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ASSESSMENT & ANALYSIS OF CIVIL AVIATION RISKS IN THE 2020 LOW ACTIVITY PERIOD

French Civil Aviation Safety Directorate (DSAC)
Safety Management coordination Office (MEAS)
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Document management

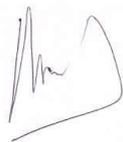
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1. Introduction

The current health crisis represents an unprecedented upheaval in the aeronautical world and has generated new threats whose effects need to be studied, both in the short and long-term. From the very first weeks of the traffic collapse, concerns have been expressed about the new threats linked to this exceptional situation. Although the period of shutdown had its own risks, it gave way to a phase of reduced activity in air transport, with partial resummptions and then a further reduction of activity. This phase, in which Civil Aviation is still in at the beginning of 2021, is therefore characterised by low activity.

Against the backdrop of a significant decline in air traffic, it is important to ensure that all the resources deployed by the State and by air operators to ensure continuous improvement in the level of safety remain present and effective. Since the beginning of the crisis, numerous actions have been taken both by national and international authorities and by the operators themselves. There have been a multitude of publications and articles that have focused on risk mitigation. Among the main documents that can be cited are the ICAO's Doc 10144 [Handbook for CAAs on the Management of Aviation Safety Risks related to COVID-19](#), EASA has dedicated a page on its website to a series of [guides](#), and at the national level, in addition to the relay it has provided for these numerous productions, DSAC, as oversight authority, has distributed its own [publications](#), mainly in the form of [safety information leaflets](#) and [guides](#) for operators.

Without detailing all the actions that have been taken by the authority and the operators, the purpose of this study is to carry out an assessment and prioritisation of safety issues on the basis of safety data collected in real time, i.e. incidents and oversight data. These data are supplemented by feedback from the operators themselves collected during exchanges with DSAC inspectors. This study aims in particular to:

- Assess the safety risks generated directly or indirectly by the safety issues arising from the current health crisis,
- Ensure that operators have taken into account all the safety issues that relate to them within the framework of their Safety Management System (SMS), or in their safety policies for operators who do not implement a SMS,
- Make recommendations as a means of reducing risks.

This study is part of a coordinated approach to continuous risk management, which is at the heart of the State Safety Programme (SSP).

Note: as accurate as we tried to be while translating the original document from French, only the latter shall be considered for reference. In any doubt, only the French version prevails. In particular, several occurrences were reported in French, often in less formal language, that we tried to render in their translation. Fewer occurrences were reported directly in English, that were then disidentified from the initial version.

2. Methodology

2.1. Safety issues taxonomy and portfolio

In order to examine the risks and their distribution by industry area, DSAC based its work on the study of the safety issues identified by EASA in its taxonomy entitled [Review of Aviation Safety Issues Arising from the COVID-19 Pandemic](#). The 45 safety issues cited in this document are grouped into six main areas: Management Systems, Human Performance, Training, Outdated Information, Infrastructure/Equipment and Financial Impact. EASA has recently integrated these safety issues into its strategic safety improvement plan, [EPAS](#). DSAC has analysed each of the safety issues, identified new ones, regrouped them and took them all into account in a portfolio specific to the health crisis, called "COVID portfolio" in this study and presented in the annex.

2.2. Input data

To carry out this study, DSAC defined two sources of information: safety events reported to the Authority during this period, and direct feedback from oversight activities. To access this information, three main actions were undertaken:

- A specific examination by detailed in depth reading of the reported safety events present in the ECCAIRS database between May 11, 2020 (end of the first lockdown in France) and October 31, 2020. Over the 172 days of the period, a sample of 70 days evenly distributed throughout the reference period was studied, representing approximately 8000 event reports, i.e. about 40% of the reports in the period. 589 reports, i.e. about 7% of the reports analysed, were considered to be causally linked at least partially to the health crisis and the low activity it generated. These events were all examined and classified in the light of the COVID portfolio.
- An analysis of SSP indicators comparing their levels in 2020 to those since 2016. Each indicator represents a safety topic (e.g. runway incursions, unsafe proximity between aircraft operating in public transport and general aviation, etc.) based on the standardised and textual fields of the ADREP taxonomy¹ contained in the reports. The number of reports for each indicator has been related to traffic data in order to allow a relevant comparison with previous years.
- Sending a survey to the various DSAC entities directly responsible for oversight (in the regions or at headquarters as appropriate) asking, for each safety area identified in the COVID portfolio, for an answer to the following four questions:
 - have you identified safety risks related to the issues and concerns in this area of safety? If yes, which ones?
 - have you issued any derogations or exemptions related to this area of safety? If yes, which ones?
 - can you specify the method or means used to assess the safety risk?
 - How do you interpret some SSP indicators showing significant changes compared to the previous year?

This study is based on the analysis of all the elements collected.

¹ Accident/Incident Data REPorting, ICAO taxonomy for describing safety events

2.3. Biases and limitations

2.3.1. Specific reading of reports

The reading covered only about 40% of the reports between May 11, 2020 and October 31, 2020 (about 8,000 reports out of a total of 20,000 reports received over the period). It is therefore not exhaustive.

The annotation of the reports has been entrusted to several safety analysts. Despite specific instructions, the annotations were subjective; in fact, the results varied between analysts depending on their professional experience.

The events selected were included in the study on the basis of the raw report as transmitted, without having sought further details from the persons who reported the numerous cases identified.

The low number of reports associated with the COVID portfolio does not allow for a statistical analysis of the results. The interpretation of the results of this specific reading should therefore be taken with caution. In the rest of the document, the figures provided do not constitute a measure of the associated risks. They are only presented to illustrate the order of magnitude in which the themes listed in the COVID portfolio may appear in safety event reports.

