

# **Review of Aviation Safety Issues Arising from the COVID-19 Pandemic Version 2 – April, 2021**



## 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 2020, which despite some increases across the summer period has continued into 2021. In April and May 2020, EASA surveyed the Member States' regulators and industry partners to identify the new or emerging aviation safety issues arising as a result of the pandemic. Those issues that were considered to be highest risk to the aviation system were assessed in detail across the summer and safety interventions were put in place. Where guidance material was developed, links are provided alongside the safety issues in this document.

Taking into consideration the ongoing impact of the pandemic on aviation, the work to identify new or emerging safety issues from the pandemic has been updated. New issues have been identified, existing issues have been amended and some have been downgraded.

In addition to this work with our Member States and industry partners, we are now also able to review the occurrence data that has been reported since March, alongside information regarding the number of exemptions in place in the European regulatory system. Together, these different sources of information provide a picture of the safety situation in European aviation.

While we often refer to a drastic reduction in aviation activities, it is important to bear in mind that for some parts of the industry workload has in fact intensified. This creates a situation where the risk profile for each Member State and organisation is very different to that of the system as a whole.

## 2 The Importance of Being Able to Manage Risks Effectively

In both 2020 and 2021, the over-arching theme to the safety issues identified has been 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 duration of the pandemic means that some of the safety issues identified in April and May 2020 have been exacerbated. These include issues such as the risk of skills and knowledge degradation due to lack of recent practice, the wellbeing of aviation professionals, the impact of long term storage of aircraft and the overall effects of reduced finances on safety, including loss of suppliers and the loss of operational and technical staff.

Additionally, there are currently a substantial number of exemptions, extensions and eroded safety buffers. That means that the aviation system in 2020 and 2021 is not the same as that which was operating previously and our perception of what can safely be achieved should be challenged. EASA has developed a wide range of resources and guidance documents to support the industry with specific challenges that have arisen during the pandemic – these can be found on the [EASA COVID-19 Resources Webpage](#). Of particular note in terms of managing safety issues in Aerodrome operations is [SIB 2020-07R2](#) on the “Progressive Restart of Aerodrome Operations after Complete or Partial Closure”.

With the complex aviation system now in a state of significant change for more than a year, it is also likely that the system when it returns to its normal capacity will operate differently to the version we experienced in 2019. Within organisations and competent authorities, individuals may have changed roles, others have had very different experiences. The connections between organisations and thus between the different elements in the system will have been broken and remade differently.



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:

*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 – you can find more information about this report and each specific Safety Issues on the [EASA Air Ops Community Site page on “Managing Safety Issues”](#):

- Infrastructure and Equipment;
- Training, Checking and Recency;
- Management Systems;
- Human Performance;
- Financial Impacts on Safety.
- Outdated Information;

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.

The new safety issues that have been identified since 2020 are listed here for ease of reference. They are then repeated in more detail in the full list of safety issues, categorised under the most relevant heading.

- Unusual approach profiles in the pandemic circumstances (Unstable approaches),
- Increase of cyber-security issues related to the pandemic situation,
- Transfer of pilots from one fleet to another resulting in low hours on type,
- Maintenance of electrical systems and visual aids at aerodromes,
- Decreased funding of aviation regulatory authorities,
- Reduction in training effectiveness due to COVID-19 restrictions,
- Rapid growth of cargo operations during the pandemic,
- Reduction in Contracted Fees to Ground Handling Service Providers,
- Knowledge transfer missed for new generation aviation personnel,
- ANSPs returning to operations after being closed for several months,
- Carriage of hand sanitiser in the cabin.

A full change log, detailed where issues have been removed, merged or renamed is available [on the Air Ops Community Site](#) as well.



## 4 Infrastructure and Equipment

Safety issues relating to maintaining or returning infrastructure and equipment to service, such as fuel contamination, ground service equipment serviceability, damage to aerodrome surfaces caused by parked aircraft.

### 4.1 The scale of aircraft storage and subsequent destorage may lead to technical failures when aircraft are returned to service

An unprecedented number of aircraft have been parked/stored since the beginning of 2020. The maintenance practices and requirements due to prolonged parking are defined by the TC Holder usually within the Aircraft Maintenance Manual (AMM). The Operators (CAMOs), 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 to keep the aircraft and its engines / systems / components in a functional state and prevent any degradation so that when the aircraft is returned to service, no excessive failure rate is experienced. However, reduced manpower may mean that airlines/AMOs may not have the capacity to carry out required maintenance tasks.

