging empathy during performance reviews.
Implement adaptive supervision in harmony with the dynamic operations.
Continue to offer existing mental well-being resources.
Foster Crew Resource Management (CRM) and Team Resource Management (TRM).

Pandemic Fatigue

After a prolonged period of dealing with the COVID-19 pandemic and all its consequences, including the government measures such as lockdowns and restrictions on social gatherings, there are emerging signs of demotivation to follow recommended protective behaviors, which the World Health Organization (WHO) has characterized as pandemic fatigue. In an aviation operational context, demotivation to follow health requirements and policies may result in an outbreak among staff which can have a potential impact on operations. The pandemic fatigue experienced by some professionals may not be well perceived by their colleagues who are still motivated to follow the policies, which can lead to reduced morale and can impact the work environment.

Additionally, there has been an upsurge in unruly passenger behavior mainly due to the requirement to wear masks, which adds to the stress and anxiety that crews are encountering due to COVID-19. Therefore, organizations should develop strategies to maintain and reinvigorate both passengers and aviation professional's support of health protocols.

COVID Additional Mitigations
Conduct continuous review and adaptation of policies and procedures, especially with the vaccine roll-out.
Encourage the involvement of aviation professionals when reviewing policies and procedures, so they can fully understand the requirements and feel that they are part of the solution.
Lead by example (modelling of best practices).
Re-enforce mutual accountability.
Exercise empathy and strive to understand why people may have lost their motivation.

3.2 Maintaining Competency and Training throughout COVID

At the beginning of the COVID global crisis, the ripple effect of lockdown measures and closing of borders led to reduced levels of traffic, inaccessibility of training facilities (such as simulators), and the suspension of medical checks that were not considered urgent. In 2020, alleviation measures including the extension of license validities were offered. Those alleviations were established as interim measures to support continued operations during the initial stages of the pandemic. As a result, licenses and recurrent training were extended by regulators, and alternatives to in classroom training were used. The COVID-19 Contingency Related Differences (CCRD) system was created by the International Civil Aviation Organization (ICAO) to capture any differences from ICAO Standards on certification and licensing that arose from mitigation measures undertaken during the pandemic. However, ICAO has requested that States plan to implement measures to mitigate the risks associated with prolonged regulatory alleviations. To avoid extending alleviations beyond 31 March 2021, States seeking alternative actions to enable service providers and personnel to maintain the validity of their certificates, licenses, and other approvals during the COVID-19 pandemic have been using the Targeted Exemptions (TE) system which was put in place on 1 April 2021.

Long periods of low traffic throughout 2020 and well into 2021 have led to prolonged periods of ATCOs not handling pre-COVID levels and complexities of air traffic, posing a risk of degradation of skills.

Unpredictable traffic levels and sporadic operations combined with changes to workforce

Due to COVID-19, the working environment continues to adapt to the variations in traffic levels, new operating procedures, and different impacts on operational staff. The requirements for physical distancing and rostering constraints have impacted the rotation and scheduling of staff. As traffic levels and complexities continue to be dynamic, bringing back ATCOs, pilots and dispatchers who have experienced prolonged absences can require additional attention to training and competency levels. This will be particularly important in cases where ATCOs and dispatchers have been exposed to limited traffic levels and flights, resulting in a potential risk of degradation of both technical and non-technical skills. The combination of different factors and measures due to COVID-19 need to be considered when assessing the local impacts on operational staff.

After an extended period away from the flight deck, pilots are often surprised by what knowledge and skills have been retained and which have degraded. Some skills return quickly while others return and develop more slowly. Experience indicates that often skills such as general procedural knowledge and manual aircraft handling are retained better or quickly regained while some areas of non-technical skills such as workload management tend to return at a slower rate. One area that is sometimes overlooked is the degradation in the use of standard phraseology. Therefore, it is critical that both pilots and ATCOs maintain diligence in regard to standard phraseology and correct procedural language.

COVID Additional Mitigations
Design an organizational response to different levels of staffing, including a strategy for staffing and training for different levels of traffic build-up.
Implement incremental return to service plans that considers possible spikes in traffic levels.
Enhance return-to-work procedures, including additional training/briefings.
Encourage operational staff to practice threat and error management.
Emphasise the importance of preparation before a flight or shift and not rushing through any procedure

Challenges related to Recurrent Training, Re-validation, and OJT

Due to the lockdown measures that have been imposed in many jurisdictions in 2020, access to training facilities was limited in some cases This has limited the access of staff and trainers to simulators. Where needed, staff training, and validation were postponed. The postponement of training and validation worked as a short-term solution to the challenge. In addition, many medical checks that were considered low priority were delayed.

Due to the environment that COVID-19 created, operational staff may be a mix of qualified and current, qualified following extended breaks (requiring re-training and checking), and/or not current with no recent experience in specific operational environments. Therefore, a "one size fits all" solution is not viable. At the same time, while each type of operation must address its unique risks related to potential skills' decay, consideration should be made to how risks may affect adjacent operations. In that context, there needs to be a balance between individual cases and addressing **s**afety issue**s** across the different domains in a concerted manner to successfully manage the risk factors**.**

At the same time, the requirements for physical distancing reduced the ability to continue with On-the-Job Training (OJT) and reduced the effectiveness of re-validation of dispatchers, ATCOs and FISOs. For example, physical distancing requirements limited "over the shoulder" assessments. At the same time, lower traffic levels throughout 2020 have reduced the overall effectiveness of OJT. Due to these new elements affecting training and validation, skill degradation may go un-noticed, resulting in the potential risk of drifting from standard procedures. Skills that are usually acquired or emphasized during OJT can be reduced.

With prolonged periods of low traffic and handling of only nominal situations, there is a risk of reduced 'edge' in handling contingency situations as operations restart. In addition, the pre-COVID 'what-if' scenarios for emergencies may not be applicable post-COVID. Airlines and ANSPs will need to re-visit their risk assessment and emergency plans to ensure that they are fit for purpose. New or modified contingency plans will need to be communicated and rehearsed to reinforce contingency response procedures.