2.3.2. SSP Indicators

The link between an increase in reporting on a safety theme and a deterioration in the level of safety cannot be established without further analysis. Indeed, the level of reporting is influenced by multiple factors which can also change over time, including the safety culture of the reporting bodies or promotional actions on certain safety topics. A collegial analysis of the SSP indicators was undertaken during a SSP review and during several meetings of the French Flight Safety Networks (Journées du Réseau Sécurité des Vols France) with experts in each field in order to ensure that these indicators are not simply statistical fluctuations but rather correspond to a reality on the ground.

In order to limit the variability of the results due to the low number of reports and the low volume of traffic during this period, the results have been grouped by quarters.

The months of November and December 2020 were excluded from the reading and analysis of the SSP indicators because of the incomplete data they contained and the absence of traffic data used to establish the rates.

The traffic data provided by DTA (Air Transport Directorate) relates only to commercial traffic at certain aerodromes and are not representative of general aviation traffic or overflight traffic. They therefore give only a partial assessment of the level of activity, whereas the reports come from both commercial and non-commercial actors.

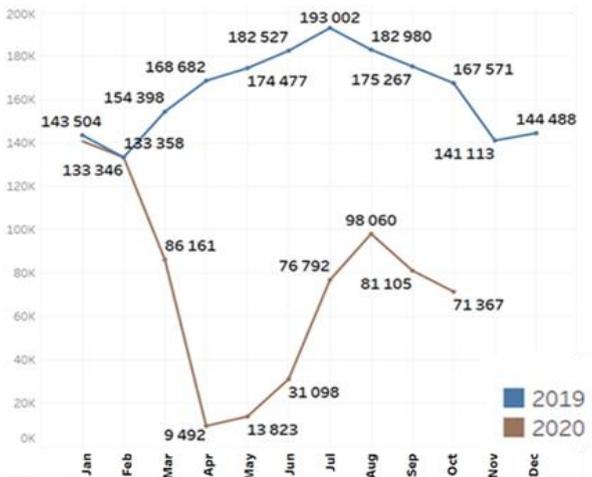
Reports from foreign operators have not been included in this analysis. On some aerodromes, the absence of data from some large operators (Ryanair, EasyJet, Volotea, etc.) may have a significant effect on the results.

3. Analysis through SSP indicators

3.1. Total volume of reports

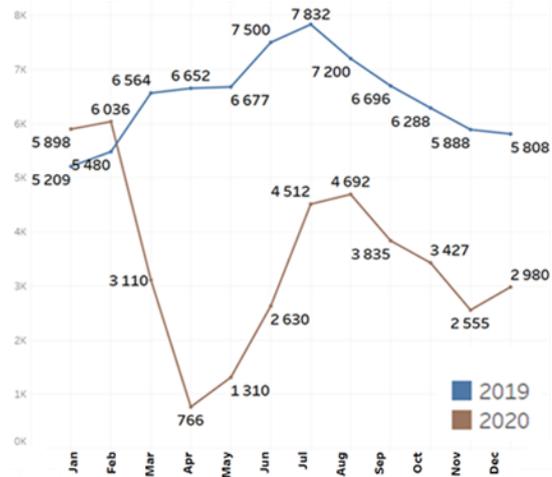
The SSP indicators are based on the reports received by DSAC and recorded in the ECCAIRS France database. The number of commercial movements (Figure 1) and the number of reports (Figure 2) followed the same trend in 2020. However, it is notable that reports resumed more rapidly in the months of May-June-July than commercial traffic. The reporting rate in 2020, i.e. the number of reports in relation to the level of traffic, remained equal to or slightly higher than in 2019 for all areas combined. Some categories of reporters saw their report rate increase, but this observation, taken alone, cannot be interpreted.

Figure 1 - Number of monthly commercial movements on French aerodromes



Source: DTA

Figure 2 - Number of reports in ECCAIRS France database by month of occurrence



Source: ECCAIRS France

3.2. Comparison of indicators

For each SSP thematic indicator, the reporting rate was calculated in relation to the number of commercial movements at French aerodromes for each type of reporting organisations. The rate for "Airlines" reports is calculated by taking into account only the movements of French airlines.

Given the low number of reports in some cases, reporting rates below 10^{-5} have not been considered in the analysis.

Only indicators showing a significant increase (>50%) for at least one type of reporting organisation were selected for further analysis. Thus, the analysis of absolute values is of little interest, and only orders of magnitude of the variations were considered.

This analysis highlighted significant increases for the following indicators (Figure 3): Runway Incursion, Wildlife hazard, Controlled Airspace infringements and Non-Stabilised Approach/Non-Compliant Approach (NSA/NCA).

The other SSP indicators have not shown such a significant upward trend - but this does not mean that the associated safety risks have not changed.

Figure 3 - Quarterly evolution of the reporting rate of SSP indicators



Source: ECCAIRS France and DTA traffic data

Note 1: Q3 2020 results exclude the months of November and December 2020.

Note 2 - reminder: The rate is calculated by dividing the number of reports corresponding to each SSP indicator and by each type of reporting organisation by the number of commercial movements at French aerodromes. The rate for "Airlines" reports is calculated by taking into account only the movements of French airlines.

3.2.1. Wildlife hazard

The *Wildlife hazard* indicator is the one that has risen the most, with a threefold increase compared to previous years. The analysis of the rate of bird strikes with commercial aircraft carried out by the French Civil Aviation Technical Service (STAC), which has expertise in ornithology and wildlife control at aerodromes, confirmed this trend. This increase was particularly spectacular between the months of May and July after an initial lockdown, where traffic had been very light or absent on certain aerodromes. The fauna, being less disturbed by aeronautical activity and possibly fewer wildlife control measures, has reappropriated certain territories. After a peak during the return to operations, the rate of reports on wildlife hazard remained above normal until October.

