Review of Aviation Safety Issues
Arising from the COVID-19 Pandemic

1   A Collaborative Approach to Identifying and Managing Risks

European aviation is a complex but very safe system. The COVID-19 pandemic resulted in an extreme reduction in operations that began in late March and has continued through to the end of May 2020. As governments have signalled that restrictions on travel will begin to ease in June, many airlines and airports are once again increasing the level of their activities. A lot has changed in these past few months and it is important that we work together during the recovery to understand the risks and safety issues that are in play and what we, as a community, can do to mitigate against them.

In supporting aviation organisations in safely increasing their service provision, EASA has been working closely with Member State regulators and industry partners to identify the new or emerging safety issues. This took the form of a survey and follow-up virtual meetings with the different stakeholder groups.

The work presented mirrors the collaborative activities that we normally carry out in identifying safety issues and managing risks as part of the European Safety Risk Management (SRM) process. Naturally, the process has been adapted to take account of the new working environment. A summary of EASA's safety risk management process can be found in our Annual Safety Review.

This paper provides the results of the first step in the SRM process in relation to COVID-19 by identifying the relevant safety issues. EASA is now addressing those safety issues to identify appropriate mitigating actions and to support their implementation across the industry. Urgent and higher risk issues are being addressed through the Return to Normal Operations (RNO) project, which has already taken several important actions in consultation with the industry and Member States. Further work on mitigating actions will include material to support oversight and standardisation activities and this information will be published as the work is matured.

2   The Importance of Being Able to Manage Risks Effectively

The survey and follow-up discussions identified many different safety issues across a wide range of operational activities. However, the over-arching theme to all of these safety issues was the need for well-functioning management systems, which ensure that we are able to identify and manage our risks effectively. Whether the issue is a specific problem faced by one domain or a human factors issue that affects all aviation personnel, it is vital that everyone in an organisation is focused on the goal of delivering safe and effective operations.

The shutdown and return to service have led to many changes to the operating environment. These will continue to evolve until we reach a "new normal". This means that organisations need to address the management of change effectively and regulators need to engage with their organisations to ensure that the results are safe and effective.

As the complex aviation system restarts, new hazards will undoubtedly emerge. Additionally, there are currently a substantial number of exemptions, extensions and eroded safety buffers. That means that the aviation system is not the same as that which was operating previously and our perception of what can safely be achieved should be challenged.

It is important to recognise the positive contribution that aviation professionals can make in restarting a complex system. The ICAO Handbook for CAAs on the Management of Aviation Safety Risks related to COVID-19 (Doc 10144) advises the following:

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Identifying interfaces and establishing channels for communication provides access to expert opinion, which is valuable in understanding the available information in a dynamic situation. Responding under a crisis situation may require qualitative decision-making using a risk management approach and asking practical questions (e.g. What supporting evidence is available?, What are the consequences of alternative options?, How will delays in decisions impact?, What is the risk tolerability for the specific situation?, What are the available resources?).

3   List of Identified Safety Issues

The list of identified Safety Issues are provided below and have been categorised under the following headings:

Management Systems;

Human Performance;

Training, Checking and Recency;

Outdated Information;

Infrastructure and Equipment;

Financial Impacts on Safety.

The issues are ordered from high to low risk within each heading. However, they have been ordered from an EASA perspective, with reference to all Member States and aviation domains. A local or organisational prioritisation of these safety issues may well be different. The order reflects an evaluation of the priorities based on the known mitigating actions and hence the order is likely to change over time.

Organisations and Member States should evaluate the applicability of the listed safety issues to their own situation and, where applicable, capture them in their SMS.

3.1   Management Systems

3.1.1   Restarting operations risks spreading COVID-19

Restarting operations not only brings passengers closer together and moves them between locations with differing infection levels, it also brings together aviation personnel. Both of these increase the risk of further spreading the virus. Organisations will need to adapt their procedures in order to minimise the risk of infection and to ensure that work areas are regularly and thoroughly cleaned.

3.1.2   Reduced oversight by competent authorities due to lockdown

Competent Authority staff have had to adapt their oversight activities to meet the COVID-19 related restrictions, one key difference being their ability to undertake on-site visits with these having been difficult or impossible to arrange. This means that oversight is not as in-depth and in many cases the time periods between checks has increased.