COVID Additional Mitigations
Where possible combine simulator (SIM) and OJT for ATCOs
Include simulator training with higher and more complex traffic levels situations.
Increase the frequency of post-operational reviews using recordings and increase revalidation frequency.
Increase performance check periodicity for ATCOs when necessary**.**
Increase supervision in situations of increased workload.
Provide staff with additional briefings to prepare for different traffic levels, new operations, new requirements.
Allow for specifics when designing and delivering training (one size does not fit all).
For pilots, plan and provide additional training while retaining the normal checking pattern.
Communicate new or modified contingency procedures.
Provide additional contingency training and rehearsals as required to reinforce required skills.

The following resources are available to support maintaining training and competency during COVID:

- [Guidance for Post-COVID Restart of Operations: CBTA Training Solutions - IATA](#)
- [Guidance for Managing Pilot Training and Licensing During COVID-19 Operations - IATA](#)
- [White Paper - ATO-AOC Partnership Including Instructor Provisioning - IATA](#)
- [White Paper - Ensuring the quality of training when classroom instruction is delivered via virtual classroom - IATA](#)
- [Training Considerations for Return to Operations - IFALPA](#)
- [Return to Flying Checklist for Pilots - IFALPA](#)
- [Coping with COVID-19 Guide - IFATCA](#)
- [Returning to Normal Crew Training - ICAO](#)

Changes in the Training Environment

The socio-economic impacts of COVID-19 will most probably introduce changes that will exist beyond the pandemic. The working environment continues to evolve. At the same time, learners, as well as learning expectations have changed. Therefore, falling back to pre-pandemic training approaches may not adequately meet the needs of the present (and the future).

With the anticipated increased dependency on automation, exploring tools such as combinations of Augmented Reality (AR) and Virtual Reality (VR) in recurrent training may serve the industry in maintaining competency beyond COVID-19. The use of gamification to prepare and train for certain contingency scenarios may ensure the availability of skills needed to handle contingency situations. Some ANSPs are looking into various technology solutions and different ways of working that allows remote learning. At the same time, several organizations and parts of the industry are investigating advanced technologies like artificial intelligence, digital twins and gaming theory to support learning progression and learners' profile diversity.

The expanded application of Competency-Based Training and Assessment (CBTA) to different operational functions can ensure performance-based training programs, and continuous monitoring and evaluation. Under CBTA, the training system performance is measured and evaluated through a feedback process that uses training metrics.

Adapting training post COVID-19 will require additional work and research with training organizations and regulators to develop a training framework that is fit for the "new normal" and makes effective use of the most recent developments in technology and training methodologies. A revised training framework will most probably combine different layers of virtual modules, in-classroom and simulator sessions, and apply CBTA principles.

4.   Considerations for Recovery

4.1 Occupational Health and Safety

Impact of varying government requirements for testing and other health measures

Given the high complexity of the current public health crisis, States are applying different mitigation measures to manage public health risks. The varying measures are affecting the aviation system in different ways. Varying testing requirements may affect how operational staff are assessed as infectious or not. In addition, because of the varying requirements, crews are sometimes subject to testing pre-departure, post arrival at the destination, and upon return to home base. A crew member may be subject to COVID testing 6-10 times/month.

Applying a distinction between crews and the flying public when imposing measures before or after a duty will facilitate the continued operation of aircraft. ICAO's Manual (Doc 10152) recommends States to recognize crew members as essential personnel. ICAO has also established a minimum dataset for testing certificates to facilitate States' recognition and harmonization of their use for air travel. Mutual recognition of tests can minimize the operational and psychological burden and time spent on complying with the different requirements for crews.

From a human factors' perspective, false positive testing can have negative impacts on operational staff, especially on crews operating international flights. Growing stigma and fear associated with positive tests may negatively affect operational staff. Furthermore, PCR tests can remain positive for weeks to months post infection in some cases. Some authorities do not recommend additional PCR tests within a 90-day period of confirmation of diagnosis. Antigen tests may be considered to differentiate current infection from past/recovered infections.

Vaccination can reduce the likelihood and severity of COVID-19 positive cases and serve as a protective measure for individuals. Organizations should develop return to work policies post COVID-19, particular for staff who have had tested positive. Such policies should be developed following vaccination as well.

COVID Additional Mitigations
Encourage mutual acceptance of tests and other health measures as they are rolled out. This could be achieved through the implementation of Public Health Corridors (PHCs) for mutual recognition of public health mitigation measures management of cross border health risks
Apply ICAO recommendations for testing and vaccinations, reflected in ICAO Doc 10152, (link).
Conduct local risk assessments taking into account global best practices.
Ensure that ICAO's CART guidance and ICAO's Doc 10152 are taken into consideration when developing national recovery plans.
Continually review corporate guidelines and return to work policies.

Challenges Associated with Managing Mixed Workforce

It is expected that a multi-layered risk assessment approach will continue to be used for the flying public as well as for operational staff. While some governments have issued vaccine mandates, others have not, however vaccination remains highly recommended by health authorities and encouraged. Therefore, the workforce in a given organization may include a mix of vaccinated and non-vaccinated staff. This means that requirements for wearing masks, contact tracing, testing, and physical distancing, will continue for some time. This may also have an impact on staff rostering and corporate policies for health measures, applied even to vaccinated staff. At the same time there may be misconceptions about the efficacy of immunity once a person is vaccinated. Therefore, one should use constant communication and training to ensure a good understanding among operational staff about residual risks post vaccination and when returning to work. Additionally, regular risk assessment will be needed to evaluate the effectiveness of the multi-layered defense against infection outbreaks, to avoid operational interruptions caused by outbreaks among staff.