3.2.2. Non-Stabilised approach/Non-Compliant approach (NSA/NCA)

The increase in *non-stabilised approaches*, already noted by IATA (International Air Transport Association), can be seen in the reports from French air traffic control from May 2020 onwards. Flying with lighter commercial aircraft, having the possibility of shortening the approach path or making visual approaches to save time, as well as the temptation to disconnect automatisms "to maintain manual handling skills" have been cited as potential factors in these events. The merging of airspace sectors that could cause an overload of work for the controller was cited in some events. The increase was most visible at Paris-CDG airport until September.

3.2.3. Runway incursion

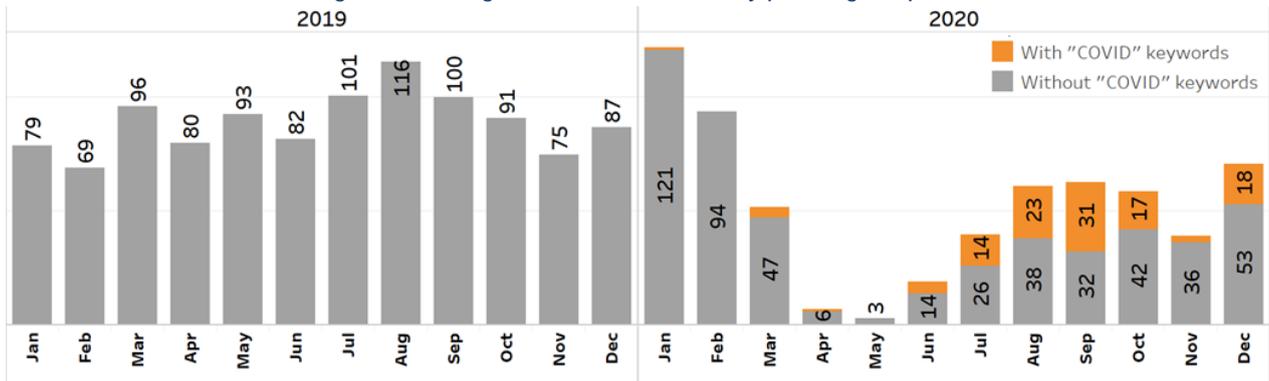
The indicator for reports of *runway incursions* increased in the second quarter of 2020 (summer season). Most of the increase concerns general aviation aircraft operating on general aviation aerodromes only or mixed commercial/general aviation aerodromes. It should be noted, for example, that the number of reports in the summer of 2020 was similar to that of the summer of 2019 at Toussus, Meaux or Perpignan airfields. Indeed, the level of traffic for general aviation was very sustained after the first lockdown lifting. However, events are not observed with general aviation alone: events with vehicles, pedestrians or between commercial aircraft are also observed. The ATM contribution can be found in some of these incursions. Runway incursions are part of undesirable events that are sensitive to the degradation of both prevention and recovery barriers. This is valid for all stakeholders, particularly for the subjects covered by the "Human Performance" and "Training, Tests and Recent Experience" areas of the COVID portfolio.

3.2.4. Controlled airspace infringement

The *controlled airspace infringement* indicator includes reports of the absence of mandatory contact before entering into the airspace. Its increase is explained by non-compliance with regulations by some general aviation aircraft. This was observed in some specific regions with heavy general aviation activity, particularly in the south-east region of France. It should be noted that this increase in the "infringement" indicator did not lead to an increase in the "air proximity" indicator, to which it is closely linked.

3.3. Unruly passengers

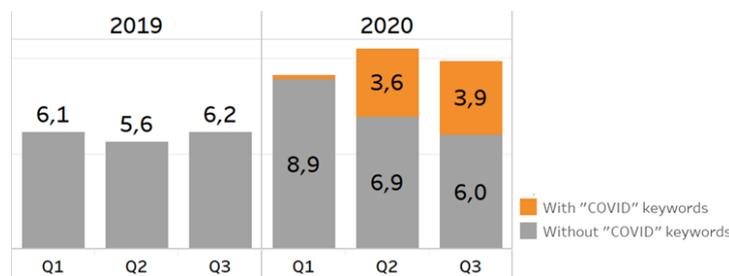
Figure 4 - Change in the number of unruly passenger reports



Source: ECCAIRS France

Unruly passenger events have been previously identified as being of interest in the context of the imperfect application of health instructions. An indicator based on *unruly passenger* event reports has been set up and used to monitor the evolution of this risk in relation to compliance with health instructions. This indicator was supplemented by information on the presence of key words related to COVID (facemask, pandemic, CV19, etc.). The absolute number of *unruly passenger* reports did not increase significantly (Figure 4) as feared, as was the case in certain foreign countries (United States in particular). However, a fraction of the *unruly passenger* events related to non-compliance with health instructions did occur, which resulted in an increase of around 30% in the rate of *unruly passenger* reports per million passengers for the French airlines (Figure 5).

Figure 5 - Rate of unruly passenger reports in relation to the number of passengers carried by French operators



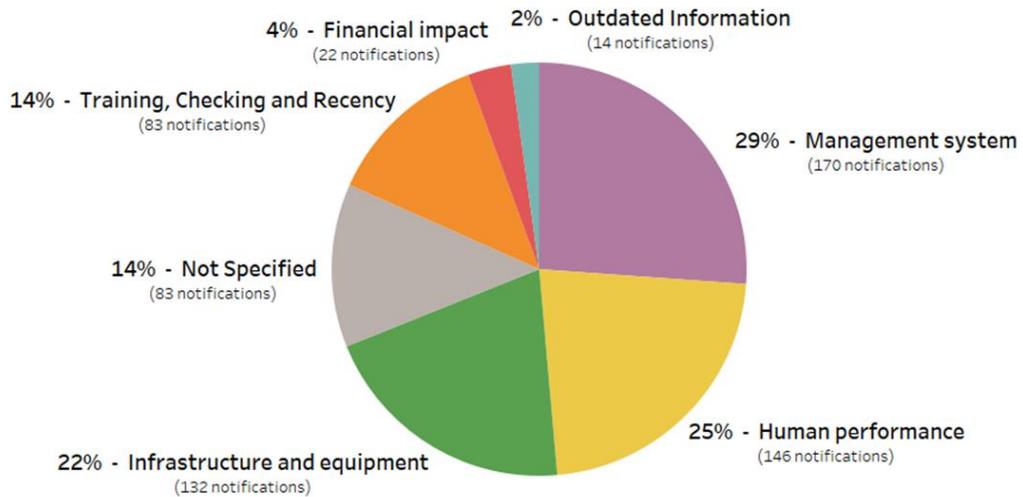
Source: ECCAIRS France and DTA traffic data