3.1.3   Reduced focus on, or prioritisation of safety

There are multiple factors that mean that organisations may not be providing safety and safety management with the same level of attention and resources as was previously possible. These include distractions and stress at a personal level, and economic pressures and the practical pressures of returning to service at an

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organisational level. Also, focussing too much on returning to service and economic survival may reduce the emphasis on human and organisational factors, to the detriment of safety.

3.1.4 Risk assessments based on previous normal operations are no longer valid

Risk assessments performed by organisations and authorities are made in the context of specific operations and operating environments. The substantially changed and still-changing operating environment and the addition of "new" types of operations mean that most risk assessments are no longer valid.

3.1.5 Restarting a complex system is challenging

The aviation system is highly interconnected, sophisticated and merges people and technology, meaning that the consequences of shut-down and restart are not completely predictable. Organisations will need to prepare good communications and decision-making strategies, using personnel expertise, data, information and good internal and external coordination.

3.1.6 Degraded management systems and loss of experienced nominated persons due to furlough and redundancies

The reduced finances of many organisations means that safety staff may have been made redundant or furloughed, while there is a significant amount of work to do in maintaining and updating their safety management systems.

3.1.7 Application of COVID-19 health control measures may negatively affect operations

COVID-19 control measures, such as PPE and physical distancing will have an effect on certain tasks, introduce new tasks and may hamper personnel performance. Organisations and authorities will need to assess the impact and consider whether tasks, equipment and working environments will need to be adapted.

3.1.8 During reduced operations, new SOPs may be introduced that require risk assessment

The reduced air traffic should normally be managed either through existing standard operating procedures (SOPs) or through organisation's contingency measures. Where new SOPs are introduced, they will require risk assessment. As air traffic increases, the previous SOPs will need to be reintroduced. Change management principles must be applied.

3.1.9 Reduced availability of aviation medical examiners (AME)

The reduced availability of AMEs implies either a reduction in available personnel, or the need to extend the period of validity of medical certificates. This will require a risk assessment in the context of each type of professional requiring a medical certificate.

3.1.10 Carriage of cargo in the passenger cabin

Carrying cargo in the passenger cabin is not straightforward. It requires the consideration of issues such as weight and balance, smoke/ fire detection, crashworthiness, evacuation procedures and modified loading procedures.

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3.1.11 Risk assessment methodology for COVID-19 exemptions and temporary rules

The exemptions and temporary rules put in place to cope with the crisis may not have undergone sufficient risk assessment. A harmonised approach and routine reassessment, as and when the situation changes, may be needed.

3.1.12 Prevention and treatment of unruly passengers in the context of COVID-19

An increase in cases of unruly or disruptive passengers should be expected, either prior to departure or in-flight. Procedures to manage this and associated training need to be developed.

3.2   Human Performance

3.2.1   Personnel may not feel safe and in control about returning to work

Personnel will be returning to duty with a higher than normal psychological stress, potentially reducing staff performance and increasing safety risks. Organisations and authorities need to understand and develop strategies to mitigate against this.

3.2.2   Decreased wellbeing of aviation professionals during shutdown

The pandemic is a significant source of anxiety, stress and uncertainty for almost everyone. Worries about unemployment for aviation staff and their relatives may be exacerbated. During the shutdown, with people working from home and therefore isolated from normal support, the personal wellbeing of professionals is likely to have suffered. For those working, this may lead to task distraction/interruption, workload/task saturation, instructions or requirements not followed. Regardless of whether personnel are working, are employed, furloughed or unemployed, we have a duty of care to support the wellbeing of aviation professionals.

3.2.3   Aviation personnel fatigue

With redundancy and furlough reducing the available number of personnel, those left working may have to work additional hours. The preparation for and eventual return to (new) normal operations will require significant additional effort in comparison with actual normal operations. These may both contribute to rising levels of fatigue.

3.2.4   Flight crew fatigue due to unavailability of rest facilities at destination or extended duty period

At certain destinations, crews are required to stay on board the aircraft and neither hotels nor restaurants are available. Where crews can leave the airport, extended duty periods may occur due to health checks and the need for physical distancing, making leaving/ re-entering the airport a longer process.

3.2.5   Personnel no longer working collaboratively

Significant gaps in working, or working from home, may have reduced people's ability to work collaboratively. This may exacerbate problems with team-working and communication while wearing PPE.

3.2.6   Reduced adherence to procedures in the new working environment

Reduced operations and underload may create a belief that the level of risk within the operating environment has substantially reduced, causing staff to become less sensitive to risk with the possibility that they are less alert/ procedures are not completely followed.