Gradually, as travel restrictions are lifted and as operators prepare to resume passenger flights, operators will need the aircraft that have been parked/stored to be returned to service. Due to the high number of aircraft involved and the limited supporting resources available to perform the work, organisations and personnel are expected to experience difficulties and increased risks. Organisations' Management Systems play an essential role in identifying the hazards, developing control measures to mitigate the associated risks and thus in ensuring a safe return to service of all aircraft.

Guidance on how to address this issue is available here:

<https://www.easa.europa.eu/community/topics/destorage-aircraft>

### 4.2 Increase of cyber security issues related to the pandemic situation (new)

Organisations are operating with reduced administrative (including CSO & other IT) staff, therefore the capability to detect and react to cyberattacks may be reduced. The issue is not specific to aviation but has an impact on aviation safety.

### 4.3 Increased presence of wildlife on aerodromes

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

Guidance on how to address this issue is available here:

<https://www.easa.europa.eu/community/topics/wildlife-hazard-management>

### 4.4 Maintenance of electrical systems and visual aids at aerodromes (new)

Staff constraints may have resulted in electrical systems and visual aids at aerodromes having less maintenance than usual. In addition, maintaining the aerodrome such that the signing and lighting is visible may have become more difficult. In late 2020, there was an excursion of a commercial aircraft due to poor signing and lighting caused by high snowbanks.

### 4.5 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 aerodromes staff may be confused by new taxiway routes and obstructed views of the aerodrome. Parked aircraft may obstruct signs and



markings, infringe the ILS critical/sensitive area and/or the line of sight of air traffic control. They might reduce runway through-put if they are parked on a closed runway, increasing the pressure on ATCOs and traffic participants in the manoeuvring area.

#### **4.6 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 aerodrome notices 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.

#### **4.7 Malfunction or failure of communication, navigation and surveillance (CNS) equipment**

The period of disuse and potentially a lack of proper maintenance during the period of shutdown may lead to malfunctions or failures of CNS equipment. Once equipment is used again, organisations will need to ensure that technical and support staff are available. System changes and updates will need to be scheduled and some issues may only become identifiable as traffic load increases.

#### **4.8 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 lockdown, leading to the ineffective handling of emergencies. This issue may be worsened by the loss of experienced personnel or changes in the operating environment, such as parked aircraft obstructing taxiways, access to active runway(s).

#### **4.9 Hazards associated with aerodromes being closed or partially closed for long periods**

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

#### **4.10 Disinfection (biocides) effect on aircraft systems and structural components**

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.

#### **4.11 Air Navigation Service providers returning to operations after being closed for several months *(new)***

Air Navigation Service providers, in particular non-complex service providers, may have had to close for several months and now need to re-open, including ensuring that equipment is fully operational, and staff meet their licencing requirements (and more importantly are competent).



## 4.12 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.

## 4.13 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 is not properly maintained during this time and then assessed/serviced to operational condition prior to return to service. In combination with a significant loss of staff in this area, it raises the risk of ground handling incidents.

## 4.14 Flight simulator recurrent evaluations have been limited

Due to COVID-19 crisis, it has not been possible to conduct the recurrent evaluations on FSTDs due to the social distancing requirements. The need for a special evaluation when restrictions are lifted is based on a risk assessment on a case by case basis. It may be possible to postpone the evaluation until the next evaluation period in 2021. For others a special evaluation may be conducted. In the mean time a desk audit is carried out on data provided by the FSTD operator.

## 4.15 Management of 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 in Member States in terms of available capacity and in air traffic demand may exacerbate the problem.

## 5 Training, Checking and Recency

Although these issues could also be placed in the human performance category, the safety issues relating to training, checking and recency were sufficiently numerous to form their own category.

### 5.1 Skills and knowledge degradation due to lack of recent practice

The significant reduction in traffic means that most aviation professionals are doing a substantially different job, some might not be working at all and others are working at a substantially reduced frequency. As proficiency decays, accuracy, speed and ultimately effectiveness of task performance will also deteriorate, such that more effort is required to perform tasks and resulting in a loss of spare mental capacity. Proficiency decay in only a few skills may lead to a decline in time management, situation awareness, and the ability to keep ahead of the situation. In non-normal situations or emergencies, appropriate actions may not be taken due to cognitive overload.