Note: the rate is calculated by dividing the number of reports corresponding to the unruly passengers indicator by the number of passengers carried by French airlines in million.

4. Analysis by COVID portfolio domain

4.1. Global breakdown

Figure 6 - Overall distribution of reports associated with COVID portfolio during specific reading



Source: Specific reading of the ECCAIRS France database.

The Covid portfolio was applied to the 589 events identified and resulted in the gross distribution shown in Figure 6.

A number of lessons can be drawn from a review of this distribution:

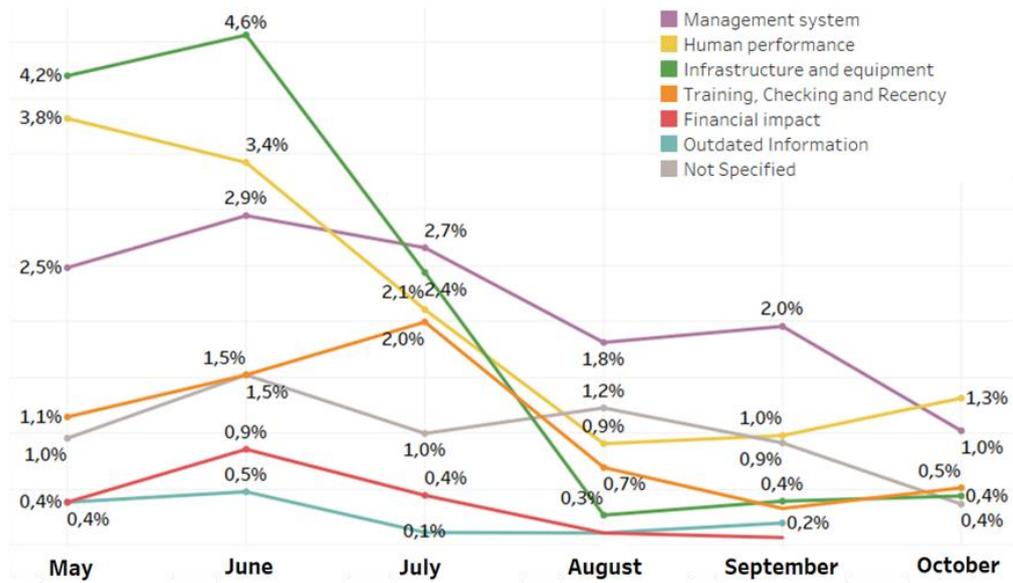
The fact that "management system" is at the top of the list of reports does not indicate that it has been deficient but is due to sub-headings grouping many families of events under this heading.

The category "financial impact" was mentioned very few times, probably because the frontline agents cannot easily see the direct contribution of this cause, or because the various economic and social support measures have mitigated its effects in this first period of the health crisis.

Finally, 14% of the events ("unspecified") are of a type that had not been foreseen by the expert's judgement when the portfolio was set up, a sign of the diversity of events and threats.

4.2. Evolution over time

Figure 7 - Proportion of reports related to COVID portfolio during specific reading compared to the total number of reports per month



Source: Specific reading of the ECCAIRS France database.

In May and June 2020, around 15% of reports were linked to the health crisis, whereas there were only 4-5% in August, September and October. Once the period of adaptation to the new situation had passed, some of the threats were resolved and more effective risk mitigation measures could have an impact. This can be seen as a resilience effect through system learning, although it cannot be ruled out that part of this decline may be due to an under-reporting bias out of sheer habit.

4.3. Detailed examination by category

The "unspecified" category corresponds to events that have been attached to a large family without recourse to subheadings.

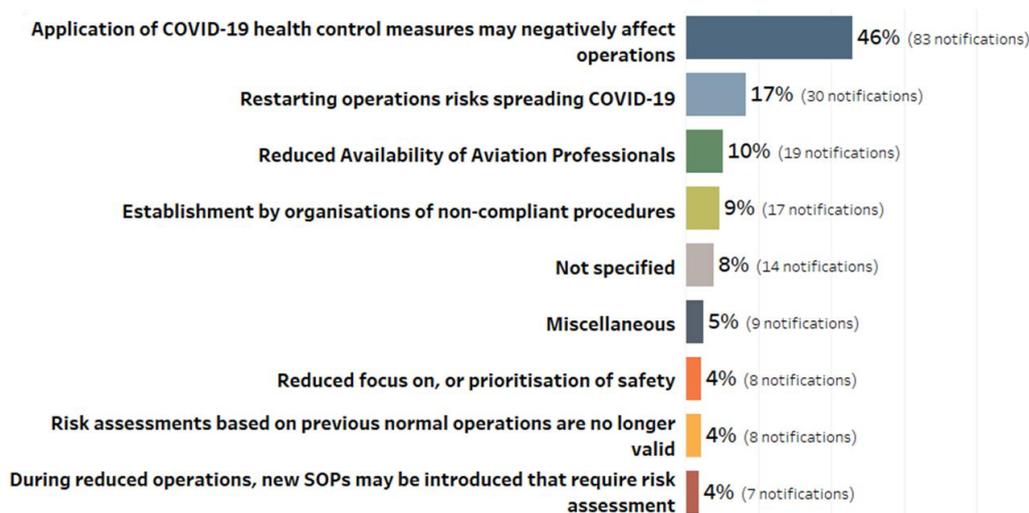
The "Miscellaneous" category includes codifications for which small proportions (a few percent) were coded.