3.2.7 Roster adaptations to reduce transmission of illness may create different team behaviours

To reduce the risk of virus transmission, some organisations have created rostered groups of personnel who work together, with the different groups never meeting one another. There is a risk that these groups will develop their own dynamics leading to deviations from procedures.

3.3 Training, Checking and Recency

3.3.1 Skills and knowledge degradation due to lack of recent practice

The 90% reduction in traffic means that most aviation professionals are not performing their normal tasks, sometimes they are doing a substantially different job, and sometimes not working at all or at a substantially reduced frequency. Simulator and classroom-based training is also not taking place. Together, this creates a reduction in the skills and knowledge of aviation professionals, and with it associated safety risks.

3.3.2 Backlog in training limiting available personnel

A reduction in the availability of training facilities will lead to a backlog in training. This means that personnel will not have received necessary recurrent/ refresher training, with a consequent effect on performance. The issue may become a limiting factor on capacity during a return to operations or will cause fatigue or overload where there is a reduced number of personnel providing services.

3.3.3 Increased periods between licence/ validation checks

The lack of testing or checking means that it will be difficult to measure or monitor any reduction in the skills and knowledge of aviation personnel. Mitigation measures should be put in place to ensure that currency is maintained in the circumstances.

3.3.4 Ground handling training programmes disruption

In addition to the problems faced by all personnel in not receiving training, ground handling has a high staff turnover, less secure employment, seasonal staff recruitment and seasonal training (such as for winter operations). This exacerbates problems relating to the inability of organisations to conduct training.

3.3.5 Long gap in flying following type-rating training

While it is not unheard of for type-rating training to be followed by a gap before commencing operational flying, the shutdown means that this is now far more widespread and therefore presents a higher risk than it had previously.

3.3.6 Increased use of real aircraft for training instead of simulators (Rotorcraft focus)

The backlog of training checks may drive organisations to use real aircraft for exercises that have more recently been conducted in simulators. In combination with a loss of skills and knowledge due to a lack of recency for instructors/ training captains and students, the risk of training related accidents is raised.

3.4 Outdated Information

3.4.1 Documentation and database updates may not have been applied

Relevant updates of operational procedures and documentation, especially temporary revisions/updates may be missed. This may have a cascading effect on the safety of operations. In addition, aircraft databases

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may not have been updated, such as FMS, TAWS, charts, etc. Manufacturers and data service providers may not be able to produce and deliver updates within the necessary timescales.

3.4.2 Outdated or inconsistent information in aeronautical information and flight plans

Aeronautical Information Management (AIM) and data service providers (DAT) are likely to have suffered from a lack of staff during the lockdown period. This reduces their ability to accomplish Aeronautical Information Service (AIS) data publication in a timely manner that meets aeronautical information update needs and to include actual updates within publications.

3.4.3 Incorrect aircraft navigation due to outdated or inconsistent information

Aircraft may deviate from their flight path, assigned flight levels or lose separation as a result of outdated or inconsistent information. This relates not only to difficulties experienced by AIM and DAT providers, but also to the ability of ATCOs, flight operations officers and pilots to receive and absorb up-to-date information, both in advance of and during the return to normal operations.

3.5 Infrastructure and Equipment

3.5.1 Increased presence of wildlife on aerodromes

The reduced level of traffic at aerodromes has increased the presence of wildlife habitation at aerodromes. This increases the risk not only of birds and insects nesting in stored aircraft and equipment, but also the risk of bird strikes to aircraft once airborne.

3.5.2 Operational risks of aircraft storage at aerodromes

Parked aircraft on closed runways and taxiways are at risk from ground damage. Aerodrome surfaces may deteriorate due to long-term static load. Operationally, crews and aerodrome staff may be confused by new taxiway routes and obstructed views of the aerodrome. Parked aircraft have the ability to obstruct signs and markings, infringe the ILS critical/sensitive area and/or the line of sight of the air traffic control, and thus should have been positioned to avoid this. The stationary aircraft may reduce runway through-put if they are parked on a closed runway, increasing the pressure on ATCOs and traffic participants in the manoeuvring area.

3.5.3 Construction / maintenance works on the Movement Area

The prolonged shutdown means that maintenance works may not be appropriately delineated, marked and lit. NOTAMs, AIP supplements and amendments may not have been promulgated. Aerodromes should ensure that such practices are avoided and promulgation notices should be checked for accuracy and the period of validity.