COVID Additional Mitigations
Base decisions related to relaxation of health measures should be based on data and recommendations by public health authorities.
Conduct regular local risk assessments to identify additional mitigation measures that may be required.
Consider ICAO's CART guidance when developing national recovery plans.

Long-term health Impacts of COVID-19 Infection

The extent of COVID-19 effects on cognitive abilities remains undetermined. However, preliminary indicators for a percentage of people who have been infected include a loss of taste and smell, loss of concentration and fatigue. There may also be possible risks around reduced lung function post COVID-19 infection. This will require stakeholders across the aviation system to constantly review guidance for their operational staff and return to work policies post infection, as new scientific evidence becomes available and is updated.

The psychological impacts of COVID-19 infections remain critical. As the aviation industry navigates the different complexities and risks of recovering operations, mental wellbeing should be at the core of all strategies. Continued support will be needed for aviation staff across the system and at various levels. One recurring issue for air crews is having to quarantine away from home. Fatigue associated with COVID, feeling of isolation, as well as quarantine conditions in some States may negatively impact crew's mental health.

COVID Additional Mitigations
Monitor new scientific evidence as it becomes available with regards to long term effects of COVID infections and update corporate policies, specifically return to work policies post infection.
Establish minimum conditions for quarantine away from home to ensure physical and mental wellbeing of crews. Reference : ICAO EB 20/36, Section 10.
Conduct local risk assessments taking into account global best practices.
Reinforce "Fit to work" self-assessment.

4.2 Change and Organization Management

The aviation system includes multiple layers of processes, technologies, and people all working together according to global standards that are based on over 100 years of flying experience. The system is complex and includes many actors along the different phases of flight. It takes all processes, technologies, and people to work together to ensure that a flight can safely take-off and arrive at its destination. COVID-19 has disrupted many established procedures across the aviation supply chain, necessitating flexibility and increased awareness.

The pandemic is not only affecting air transportation but also sectors that depend on air transport in their distribution channels.

Additionally, up to 46 million jobs are at risk globally, which is more than half of the 87.7 million jobs supported by aviation in normal times, according to the Air Transport Action Group (ATAG). Prior to COVID-19, the industry was forecasting a severe shortage in aviation skilled professionals, including pilots and air traffic controllers. If air traffic does not recover to 2019 levels by 2024, and the aviation industry continues to bleed and lose expertise along the way, then the industry's future resilience and sustainability are at risk.

However, dire times call for advancements and innovation to ensure survivability. With the outbreak of COVID-19, demand soared for medical and personal protective equipment. Ventilators, face masks, gloves and disinfectants became scarce commodities. When space in the belly of passenger aircraft was not sufficient, airlines were innovative in finding additional cargo capacity. Some airlines and airports found new ways to upgrade 'paperless travel' to 'contactless travel' to allow passengers to check in, drop their bags off and board their flight without coming in contact with another person or kiosk. Airlines are exploring how to use touchless biometrics, self-service, automation, and mobile devices in their future service offering. However, such digital applications bring with them new challenges.

Reduction of Availability of Safety Staff to Support Increase of Operations

At the start of COVID-19, ANSPs across the regions tried to balance the drop in movement levels with reduced staffing while continuing to deliver safe Air Traffic Services (ATS). As air traffic levels start recovering to pre-COVID levels, various new challenges come into play, primarily those related to availability of operational staff to support increasing levels and complexities of operations. While staff redundancy measures for ANSPs affected mostly non-operational staff, airlines and airports had a different experience. Reductions in staff affected pilots, dispatchers, and ground crews (at varying levels). Irrespective of the decisions that are made when it comes to workforce, it is imperative that safety accountabilities and appropriate safety governance are maintained during and post COVID. This includes identifying and addressing potential risks in a timely manner and ensuring that there is no drift from the organization's safety culture.

COVID Additional Mitigations
Carry out a prioritization exercise to refine critical SPI's (as needed) in coordination with the national aviation authority.
Strengthen regulatory oversight and internal SMS.
Post any workforce related decision, review hierarchy (reporting lines) to ensure effectiveness.
Review and address drift from SOPs on an on-going basis.
Ensure constant management communication to re-enforce safety focus and empowerment of safety leaders within the organization.
Conduct refresher/awareness training where required.

Established Baselines are no Longer Indicative of the Operational Environment

The 'new normal' created by COVID-19 is challenging some of the assumptions regarding how many functions of the supply chain are carried out. One pillar is demand forecast accuracy. Traffic forecasts drive planning functions of airlines, airports, ANSPs, aircraft manufacturers. Due to COVID-19 impacts, economic outlook forecasts have been changing, at times from one week to the other. At the same time, passengers have been booking flights much later than in previous years. The changing consumer sentiment and purchasing behaviours may endure beyond the pandemic.

Airlines, ANSPs, and other stakeholders in the aviation supply chain may face difficulty in resource planning and staff/crew scheduling. Some organizations are trying to rehire staff made redundant in 2020, but some of the workforce that left the industry moved on to other roles and other sectors. Some markets have experienced a, a mismatch between available resources and capacity and this could continue as demand returns faster than had been expected. Airlines and the aviation supply chain will need to adapt and be agile, where possible, to ensure a safe operation during recovery to normal traffic levels.

Under these circumstances, ensuring safety and maintaining efficiency across the aviation supply chain will depend on re-thinking some of the current and future requirements and the available capacity. Close collaboration among the different actors across the supply chain will be even more critical during and after recovery.

COVID Additional Mitigations
Apply flexibility in planning operations and scheduling staff.
Carry out regular assessments of dynamic changes and prepare for the changes that will remain in the system beyond recovery
Provide additional supervision during unanticipated traffic peaks.
Enhance risk management systems to better predict disruptions and prepare for them.