The examples of reported events in each category have been extracted from the ECCAIRS France database and transcribed without change, except for non-essential and/or potentially identifying elements, which have been deleted and replaced by [...].

Except in exceptional cases, the QFU and associated parameters (wind, headings...) are converted to a 01/19 runway in order to anonymise the events reported while making them easier to read.

4.3.1. Management system

Figure 8 - Distribution of topics associated with the "Management System" domain of COVID portfolio



Source: Specific reading of the ECCAIRS France database.

Note 1: the topic "Establishment by organisations of non-compliant procedures" does not appear in the COVID EASA taxonomy and has been added by DSAC.

Note 2: the topic "Reduced Availability of Critical Aviation Occupations" has been expanded by DSAC to "Reduced Availability of Aviation Professionals".

As a result of the fall in the level of activity and/or short-time working, many operators (particularly aerodrome operators and ANSPs) have seen the operation of their management systems affected to varying degrees. For some operators, this has resulted in:

- a risk on the ability to maintain internal oversight programs,
- a delay in the analysis of safety events, with diagnostic often impoverished,
- more rarely a delay of up to several weeks in reporting their events.

Some events mention the unavailability of Aircraft Rescue and Firefighting Service (ARFFS) and/or wildlife control personnel. Degradations in the service provided have been observed although this information was published in the Aeronautical Information in most cases. The accumulation of such degradations may have an impact on the level of safety.

Threats also arise in connection with the management of atypical operations (new operations or changes in the network due to the crisis) whose procedures are not always detailed in the organisation's reference frameworks.

On the maintenance and continuing airworthiness side, a few safety event reports were detected. The analysis often revealed the reduction in the number of qualified personnel available to carry out checks, the impact of teleworking on the management of the activity, and the difficulty of taking into account the new operating methods (specific cargo flights).

Finally, most events involving unruly passengers are classified in this category, one of the factors of which is linked to the application of health instructions (wearing of facemasks, placing and distancing in the cabin, etc.).

Examples of events reported in the "management system" category

Absence of wildlife control

Scenario of the event: Observation of 2 foxes playing on the runway and which will occupy the runway for almost 45 minutes. Also presence of a large number of birds. No means of wildlife control available.

Answer from the operator: Concerning the absence of wildlife control, there were not enough staff. We are going to add on the NOTAM the schedules without wildlife control available.

Associated COVID portfolio elements: Reduced Availability of Aviation Professionals

[Operator's request to carry out maintenance that is not consistent with the practices and needs of cargo flights]

Scenario of the event: Cargo flight with PAX aircraft without cargo in cabin. In addition to the XXX procedure, I ask the co-pilot to check that the water is turned off. The water in the galleys is turned off, however, there is still water in the toilets. The mechanic informs me that, contrary to recent practice, the attached maintenance checklist no longer requires the water to be turned off in the toilets. After analysing the situation and contacting maintenance, the decision was made to return to previous practices and we closed the valves behind the mirrors in all the toilets except 11 and 12. We mention this action on the ATL [Aircraft Technical Log]. At the end of the flight, maintenance sends us a message that confirms our choice.

Elements of analysis by the operator: Pronounced maintenance release without toilet water cut-off. Subject monitored internally. Taken into account by maintenance. Maintenance answer: Following the numerous pilot and maintenance reports on this subject, it was decided to overhaul the CL XXXX in order to respond as well as possible to the new operation of our cabins (cargo). This CL has been made for ferry flights and control flights. It now appears that this procedure requires adaptations and improvements to be in line with the new cabin configuration requested.

After analysis, modifications to the CLXXXX and the launch process were initiated and it was decided in collaboration with all the stakeholders in the application of this CL to create 3 separate CLs: - flight without cabin crew (equivalent to a ferry flight for pilots), - flight with cargo in the cabin, - test flight/ check flight...

These new procedures, customised for each type of flight, will enable the technicians in charge of cabin configuration to read them more easily, thus eliminating possible interpretations and sources of error. Validation of these 3 CLs is underway and their implementation should be completed rapidly.

Associated COVID portfolio elements: Risk assessments based on previous normal operations are no longer valid

Take-off with unfinished weight and balance process

Scenario of the event: After receiving the validation on ground I do not tell the copilot that we have to wait [for the update before departure] ... We are then overwhelmed by the difficulty in getting a push and leave without [update before departure]. After the takeoff we receive a correction loadsheet modifying ZFW and ZFWCG.

Elements of analysis: The mass and balance procedure is completed by captain signature and reception of the message [update before departure] (MANEX A). Hurry-up syndrome is a threat during turnaround. It is all the more topical with low loads implying faster boarding and the means on the ground not being systematically available when the crew is ready. Good analysis of the crew. FSO return to flight crew for recall.

Associated COVID portfolio elements: Management system

Smoke lavatory during descent on a two-pilot cargo flight

Scenario of the event: The smoke lavatory alarm goes off during the descent to FL220. We are on a pax plane decommissioned for cargo transport in the hold. The cabin is empty. We change the division of labor: the captain becomes PF and manages the trajectory and the radio. The [co-pilot] goes into the cabin to manage any fire. It is 4h19Z, the alarm comes from the lavatory 44 or door 4D. I speed up the flight to save time in the event of a fire and I communicate my actions to the co-pilot via the public address.