Guidance on how to address this issue is available here:

<https://www.easa.europa.eu/community/topics/skills-and-knowledge-degradation>

## 5.2 Transfer of pilots from one fleet to another resulting in low hours on type (new)

Many airlines have downsized and, in some cases, retired entire fleets. In doing so, some pilots will have been transferred to a new fleet with low hours on type and at a point where there is little opportunity to fly frequently.

## 5.3 Reduction in training effectiveness due to COVID-19 restrictions (new)

Necessary adaptations to training to prevent the spread of COVID may reduce the effectiveness of certain training, unless proper IT tools are used and adaptations made. Examples of areas requiring adaptation and tools include CRM training, or cabin crew training using safety equipment and performing CPR.

EASA has published guidance for allowing virtual classroom instruction and distance learning here:

<https://www.easa.europa.eu/document-library/general-publications/guidance-allowing-virtual-classroom-instruction-and-distance>

## 5.4 Increased use of real aircraft for training instead of simulators

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 skills and knowledge degradation due to lack of recency for instructors/ training captains and students, this raises the risk of training related accidents.

## 5.5 Ground handling staff and training programme disruption

Ground handling service providers have released a lot of staff during the pandemic. With business coming back sporadically and classroom training difficult due to social distancing rules, there is a concern that there will be more inexperienced staff on the ramp than would be usual. Airlines, aerodrome operators and ground handling organisations need to consider whether procedures and turnaround times need to be altered in these circumstances.

In addition to the problems faced for all personnel in missing training, ground handling has a high staff turnover, less secure employment, seasonal staff recruitment and seasonal training (such as for winter operations).

## 5.6 Knowledge transfer missed for new generation aviation personnel (new)

Many highly knowledgeable people have retired from the industry or changed over to another industry during the past 12 months, with little opportunity to provide detailed and gradual handovers to colleagues. As a result, organisations and the industry as a whole has lost the experience and tacit knowledge from a generation that in many cases founded the industry we work in and developed the procedures, principles and regulations that we now take for granted.

## 5.7 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.



## 5.8 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 skills and knowledge of aviation personnel. Licence validity may also lapse, with resultant staffing issues.

## 5.9 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 (greater frequency) than previously.

## 6 Management Systems

Safety issues related to management systems and the integration of CV19 mitigations into organisations' work.

### 6.1 Extent and duration of COVID-19 exemptions and temporary rules

The exemptions and temporary rules put in place to cope with the crisis must be risk assessed. A harmonised approach and routine reassessment when the situation changes may be needed, for example when public health authority requirements are changed.

Guidance on COVID exemptions in the aircrew and air operations domains is available here:

<https://www.easa.europa.eu/newsroom-and-events/news/easa-has-published-two-new-sets-guidelines-domains-air-operations-and>

<https://www.easa.europa.eu/document-library/general-publications/guidelines-handling-exemptions-crew-training-and-checking>,

<https://www.easa.europa.eu/document-library/general-publications/guidelines-continued-granting-exemptions-accordance-article>,

<https://www.easa.europa.eu/document-library/general-publications/guidelines-handling-exemptions-flight-crew-recent-experience>,

<https://www.easa.europa.eu/document-library/general-publications/cabin-crew-recurrent-training-guidelines-context-covid-19>,

### 6.2 Reduced oversight by competent authorities

Competent authority staff are less available and on-site visits have thus far been difficult or impossible. This means that oversight is not as in-depth and in many cases the time periods between checks have increased. In addition, occurrence data collection has reduced in proportion with traffic, making it harder to perform remote monitoring. Guidance has been provided to the Member State competent authorities on how to effectively mitigate against this risk.

### 6.3 Reduced availability of aviation medical examiners

Although there have been concerns regarding the potential for the reduced availability of AMEs during the vaccination campaign, this has not yet materialised. Should AME availability become an issue, exemptions and extensions may increase, which will need risk assessment in the context of each type of professional requiring a medical certificate.



## 6.4 Rapid growth of cargo organisations during the pandemic (new)

Not all organisations have been negatively impacted during the pandemic, some have grown rapidly. While this is positive, it presents a challenge to regulators overseeing these organisations at a point where they cannot readily visit the organisation.