Over Reliance on Automation in the 'New Normal'

In the COVID-19 operational environment, technology trends became the new normal. Remote and virtual training tools and capabilities were more widely used than in pre-COVID times. COVID-19 also has increased the urgency to use robotics and unmanned technology because of mobility restrictions and the need for "touchless" processes. Demand for remote access to critical assets, whether for security, inspection or disinfection, increased because of the pandemic. However, an unbalanced reliance on technology in safety critical tasks may result in negative outcomes. This is especially the case as traffic starts ramping up again while operational staff may not have been using parts of their cognitive functions that are normally applied in their jobs.

On the other hand, the industry is presented with an opportunity to explore transformation and enhancing performance through digitization and automation. For example, exploring tools such as combinations of Augmented Reality (AR) and Virtual Reality (VR) in recurrent training could serve the industry in maintaining competency beyond COVID-19. The use of gaming type platforms to prepare and train for certain contingency scenarios could ensure the availability of skills needed to handle contingency situations.

COVID Additional Mitigations
Ensure proper roll-out of refresher training (include OJT) as traffic ramps up.
Carry out an operational and safety performance assessment against set KPIs/SPIs with a focus on areas that had reliance on automation since the outbreak of the pandemic.
Leverage data analytics and current risk assessments to identify system vulnerabilities.

Overwhelming Rapid and Dynamic Changes to the Operational Environment

Recovery is expected to be characterized by constantly fluctuating variables, such as traffic and new travel requirements, economic uncertainty, rushed implementation timeframes, and limited time to take resources or equipment out of operations, e.g. for training or maintenance respectively. This may reduce the bandwidth for an organization to quickly adapt and the ability for management to think on its feet. During recovery Collaborative Decision Making (CDM) will be essential to ensure effective response to changes in the operating environment.

COVID Additional Mitigations
Quantify and foster the skill of effective dynamic bi-directional communication.
Develop the capability to "Read the room".
Balance the composition of shifts/crews based on levels of proficiency and experience.

4.3 Pilot-ATCO Interface during Recovery

The impacts of COVID-19 extend to the interface, communication, and operating environment between flight crews and ATCOs. Several considerations need to be made with regards to the effects of training and recency and human factors on both flight crews and ATCOs as they interact with each other. In addition, varying traffic levels after periods of reduced operations could increase the magnitude of certain operational challenges for both airlines and ANSPs. The combination of new and amplified risks and challenges can affect safety of operations as traffic levels build up.

As airlines and the aviation supply chain actors work together on restarting operations, it is expected that we will continue having varying traffic levels, changing conditions at airports, and interactions between the flight crews and air traffic control that are not necessarily covered by existing procedures and phraseology. Therefore, it will be critical to understand the stressors and challenges on both sides. For example, the flight crew might be looking for a more efficient route but ATCOs may not be able to accommodate such request coming from the crew. Trying to meet expectations, at a time when there are additional or new capacity constraints because of the new operating environment, may create additional stress between crews and ATCOs.

Flight Crew - ATCO communication

Coming back to operation in the new environment, there is a risk that flight crews may have diminished familiarity with phraseology or may have forgotten specific requirements for a given airspace, for example oceanic clearances or some aspects of emergency procedures. There is also a risk of reduced familiarity with certain procedures.

As air traffic ramps up, it is important for flight crews and ATCOs to take time to make sure that they understand each other, and that any ATC clearance is clearly understood. If flight crews are given a clearance they cannot comply with, then they should say so. If flight crews need a clearance to be repeated, then they should ask. Additional hear-back, read-back may cause frequency congestion but that is expected to go back to normal levels as both flight crews and ATCOs get back to their normal schedules of operations.

COVID Additional Mitigations
Increase awareness of SOPs and standard phraseology through training, briefings, and safety promotion.
Encourage controllers to break down clearance to digestible segments.
Airlines to conduct their own internal risk assessments when resuming operations on specific routes.

Desire to maintain on time performance and the ability of ATCOs to accommodate requests from pilots in the evolving environment

Requirements to ensure the biosafety and health of passengers, crews, and staff may add buffers to ground time and impact overall network performance. There are estimates that additional sanitation and biosafety requirements may cause up to a doubling in the amount of time passengers have to spend at airports/ This will have a direct effect on aircraft turn-around times during the recovery phase. Therefore, flight crews and ATCOs should consider system and individual stressors during operation when they interact with each other. It is also important to resist the temptation to take short cuts and avoid rushing or making hasty decisions.

During periods of low traffic, it was possible to introduce more efficient routes and some operational improvements. During recovery, it may not be possible for ATCOs to continue granting requests for direct routing for example, because of the increasing traffic levels and additional capacity constraints. Airlines and ANSPs should always work together to achieve system and operational improvements. Where feasible, pre-COVID-19 capacity constraints should not be re-introduced. At the same time, flight crews are encouraged to take their time when they need to and not feel pressed or rushed because of the changing environment they're operating in.

COVID Additional Mitigations
Use briefings to increase flight crews' and ATCO's understanding of the changing environment and its potential impact on system performance and delays.
ANSPs to utilize flow management procedures to make necessary adjustments in response to airport/airspace capacity changes.
Airlines to promote additional flight crew operational briefings.

4.4 ATM-Airport Operations during Recovery

Although air traffic movements in several domestic markets have experienced strong recovery, international traffic continues to be highly depressed. This is largely owing to continued government border restrictions and requirements. Additionally, the airport capacities and operations have been impacted with unusual aircraft ground movements . All of which may cause safety hazards.

Some airports have taken advantage of lower traffic levels to initiate maintenance work and renovations. Prolonged periods of low traffic at some airports may have caused an increase in wildlife nesting. As traffic levels ramp up, the availability of airport infrastructure may have an impact on traffic management. At the same time, the additional requirements to ensure the biosafety and health of passengers, crews, and staff could affect time spent on the ground which will impact overall network performance.