The co-pilot cancels the alarm, inspects, then makes a cabin call to let me know that there is no fire or anything abnormal and then returns to the station. It is 4:25Z. After analysing the new situation, we decide that the co-pilot return to gate 4R to confirm that the situation has not changed. This is the case. He returns to the controls at FL100 and then becomes PF again. A new assessment of the situation leads us to conclude that the smoke detector is faulty. Landing at 4:38Z, 19 min after the event.

Associated COVID portfolio elements: Management system

Derogating flight

Scenario of the event: Derogating flight double legs AAA/BBB/CCC. 1st leg AAA/CCC with 120 passengers, early departure, CCC arrival on time. Flight conditions with occasional but sustained turbulence, sometimes moderate.

BBB stopover treatment optimised by ground staff with the need to comply with particularly strict and restrictive health regulations. It is these conditions that increased flight fatigue, namely : - disembarking passengers in groups of 50, then waiting for the first 50 passengers to go through customs and health formalities, and then the same for the other passengers, again in groups of 50, i.e. an overall treatment, just for passengers, of around 40 minutes.

Then, cabin and cockpit disinfection by reinforced teams with the obligation for the crew (pilots and cabin crew) to leave the bridge during this process. Waiting time = 30 additional minutes.

Although the transit at BBB was efficient, the workload was relatively bearable. On arrival at CCC, we had to wait for the crew leaving for AAA with the plane to take care of the passengers remaining on board. This wait was particularly long (more than an hour) even though we arrived at CCC 20 minutes ahead of schedule. We arrived at the hotel more than two hours after the block even though the hotel is located on the airport platform (less than 20 min by bus).

Associated COVID portfolio elements: Management system / Aviation personnel fatigue

Unruly Passenger Level 1

Scenario of the event: During boarding, the passenger in [seat number] categorically refuses to sit next to another passenger for health reasons.

She repeatedly reiterates that she is a doctor and that she and her patients should not expose themselves. She does not understand how the airline can do this and says that she wants to file a complaint if she is forced to travel under such conditions. I tell her that the airline has the right to do so... I did not go into the speech about all the health measures put in place by our airline because it is closed to all arguments.

I inform the purser who authorises me to move the pax to another area after having consulted and informed the captain.

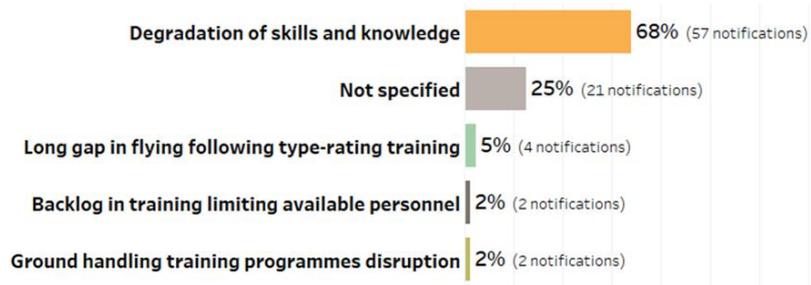
I go back to see the passenger to calm the situation but also to make her understand that we were able to find a solution today, but that this will not always be the case in the future. That if she wants to travel, she has to accept the rules. She reiterates the fact that it is not normal not to have been informed by the airline of the conditions of transport with the failure to respect the distances. I answer her that from now on, she is informed and invites her to buy a second seat for her future trips if this situation is really constraining for her.

The passenger did not attract attention to herself during the rest of the flight.

Associated COVID portfolio elements: Application of COVID-19 health control measures may negatively affect operations

4.3.2. Training, Checking and Recency

Figure 9 - Distribution of topics associated with the " Training, Checking and Recency " domain of COVID portfolio



Source: Specific reading of the ECCAIRS France database.

A reading of certain reports reveals difficulties in maintaining the qualification requirements for agents working at the aerodrome (aerodrome firefighters and drivers on the movement area in particular).

In general aviation, the lack of recent experience and/or the difficulty of carrying out dual flights with an instructor seems to have affected flight safety. At least one case in recreational aviation has been identified where the flight was knowingly undertaken without an instructor for fear of exposing oneself to health risks, which led to an accident, the [report](#) of which appears on the BEA site. In this case, the threat was selected as a risk without any mitigation measures, even though the federation to which the pilot was affiliated had published recommendations on the subject.

Many events reveal errors, omissions, loss of automatism and routines, a sign that practice is lacking. These errors can sometimes seem insignificant and are classified with low levels of risk by the operator's analysis. They nevertheless show a lack of practice which can, depending on the context, prove more critical. Pilots' lack of self-confidence is also felt, for example, in reports reporting long or supposedly long landings, where the demands for parameter analysis are greater than usual, but also with short or hard landings. Lack of practice also results in lack of skill and confusion between controllers, or a lack of responsiveness to particular situations.

In terms of the use of the portfolio, the distinction between "human performance" and "training" is delicate: one is a symptom, the other is the root cause. Reports often contain little or no information on the training of professionals and their recent practice.

Cognitive overload has been observed during traffic peaks after long periods of low activity, which reinforces the need to maintain the skills of aviation professionals.

Examples of events reported in the "Training, Checking and Recency" category

Take-off despite alarm

Scenario of the event: special cockpit because it is my flight [...] to take over after 5 months without flying. Instructor in the right seat and 2 copilots in seats 3 and 4. Rolling [...] for runway 02R. Rolling with a heavy workload because we had initially planned for runway 01L. Aircraft parameters reset, briefing updated and procedure [...] carried out. 3 contradictory ATC instructions also add load: "hold short 02R" then "Line up 02R and wait" then again "hold short 02R". We arrive at the stopping point ready, C/L performed. And we are cleared for alignment and take-off 02R. During the thrust setting, the alarm sounds furtively, " Config Gear Steering ". I announce Stop, but the instructor announces "no it's ok". At that moment, I approve and we continue the take-off. On second thought, we should have stopped the take-off, especially as we were at low speed and that's what had been evoked at the briefing for any alarm before 80kts. The particular cockpit of the flight, the fact of being PM and therefore not having my hands on the controls at that moment, and maybe also the fact of still being "young" on this plane, made me take a bad decision.