## 6.5 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. They may also introduce new risks. Organisations and authorities will need to assess the impact and consider whether tasks, equipment and working environments will need to be adapted.

Guidance on integrated risk management is addressed by the material produced under the safety issue “Risk assessments based on previous normal operations are no longer valid” and is available here: <https://www.easa.europa.eu/community/topics/risk-assessments-based-previous-normal-operations-are-no-longer-valid>

## 6.6 Shut-down, restart and gradual recovery of a complex system is unpredictable

The aviation system is highly interconnected, sophisticated and merges people and technology. This means that the consequences of shut-down, restart and gradual recovery of are not completely predictable. Thus the aviation system resilience needs to be improved. Organisations will need to prepare good communications and decision-making strategies, using personnel expertise, data/ information and good internal and external coordination.

Guidance on how to address this issue is available here:

<https://www.easa.europa.eu/community/topics/resilience>

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

Managing disruptive passengers while maintaining physical distancing has involved changes to procedures with additional verification tasks and increased cabin crew workload. Cabin crew members reported that passengers are frequently slow, reluctant or need repeated reminding to wear face masks, creating a potential point of conflict that needs to be managed.

## 6.8 Risk assessments based on previous normal operations are no longer valid

Organisations’ and authorities’ risk assessments are made in the context of specific operations and operating environments. The substantially changed and changing operating environment as well as commencing “new” types of operations mean that most risk assessments are no longer valid.

Guidance on how to address this problem is available here:

<https://www.easa.europa.eu/community/topics/risk-assessments-based-previous-normal-operations-are-no-longer-valid>



## 6.9 Reduced focus on, or prioritisation of safety, human and organisational factors

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 normal. These include distractions and stress at a personal level, and economic pressures, loss of staff and the practical pressures of returning to service at an organisational level.

Guidance on how to address this problem is available here:

<https://www.easa.europa.eu/community/topics/maintaining-safety-focus-during-covid-19-pandemic>

## 6.10 Carriage of hand sanitiser in the cabin (new)

In some airports, passengers may be allowed to exceed the 100 ml security requirement and carry up to 2 litres of hand sanitiser into the cabin in small containers of 250 ml as per the safety regulations. Additionally, safety regulations allow operators to carry alcohol-based hand sanitizers and alcohol-based cleaning products onboard for use on the aircraft during the flight or series of flights for the purposes of passenger and crew hygiene. Operators should consider the related safety and security risks resulting from having high quantities of alcohol-based products on board.

## 6.11 Contamination and Risk of Infection on Return to Work

Organisations will need to adapt their procedures to minimise the risk of infection and to ensure that work areas are regularly and thoroughly cleaned. Guidance from ECDC is regulatory requirements from Member States public health authorities are regularly updated and these need to be taken into account.

The EASA-ECDC Aviation Health Safety Protocol is available here:

<https://www.easa.europa.eu/document-library/general-publications/covid-19-aviation-health-safety-protocol>

Training material on the protocol and interactive checklists are available here:

<https://www.easa.europa.eu/community/topics/support-implementation-aviation-health-safety-protocol>

## 6.12 Increasing passenger traffic risks spreading COVID-19

Restarting operations brings passengers close together and moves them between locations with differing infection levels, thus increasing the risk of infection in some locations and moving new variants between locations.

## 6.13 Carriage of cargo in the passenger cabin

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

Guidance on how to address this issue is available here:

<https://www.easa.europa.eu/document-library/general-publications/guidelines-transport-cargo-passenger-aircraft>



## 6.14 During reduced operations, new SOPs or working practices may be introduced that need risk assessment

The limited traffic means that ANSPs (and other organisations) may introduce new SOPs or simply alter their working practices. As traffic increases, the previous SOPs or working practices will need to be reintroduced, or new SOPs or ways of working developed.

## 7 Human Performance

The impact of the shutdown and return to service on human performance, such as fatigue or wellbeing.

### 7.1 Reduced adherence to procedures in the new working environment

In reduced operations, underload may create a sense of a less risky operating environment, causing staff become complacent, not completely follow procedures and/ or to be less alert. Organisations need to consider both underload and overload in workload planning.