Impact of COVID-19 on Maintaining Serviceability of Navigational Aids at Some Aerodromes

In some locations, government restrictions continue to challenge inspection and maintenance of navigational aids, primarily due to inaccessibility of inspection aircraft, spare parts, or staff. This may result in erroneous navigational information to aircraft from uncertified/uncalibrated navigational aids.

COVID Additional Mitigations
Conduct a local risk analysis with the assistance of the local runway safety team (if established).
Promulgate NOTAM's regarding nav aids restrictions or unavailability in a timely manner.
Promote cooperative sharing of resources (maintenance and inspection staff) for improved safety.

Increased Traffic at Airports with a Large Number of Parked Aircraft

As traffic levels increase during recovery, there are still some airports with a high number of parked aircraft. This may result in increased non-standard aircraft surface movements, which could negatively impact airport operations. At the same time, changes in the availability of airport infrastructure may cause confusion during operation and may result in irregular surface operation or runway incursions. Because of higher than usual number of parked aircraft, visibility of airport signage and markings, and obstacle limitation surfaces may be obstructed. In addition to impacting the interface between ATCOs and air crews, such issues may also impact the interface between air and ground crews.

Due to higher than usual numbers of parked aircraft, there is a potential risk of obstruction of clear line of sight from the tower. Non-standard aircraft ground movement may also have a potential impact on Communication, Navigation and Surveillance equipment, and potentially cause infringement of ILS critical or sensitive areas. Limitations of manoeuvring areas could result in inadequate/insufficient wingtip clearance if new procedures are not in place to ensure safe surface movement. This may result in a runway incursion and may cause additional workload for ATCOs and airport staff. Additionally, frequent changes in procedures may result in inappropriate surface operation, such as manoeuvring or entering the incorrect taxiway or runway.

COVID Additional Mitigations
Airports to develop local restart plans that are aligned with airline restart plans. Such plans should be continuously reviewed.
Consider establishing a committee for managing and planning aircraft parking with representatives from the airport operator, airlines, ANSPs.
Promot**e** and re-enforc**e** special procedures that have been developed for operating in the new environment, particularly during the staff call back period**.**
Pilots and ATCOs to exercise caution when conducting unusual operations during low visibility conditions.

Potential Increase in Wildlife Presence and Insect Infestation

While traffic levels are low, the quiet surroundings have been favourable for wildlife to nest and create new habitats. This poses a serious threat to aviation safety. In addition, the impact of the pandemic on resources and accessibility to infrastructure may have made it difficult to fully apply wildlife prevention programs. Airports that have initiated maintenance or renovations while traffic is low may face the potential risk of increased wildlife nesting because of water sources that were made available for construction work. In some cases where aircraft have been parked for a long period of time, there have been reports of insect infestation inside the aircraft's pitot tubes, specifically bees. This infestation may result in unreliable airspeed and altitude readings during the first flight after an aircraft leaves storage if these nests are not discovered and removed. Therefore, additional attention is required when parked aircraft are returned to service and when air crews carry out their walk-around checks prior to departure.

COVID Additional Mitigations
Airports should refresh their local risk assessments of the changing environment and define the appropriate wildlife management measures in the context of COVID-19 impacts.
Exercise diligence and adherence to existing mitigations and return to service inspection procedures.
Leverage data analytics and current risk assessments to identify system vulnerabilities.

The new revision of Doc 9137, titled "Aerodrome Services Manual Part 3 Wildlife Control and Reduction", developed by the International Civil Aviation Organization (ICAO) is a good reference for airports to develop mitigation measures.

Reduced Resources for Ground Operations Impacting Turnaround Times

Ground handling agents across all regions have been experiencing different impacts of COVID-19, including impacts on their staff. As traffic levels start increasing again, staff call back periods in different regions may differ. At the same time, there some ground operational staff may have left the industry. In some cases, new and junior recruits may be joining the ground handling staff and therefore, may not have the same level of experience or training. Combined with the sanitization and other health measures, this may lengthen turnaround times. However, passenger expectations will continue to demand faster and more seamless boarding process. With the added pressure on ground staff, workload, and the possible lack of experience, there is a risk of increased ground incidents. This will have a ripple effect on air crews and may add undesired pressure, e.g. on time performance in the new environment.

COVID Additional Mitigations
Plan adequately and long enough in advance roll-out of training and re-training of ground handling staff.
Consider human factors in ground crew scheduling.
Through briefings and awareness, emphasize to air and ground crew that safety is more important than on time performance.

IATA has published guidance material to support the return to service of ground handling agents which can be accessed using this link.

Increased Operation of other Airspace Users While Air Traffic was Low

While air traffic was low, new authorizations were granted to operators of remotely piloted aircraft, specifically those with use cases that became in demand during the pandemic, e.g. remote delivery of medical and pharmaceutical items, and remote surveillance of infrastructure. This resulted in an increase in operations of remotely piloted aircraft. As air traffic levels start to build up, additional attention is required to assure that operations of remotely piloted aircraft do not have a negative safety impact on airports and aircraft.

COVID Additional Mitigations
Re-evaluate the special authorizations that were granted during COVID.
Airport and ANSPs to develop risk based local procedures for detection and mitigation of unauthorized remotely piloted aircraft, in line with best practices.
Learn from existing trials involving technology to detect unauthorized operations of remotely piloted aircraft.

Additionally, demand for business aviation services soared since the outbreak of the pandemic. General Aviation (GA) pilots engaged in essential service flights and supported transportation of essential goods to domestic airports. With lower than usual number of commercial aviation aircraft operating in airspace, GA pilots may have developed new behaviours and expectations. As air traffic levels rise to pre-COVID levels, adherence to standard operating procedures will be required.

COVID Additional Mitigations
Local airports and ANSPs to work with GA associations and flight schools to assure diligence of GA pilots during the recovery of air traffic.
Increased diligence of both GA pilots and ATCOs for infringement.