Associated COVID portfolio elements: Long gap in flying following type-rating training

Late gear retraction

Scenario of the event: Authorised alignment and take-off, I forget the lights and the transponder. I realise this during the take-off run and I plan to regularise the configuration once in the air. Around 200/300 ft above ground level I normalize the configuration but forget the "positive rate". The co-pilot, in line training, realises this and verbalises ["positive rate, gear up"]. The train will be retracted at about 700 ft. above ground level. Context: only 13 rotations have been carried out over the last 6 months, of which only one has been carried out for [2 months]. The omission of the lights and transponder items modified my usual rotation sequence, coupled with reduced experience over the last few months, favoured this second omission.

Associated COVID portfolio elements: Degradation of skills and knowledge

Lining up on the wrong QFU

Scenario of the event: We start the taxi out to XXX. The parameters have been checked and are compatible for take-off on runway [01] from intersection YY. We cross the waiting point and I follow the ground markings to the left. Once aligned with the centreline of the runway, the instructor realises that I am not stopping and informs me that we are planning to take off from YY. I realise my mistake and stop without excessive braking, we were exiting the turn at low speed. We are alone on the track and there is no traffic on final, I perform a powerback of about ten meters until I see the intersection in the left, back field of the side window. We converse quickly (a few seconds) in the cockpit on the event and then the [pre-take-off actions] are carried out as well as the checklists. Take-off is then started. We were on the fourth stage of the rotation, this is my third day of activity after not flying for 9 months. A little fatigue was felt but without any effect on the flight until then, the work routine still not having returned and the procedures having evolved a little during my absence, I had to devote more resources than expected, during the taxiing, to think about the sequencing of the actions ([actions before take-off], C/L, [...], actions to be performed, ...). I forgot about the planned departure action in QFU [01], the reverse runway being in use.

Associated COVID portfolio elements: Degradation of skills and knowledge , Aviation personnel fatigue

Non-stabilised approach

Scenario of the event: Morning return flight, PF on the way back. During the briefing, I mention the threat of under-training (one return trip every 15 days since June, 700 flight hours on [aircraft type]) and therefore the fact that I no longer dare to disengage the automatic systems. CAVOK, the captain offered to help me by increasing his monitoring in order to put me at ease and allow me to train. I hesitate but my Control 1 Training 1 deadline approaching, I want to train. AP FD ATHR disconnected at 6000 ft before the LOC interception, runway in sight. The approach goes well, then after full flaps I go high, I correct, speed a little high I reduce (too much) then go under the slope, under VLS. I readjust the thrust and correct the slope just before the flare. We should have gone around.

Elements of analysis by the operator: (...) Subject lack of recent co-pilot training with little experience. FSO return to crew with elements (Analysis and curves)

Associated COVID portfolio elements: Degradation of skills and knowledge

STCA Alert HN 70

Scenario of the event: Runway landings on [02L] and [01R]. [Aircraft 1] is vectored to ILS [02L]. Inspection of runway [01R] planned. [Aircraft 2] is vectored to ILS [01L] (runway intended for take-offs) to shorten its taxiing path to its parking area. Axes [02L] and [01R] are displayed on the radar. Axis [01L] is not displayed. Different approach sectors are merged. Context for exit from [Lockdown].

[The approach controller] plans to shorten the path of [aircraft 1] as much as possible in order to 'fly past' [aircraft 2] and to avoid the chevron intercept rule which guarantees the minimum spacing required for a simultaneous approach. [Aircraft 1] makes a non-compliant approach.

[Aircraft 2] begins its descent on the ILS [01L] before [aircraft 1] is established on the LLZ [02L], creating a loss of radar separation. The [approach controller] is surprised by the early descent of [aircraft 2] on the ILS [01L] (not displayed on the radar chart) which takes place 0.5 NM before the FAP of the ILS [01R] which is displayed on the radar.

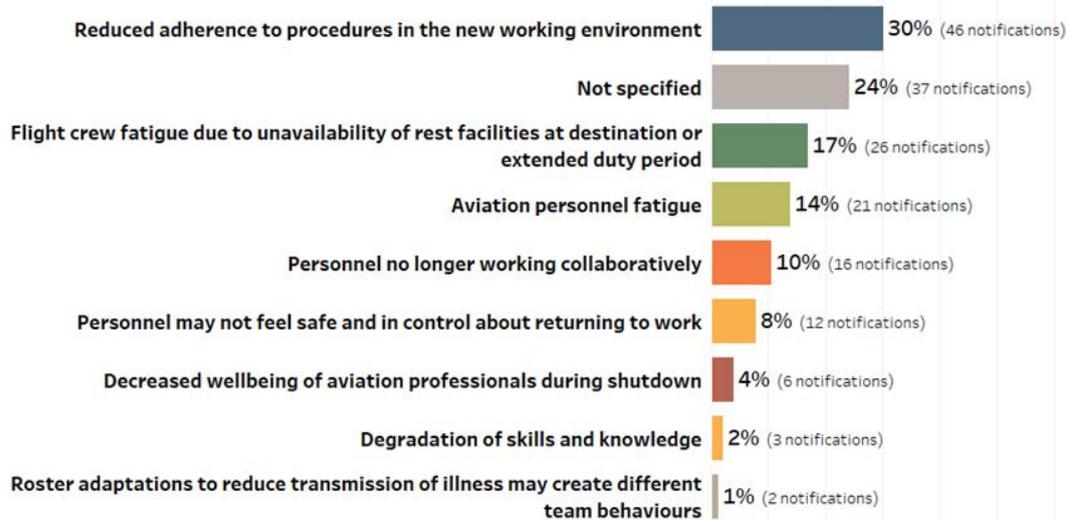
When the STCA is activated, [the approach controller] does not provide traffic information in order not to congest his own frequency and to be ready to deliver an emergency message (heading left, 030) in case of an overshoot. He does not issue an evasive manoeuvre. No speed instructions are given.