### 7.2 Decreased wellbeing of aviation professionals during shutdown and on return to work

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

As traffic levels increase, personnel will be returning to duty with a higher than normal psychological stress. Organisations and regulators need to understand the sources of aviation professionals' fear, increased stress, and distraction, which can potentially reduce staff performance and increase safety risks.

EASA has created a wellbeing resource hub to support aviation professionals throughout the pandemic and beyond.

<https://www.easa.europa.eu/community/content/wellbeing>

You can find specific information about personal wellbeing in the section "Looking after yourself"

<https://www.easa.europa.eu/community/content/information-looking-after-yourself>

Another section of the wellbeing hub provides information on "Managing others"

<https://www.easa.europa.eu/community/content/managing-others>

There is also a range of career support material in the section "Managing the impact on your career"

<https://www.easa.europa.eu/community/content/managing-impact-your-career>

### 7.3 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 separation making leaving/ re-entering the airport a longer process. Operators who have remained active throughout the pandemic (such as cargo or HEMS) should pay particular attention to long-term fatigue issues.

Guidance on temporary FTL exemptions is available here:

<https://www.easa.europa.eu/document-library/general-publications/flight-time-limitation-temporary-exemptions-under-article-711>

### 7.4 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.

### 7.5 Aviation personnel fatigue

With redundancy and furlough reducing the available number of personnel, those left working have often worked additional hours or had a more complex working day due to a greater variety of tasks being performed. Preparing for an increase in or return to more normal operations will require significant additional effort in comparison with actual normal operations. Organisations should pay close attention to fatigue reporting and actively support reporting of fatigue and other occurrences via a strong just culture.

Guidance on how to address this issue is available here:

<https://www.easa.europa.eu/community/topics/fatigue-management>

### 7.6 Unusual approach profiles in the circumstances of the pandemic (unstable approaches) (new)

During the past 12 months, the rate of unstable approaches, has increased. This may be due to factors such as recency, lighter aircraft, or to changes in aircraft routing during the final phases of flight.

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

To reduce the risk of virus transmission, some organisations have created 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.

### 7.8 Impact of the pandemic on the ground handling industry – human factors

Ground handling organisations have lost staff and those left have managed a very varied workload with fewer daily aircraft movements. If traffic increases steeply, there will be a combination of staff who are no longer used to a busy airport environment and newly recruited staff. The poor employment conditions

experienced by many in this aviation domain may have exacerbated the impact of the pandemic both personally and professionally.

## 8 Financial Impact

The financial impact of the shutdown and gradual return to service influences safety, such as fewer resources and disconnected supply chains. It is also one of the underlying aspects for safety issues in other categories.

### 8.1 Reduced available financial resources limiting the number of operational and technical personnel and delaying investment

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 long after traffic levels have begun to recover.

### 8.2 Missing suppliers and difficulty liaising with suppliers

The lockdowns resulted in difficulties for organisations liaising with their suppliers. Further economic constraints may increase problems with it becoming difficult to maintain the supply chain, leading to a lack of spare parts, products, calibrated tooling and so on. A lack of any of these resources can interfere with the ability to complete a task.

### 8.3 Reduction in contracted fees to ground handling service providers (new)

In a section of industry already struggling to finance itself, this reduction will see less staff handling aircraft, or staff performing duties for which they are not properly trained.

### 8.4 Decreased funding of aviation regulatory authorities (new)

The dependence of many of aviation's regulatory authorities on funding from the industry means that they may now lack funds at a point where regulators need to be highly active in overseeing an industry that is both pressurised and changing rapidly.

## 9 Outdated Information

The shutdown means that several types of information may be out of date and difficult to update in time for a return to service. Staff will need time to get up to date on return to operations.

### 9.1 Documentation and database updates may not have been applied, resulting in outdated or inconsistent information

Relevant updates of operational procedures and documentation, especially temporary revisions/updates may have been missed. In addition, aircraft databases such as TCAS, TAWS Nav DB, AIS, may be out of date.

### 9.2 Incorrect aircraft navigation due to difficulties in getting up to date with changed/ new information

Aircraft may deviate from their allocated flight path, assigned flight levels or lose separation as a result of working with outdated or inconsistent information. Assuming that databases have been updated, pilots,



flight operations officers and ATCOs will still need time to get up to date both in advance of and during the return to normal operations.