Re-opening of closed terminals at some airports after long periods without operations

To reduce the gravity of COVID-19 impacts, some airports have limited the number of facilities that are being used while traffic levels are lower than usual. As traffic levels start building up again, and specifically if there are sudden spikes in traffic levels, there may be an unexpected return to standard ground movements. Considering that ground staff may have developed certain behaviours because some facilities or infrastructure have not been used for a period of time, this may result in ground incidents. Therefore, thorough training and briefings should be used to prepare staff for back to standard operations.

COVID Additional Mitigations
Review surface movement procedures as they are reinstated.
Through training and briefings, reinforce the need to adhere to standard procedures.
Use additional observers and provide support for all stakeholders during transition to standard operations.

5.   Appendix – Example of Risk Matrix

5.1 Occupational Health and Safety

Event	Hazard	Existing Controls	Additional Mitigation Actions (COVID-19 Impacts)
Post COVID effect on health for operational staff	1. The extent of COVID's effect on cognitive abilities remains undetermined. However, preliminary indicators could include a loss of taste/smell, loss of concentration and fatigue for a percentage that been infected 2. Risk of post-infection & psychological stress 3. Risk of re-infection & other potential sickness linked to return to work policies 4. Risk of unacceptable quarantine conditions away from home if crews self-identify as falling sick 5. Lack of comprehensive research around reduced lung function post COVID infection	• Ongoing dialog with medical professionals. • "Fit to work" self-check. • Existing sick leave policies. • Existing return to work policies.	• Reinforce "Fit to work" self-check. • Additional training and awareness. • CART guidance for quarantine away from home. • Update return to work policies to include specifics related to COVID.
Impact of varying government requirements for vaccinations for operational staff	1. Risk of lack of mutual acceptance of different States or regions for vaccine types which can impact operational staff, primarily air crew. 2. Varying requirements for return-to-work post vaccination - Scheduling/rostering for operational staff with varying times for return to work - Challenges with staff rostering of a mixed workforce population and possible impacts on workload 3. Potential misconception about efficacy of immunity once vaccinated. 4. Risks of spikes in traffic when staff rostering still requires social distancing and rotations of sub-teams. 5. Varying prioritization of when someone is vaccinated.	Social distancing and mask requirements.	• Reinforce existing controls and maintain for the foreseeable future. • Encourage mutual acceptance of vaccines • Transparent communication and clear expectations.
Varying COVID testing requirements and negative impact on operational staff	1. Risk of alienation and distancing from those previously presumed or tested positive. 2. Non-standard testing that may affect how operational staff may be perceived as infectious or not. 3. False positive of COVID post infection (continued presence of the antigen even though the person has recovered).	• Existing post medical policy regarding return to work. • Existing sanitary measures protocols. • Existing OHS policies from States. • COVID specific policies that have been implemented for sanitation and hygiene.	Conduct additional risk assessments to identify where additional mitigations may be appropriate, i.e. best practices from ANSP's and Airlines.
Mix of vaccinated and unvaccinated staff.	1. Overconfidence of both vaccinated and unvaccinated staff. 2. Lack of information that would permit relaxing protection protocols for social distancing and PPE.	• Existing sanitary measures protocols. • Existing OHS policies from States. • COVID specific policies that have been implemented for sanitation and hygiene. • Business continuity contingency plans.	Exercise caution and rely on verified data with the relaxing of hygiene measures and all COVID mitigation practices.

5.2 Human Factors

Event	Hazard	Existing Controls	Additional Mitigation Actions (COVID-19 Impacts)
Constant change in health and operational procedures	1. Increased stress levels due to non-standard operations 2. Less effective CRM due to procedural changes 3. Less effective communication 4. Impact of changes in scheduling in rostering of crew, and dispatchers' ability to track these changes	• CRM/TRM training • Human Factors Program • Briefing procedure • Information bulletins • Briefing medium/tools • Adaptive supervision in harmony with the dynamic operations • Supervisory techniques clearly defined and communicated • Coordination procedures that support appropriate interventions where required. • Wellbeing programs and support	• Increased oversight • Provide all personnel with related briefings and communications (including COVID-19 measures / restrictions) • Empathetic approach to performance/service level penalties • Positive safety culture fostering a supportive work environment
Pressure, bereavement, tiredness, stress, fatigue, etc.	1. Reduced reporting 2. Tiredness and reduction in attentiveness 3. Emotional response and behaviors to stress 4. Pandemic fatigue 5. Loss of focus 6. Impatience	• Positive safety culture environment • Risk assessment considering pandemic impacts of human performance • Human Factors Program • Fit for duty policy • Wellness programs • Safety assurance processes	• Raise awareness among leadership and management to support wellbeing for aviation personnel. • Pro-active operational supervision
Increased frequency and volume of external distractions (i.e.: family, politics, economy, health)	Reduced focus	• Limitation of personal communication devices • Break schedule	• Wellbeing programs and support • Increased oversight • Safety promotion • Revised break schedule
Rebellious behaviors in response to long term mitigation measures	Drift from established COVID policies and procedures.	• Continuous review and adaptation of policies and procedures • Leadership by example (modeling of best practices)	• Revised policies and engagement with evolving context of vaccine roll-out • Re-enforce mutual accountability

5.3 Competency & Training

Event	Hazard	Existing Controls	Additional Mitigation Actions (COVID-19/Restart and Recovery)

Varying traffic levels combined with changes to workforce and sporadic operations	1. Reduced resources impacting rostering/scheduling/shifts
	2. Potential degradation in competency
	3. Planning training during recovery periods when there is a spike in traffic levels
		• Licensing, training and recency requirements
		• Virtual Training
		• Line Checks
			• Strategic staffing during reduced operations
			• Incremental and adaptable return to service strategies to include:
			  o All stakeholders to work together to address planning schedules and manpower requirements
			  o Return to work training and briefs
			  o Increase supervision
			  o Continue awareness campaign
			• Re-enforce due diligence of self and colleague proficiencies
			• Reduce the period for revalidation