3.5.4 The rapid storage and de-storage of aircraft may lead to technical failures

The number and rate of aircraft entering and then exiting storage has been very high. Examples of associated hazards are: aircraft that have not been adequately protected by covers; fuel contamination; wildlife ingress; and a lack of maintenance. Sufficient time and personnel will need to be made available in order to return these aircraft to service.

3.5.5 Postponement of emergency response plan exercises may lead to ineffective handling of emergencies

Full or partial emergency response plan exercises may have been postponed or cancelled due to the lockdown, leading to the ineffective handling of emergencies. This issue may be worsened by a loss of experienced personnel or changes in the operating environment, such as parked aircraft obstructing taxiways.

3.5.6 The impact of maintenance practices during fleet groundings due to COVID-19

The maintenance practices and requirements due to prolonged parking are defined by the TC Holder usually within the Aircraft Maintenance Manual (AMM). Operators (CAMO's), in close relation with the maintenance organisations (AMOs), are required to plan these maintenance tasks at intervals defined in the AMM. These requirements are essential in keeping the aircraft and its engines / systems / components in a functional state and prevent any degradation so that no excessive failure rate is experienced when the aircraft is returned to service. However, reduced manpower may mean that airlines/AMOs may not have the capacity to carry out required maintenance tasks.

3.5.7 Malfunction or failure of communication, navigation and surveillance (CNS) equipment

The period of disuse and potential lack of proper maintenance during the period of shutdown may lead to malfunctions or failures of equipment. Once equipment is used again, ensuring that technical and support staff are available may be difficult. Additionally, planned system changes may not have been implemented, there may be a backlog in required updates and issues may only become identifiable as traffic load increases.

3.5.8 Hazards associated with aerodromes being closed or partially closed for long periods

During closure or partial closure, maintenance of equipment, systems, signage and the cleaning of surfaces may not have taken place. As aerodromes re-open, sufficient personnel and time will be required to return the aerodrome to normal operations.

3.5.9 Ground Service Equipment may malfunction due to long periods of disuse and a lack of maintenance

Ground Service Equipment may have sat inactive for a considerable length of time. This could cause technical problems if the equipment has not properly been maintained during the period of inactivity and may need to be then assessed/serviced to operational condition prior to being returned to service.

3.5.10 Technical issues relating to recommencing use of aircraft fuelling after a long break

Water, sediment and microbiological growth may be present in both hydrant systems and fueller tanks, filters may have dried or become damaged through lack of use, and normal checks may not have been carried out. In addition, any fuel received may have been stored for a longer period than normal elsewhere, creating additional problems with fuel quality.

3.5.11 Disinfection (biocides) effect on aircraft systems and structural components

A high demand for biocide may cause organisations to use materials other than those specified in the AMM. This must be avoided, since the aircraft may be damaged by alternatives.

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3.5.12 Management of unpredictable air traffic evolution during the recovery phase

The scale of the likely increase in air traffic levels may make the evolution of air traffic difficult to predict, creating a mismatch in capacity. Differing paces of recovery across the network in terms of available capacity and in air traffic demand may exacerbate the problem.

3.5.13 The impact of fewer aircraft observations on Meteorological modelling

Weather forecasts use data from aircraft (e.g. AMDAR and Mode-S) in the initialisation of numerical weather prediction, and the large decrease in the number of observations available will have an impact on the accuracy of the forecasts produced. Initial analysis suggests that this impact is low, but the data from April, May and June has not yet been analysed.

3.6 Financial Impacts on Safety

3.6.1 Missing suppliers and difficulty liaising with suppliers

The shutdown has already resulted in difficulties for organisations liaising with their suppliers. Further economic constraints may increase problems, making it difficult to maintain the supply chain.

3.6.2 Reduced Available Financial Resources

A reduction in available financial resources may cause the loss of key personnel and corporate knowledge, increase pressure on personnel, and affect decision-making. Long term investment plans may slip or be changed, with consequences manifesting themselves long after traffic levels have begun to recover.

3.6.3 Shortage of operational and technical staff

Organisations' limited finances may limit the number of personnel they employ and movement restrictions resulting from the pandemic may further hamper personnel in remaining in the workplace. Health and national movement restrictions may also cause shortages in personnel and these shortages may be difficult to plan for, with regional or local lockdowns a possibility.

3.6.4 Technical issues related to an ageing fleet

A consideration still open for debate is whether a reduction in financial resources will generate an ageing fleet, with consequent technical issues. However, the reduction in aircraft in use could have the opposite effect – older aircraft are left parked in favour of younger aircraft.

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