Lack of access to recurrent training	Potential reduction in proficiency and familiarization with some procedures that have not been used after long durations of no or reduced operation	• Online training • Simulator sessions	• Explore enhancing online training options • Work with regulators and training organizations to address backlog of licenses and medical revalidations • Ensure staff have access to online training • Improved supervision for personnel with extended licenses • Be mindful of ATCO's workload • Prioritize sim-sessions for staff with extended licenses

Physical distancing impacts effective re-validation/OJT of dispatchers and operational controllers (ATCOs) and FISOs (renewal of medical, over the shoulder, phraseology, etc.)	1. Skill degradation goes un-noticed 2. Drift from standard procedures 3. Degradation of skill that are usually acquired during OJT	• Supervision • Effective tracking of license currency and validation.	• Increased post operational reviews using recordings • Use longer headsets • Use PPE as an alternative to physical distance requirements (where allowed) • Monitor from adjacent positions rather than over the shoulder • Increase performance checks • Review check requirements to include simulators with high traffic situations
Increased reliance on virtual training methods resulting in not meeting the training objectives and or requirements for advanced and complex scenarios.	1. Training needs not addressed properly 2. An observable degradation in proficiency and/or familiarization with procedures	• Competency assessments after recurrent training. • Quality control of existing training and implementation. • Supervision.	• Explore availability of remote/virtual simulators for training • Industry should study effectiveness of virtual training
Reduced competency in emerging contingency scenarios in a changing environment	Existing contingency procedures not adequate for the emerging risks	• Emergency Response Plans • Training	• Contingency procedures need to be reviewed and adapted to the changing scenario • New/modified contingency procedures need to be communicated, coordinated, and exercised • Reinforce contingency training
Operational assessment of skills will be conducted in reduced traffic conditions, not providing the appropriate complexity for full operational capacity.	Reduced exposure and potentially reduced skills to manage operations when traffic levels are higher or more complex	• Supervision • Tactical opening of sectors • Tactical use of resources by the supervisor	• Increased Supervision with increased workload • Where available, use of simulators to practice operations in higher traffic levels
Combination of the unpredictability of traffic recovery, the expiration of the exemptions, and reduced access to training facilities, affecting staff training and availability.	1. Organizational pressure impacting crew rostering 2. Insufficient resources to meet traffic demand	• Flow management • Combining sectors	• Implementation of public health corridors to facilitate access to training facilities (ICAO CART) • Allowing flexibility without compromising safety

5.4 Organization and Change Management

Event	Hazard	Existing Controls	Additional Mitigation Actions (COVID-19 Impacts)
Reduction of availability of safety staff to support increase of operations, which would impact timely analysis and process development in a rapidly changing environment.	1. Reduced capacity to identify and address potential risks in a timely manner 2. Safety cultural drift	• Quality assurance/control program • Automatic detection where operable • Regulatory requirement for accountable executives • Audit standard requiring staff to operate and effective SMS • Readiness and adaptability of staff	• Prioritization exercise to refine critical SPI's (as needed) in coordination with the national regulator • Empowered safety leadership • Regulatory oversight of appropriate staffing to support an effective SMS • Streamlining hierarchy (reporting lines) for more effective responses • Re-enforcing confidence in the safety system • Ensure drift from SOPs is addressed • Encourage participation in data sharing programs
Established baselines are no longer indicative of the operational environment challenging the ability to accurately forecast resources and other concerns	1. Difficulty of resource planning, staffing, scheduling, etc., either over or under resourced. 2. Recall of ground staff and the safe ramp up time to align resources to meet traffic spikes with short notice. 3. In addition, the availability of airport capacity and new safety measures that are in place.	• Effective SMS program • Robust traffic forecasting and monitoring tools for collaborative decision making.	• Shorter than historically, periods of projections during the current environment • Conduct ongoing assessments for dynamic changes that will sustain going forward beyond recovery. • Reinforce importance of supervision during unanticipated traffic peaks. • Strategic capacity management.
Over reliance on technology (automation) within the current operating environment impacting organizational work design. Socio-technical systems (STS) aspects of the role	Unbalanced reliance on technology which results in negative outcomes when there is an unexpected change of state.	• Technological redundancies, defenses in depth and contingency procedures • Effective SMS program • Collaborative Decision Making (CDM). • Refresher training • OJT and in person training	• Refresh and reenforce training to include OJT and in person training • Learning and planning from previous events • Robust archival and preventative maintenance • Leveraging data analytics and current risk assessments to identify system vulnerabilities

The rapid and dynamic changes may overwhelm the organizational capacity to effectively manage change	1. Rapid course correction during recovery may stretch the resiliency of the organizational change process 2. Difficulty in identifying the scope and breadth of measures that need to occur	• Workforce planning tools • Robust traffic monitoring and forecasting • CDM • Effective crew rostering and supervision	• Quantify and foster the skill of effective dynamic communication bi-directional • Developing the capability to "Read the room" • Balancing the crew/ATCO's based on the current levels of proficiency and experience

5.5 ATCO-Crew Interface

Event	Hazard	Existing Controls	Additional Mitigation Actions (COVID-19 Impacts)
Pilot - ATCO communication	1. Risk of diminished English language skills and phraseology discipline. 2. Potential reduction in pilot familiarity with procedures and related phraseology 3. Possible frequency congestion	• Hear back/read back • CRM • Surveillance and safety nets • Pilot threat and error management briefing • Safety assurance	• Increased awareness via safety promotion • Encourage controllers to break down clearance to digestible segments • Airlines should conduct their own internal SRA when resuming operations on specific routes • Emphasize the use of standard phraseology • Adjusting the number of sectors to complement traffic levels
Risk associated with a combination of pilot's aim to maintain on time performance and the ability of ATCOs to accommodate non-standard requests from pilots in the evolving environment.	1. Pilot's expectations vs ATCOs constraints and vice-versa might cause pressure to maintain on time performance in the evolving environment with all the changing stressors and constraints. 2. As traffic increases, delays may be encountered due the evolving environment. This may put additional pressure on pilots and ATCOs and effect their interaction.	• Procedures for both Pilot's and ATCO's. • Safety assurance	• Informative briefings related to Pilot/ATCO communication with an emphasis on the changing environment and its potential impact on system performance and delays • Flight deck communication emphasized operational briefings, and confirmation of intention with ATCO • As traffic levels increase, there is a need to manage the flow of traffic through procedures (such as ATFM or ACDM) to make necessary adjustments in response to airport/airspace capacity changes

5.6 ATM & Airport Operations

Event	Hazard	Existing Controls	Additional Mitigation Actions (COVID-19 Impacts)
Impact of COVID-19 on maintaining serviceability of navigational aids at locations where access to inspection aircraft is limited, or availability of spare parts and staff.	Erroneous navigational information to aircraft from uncertified calibration of ILS, PAPI, VASI and/or other navigational aids.	• NOTAMs communicating availability of nav aids • Existing redundancies - eg: alternate nav aids, ATC surveillance, RNAV overlay • Flight crew cross check • Pilot's discretion to initiate go-around • Regulatory requirement for periodic maintenance and inspections	• Local runway safety team is recommended to conduct a local risk analysis • Timely NOTAM's regarding nav aids availability • State cooperative sharing of resources (maintenance and inspection staff) for improved safety
Opening of borders resulting in increased aircraft ground movements at airports with a large number of parked aircraft (non-standard, quantity and location) negatively impacting airport ops & critical infrastructure.	1. Limitations on maneuvering areas, wingtip clearance 2. Reduction/obstruction of clear line of sight from the tower 3. Potential infringement of critical/sensitive areas due to non-standard aircraft ground movement 4. Runway incursion 5. Obstruction of obstacle limitation surfaces 6. Workload and RTF congestion	• Aircraft ground movement control • Operating procedures • SMS requirements for ground operations • Existing driver operational/safety training for maneuvering area • Best practices and guidance published by industry groups to support safe operations during COVID-19	• Local restart plan for airports that were closed is essential. Align with airline restart plans regarding aircraft return to service • Promotion and re-enforcement of special procedures that have been developed for operating in the new environment
Continuous change in of procedures, airport capacity, number and location of parked aircraft. Specifically effecting air/ground crew interface.	1. Wrong surface operation (incorrect taxi way or runway) 2. Runway incursion 3. Potential infringement of critical/sensitive areas due to non-standard aircraft ground movement 4. Obstruction of obstacle limitation surface	• Runway safety teams • Air Traffic procedures and aerodrome infrastructure standards • Critical area protection • Lighting, marking and signage • Surface surveillance Relevant NOTAMs - Crew briefing	• Promote increased vigilance • Awareness of new hazards • Increased frequency of Runway Safety Teams • Airport operator is recommended to conduct additional local risk assessment in context of the new environment
Potential increase in wildlife presence on or near some runways or taxiways due to low traffic levels	1. Wildlife strike. 2. Construction on airport can create water sources and increase the number of insects, which attract birds. 3. Potentially reduced personnel, resources and accessibility limitations, hindering personnel from mitigation activities	• ICAO requirement for Wildlife Hazard Management plans • Airport services manual • Pilot and Maintenance SOP's • NOTAMs • Habitat Management	• It is recommended that the airport conducts/updates local risk assessment of the changing environment Appropriate wildlife management staff • Promote increased vigilance

Pestilence infestation in parked aircraft. (Bees)	Clogged pitot static tubes impacting reliant instrumentation	• Guidance from Boeing, Airbus and EASA • IATA Operational Notice (XX-XXX) • Return to service inspections. Standard pilot walk around	• Continued diligence and re-enforcement of existing mitigations and return to service inspections.
Increased unmanned aircraft operation traffic near airports	Increased operations of unmanned aircraft resulting in potential increase of unauthorized operation of unmanned aircraft near airports (compared to number of events pre-COVID).	• Authorization to operate. • Local and contingency procedures.	• Review of authorizations with the increase in traffic UTM guidance. • Development of risk based local procedures in line with best practices. • Design and implementation of guidance materials. • Learning from existing trials of involving technology to monitor and detect unauthorized UA operations. Regulatory assessment of authorizations that were granted during reduced traffic in COVID.
Weather (icing and winter ops, seasonal changes)	Weather disruptions to aerodrome operations.	Existing procedures - local and contingency.	Refresher and oversite of contingency procedures.
Reduced resources and inexperienced staff for ground handling effecting surface movement	Human factors of increased incidents due to inexperience of staff, workload and limited resources	• Training for new staff as well as refresher for existing staff. • Supervision of new staff	• Refresher training for existing staff. • Pairing experience staff with new hires. • Management control of workload for new hires. • Increased supervision.
Closed airport terminal re-opened	1. Unexpected return to standard ground movements 2. Short cuts no longer available 3. Parked ground service equipment 4. Wing tip clearance 5. New taxi routes	• Temporary procedures and procedural review with amendments. • Runway Safety Action Teams	• Re-enforce taxi discipline (no shortcuts) • Ground service discipline to be enforced. • Review of surface movement procedures as they are reinstated. • Refresher training for all involved. • Additional observers and support for all stakeholders during transition to normal operations

			• Awareness to GA pilots of increasing commercial operations
			• Work with GA associations and flight schools for increased visibility
Increase in GA traffic around and/or within controlled airspace during COVID	GA pilot and ATCO reduced diligence in standard operating procedures around airspace boundaries.	• IFR Operations: technological solutions • VFR Operations: See and avoid	• Increased diligence of both GA pilots and ATCO for infringement