The [approach controller] refers to a loss of reference points in the management of simultaneous approaches following the context of COVID 19, which led him to less frequently perform his duties as approach controller, after his recent qualification.

Associated COVID portfolio elements: Degradation of skills and knowledge

4.3.3. Human performance

Figure 10 - Distribution of topics associated with the "Human Performance" domain of COVID portfolio



Source: Specific reading of the ECCAIRS France database.

Non-compliance with procedures and working methods is present in the reports and feedback from oversight activities in almost all areas. It can have different reasons:

- e.g. a drop in traffic leading to a drop in attention and reduced vigilance (ATCO)
- lack of recent practice
- new procedures created by operators to adapt to the crisis less well assimilated
- pressure induced by the reduction of staff (ground handling).

However, this decrease in adherence to procedures, is much more indicative of lack of practice and loss of routine and habitual reference points than of voluntary non-compliance, although in rare cases a lack of involvement in relation to the particular context is cited. In a context of low activity, the slightest increase of workload can then quickly lead to cognitive overload and limit the quality of the application of procedures by causing errors and omissions, as the examples below show.

The risks associated with flight crew fatigue on flights with exemptions or binding health protocols appear to have been well considered by operators who, for example, have made additional pilots available, but the factor is often cited in the reports. The threat is therefore real, but fatigue risk management mechanisms appear to have mitigated its effects at least temporarily.

Examples of events reported in the "Human Performance" category

2 Forgotten checklists

Scenario of the event: Covid context and captain return to work flight. Threats expressed and briefed. Despite everything, during the push, something bothers me and I realise that we didn't do the before start C/L. All the actions were done. At the arrival on XXX, I point out that the last stage of approach is the same as the transition altitude and that this constitutes a threat. However, the approach C/L will be forgotten and recalled in the final. Rest of the rotation is normal.

Associated COVID portfolio elements: Reduced adherence to procedures in the new working environment

[Forgot Pitot cover], aborted take-off

Scenario of the event: During the take-off run, we detect a discrepancy between the left and right anemometers (40kt). I decide to abort the take-off. When we arrive at the stand, I notice that the pitot cover has remained in place on the right pitot and proceed to remove it. We proceed to a new take-off, which takes place without any problem.

Elements of analysis by the operator: The crew (...) decides to abort the take-off as indicated in the MANEX procedures. (...) The aircraft walk around is an important action by the crew which enables this type of situation to be avoided. The resumption of flights after a long period of inactivity linked to the COVID 19 pandemic may explain this phenomenon. Crews will be reminded to avoid repeating this type of event.

Associated COVID portfolio elements: Reduced adherence to procedures in the new working environment

NSA: "Exit flaps instead of speed brakes"

Scenario of the event: During the approach, FL 090, 250kt, shortening of the trajectory by control and speed reduction. Mistake on my part and release of the flaps for a few seconds instead of the speed brakes. High speed alarm. Incident reported on the TLB, after technical inspection, aircraft ok.

Elements of analysis by the operator : Little traffic on the frequency, ATC requests a reduction of trajectory with a short remaining distance announcement, the captain is surprised, this possibility had not been evoked during the briefing. His first reflex is to extend the SPOILERS but he makes a mistake, he sets the flap control to extended by mistake, and it is reset to 0 as soon as the error is detected. In order to delay, he asks ATC to extend the downwind to redo his action project. No aircraft damage found after technical inspection. A lack of feeling at ease is undoubtedly a contributor to the event.

Associated COVID portfolio elements: Human Performance

Significant fatigue on flight with 3 pilots after confinement to the hotel during the stopover.

Scenario of the event: Departure of XXX with 3 pilots on this rotation with a flight time of 12 hours on the outward journey but without knowing the return flight time as it is the second flight after service of the stopover is resumed. Finally block-block time on the return flight of 13h45, with numerous weather evolutions on departure from YYY, all in a 3 pilot-configuration and without cabin crew as the flight was carrying cargo only! In addition, very particular circumstances of strict confinement during the entire stopover at YYY (56h without being allowed to leave the room because of COVID). These 56 hours spent locked in the room without being able to do any physical activity or just get some fresh air outside, were finally difficult to manage in terms of fatigue...very complicated to relate to a particular rhythm, very difficult rest in the hotel and interspersed with a lot of insomnia. My state of alertness deteriorated even more when adding the first rest period on the return flight of 3h40 between 15h40TU and 19h20TU during which I couldn't sleep.

Elements of analysis by the operator: Locked in the room for [56] hours => insomnia. Absence of sleep during the flight rest turn (1st turn = 3h40) => deteriorated state of alertness.

Associated COVID portfolio elements: Flight crew fatigue due to unavailability of rest facilities at destination or extended duty period

Unstabilised approach

Scenario of the event: Light aircraft, 48 tons (13 pax), approach speed 125kts. Constraint 160kts until 4 NM in final, we cross the stabilization gate 15 kts too fast; configuration established, check list carried out, thrust established at 40 percent N1. Decision to continue the approach, taking into account the fatigue and weariness I am feeling at the moment in this gloomy context. Estimated fatigue level [one notch before maximum level].

Elements of analysis by the operator : Unstabilised approach followed by landing: V 140 kts iso 125 kts at 1000 ft.

Associated COVID portfolio elements: Aviation personnel fatigue

Go around after controller reduced vigilance

Scenario of the event: Airline ASR: On final approach runway [01] of the XXX airport, after being cleared to land, the ATC advised me that there was a vehicle and people on the runway and told me to perform a go around to abort the landing procedure. (...)

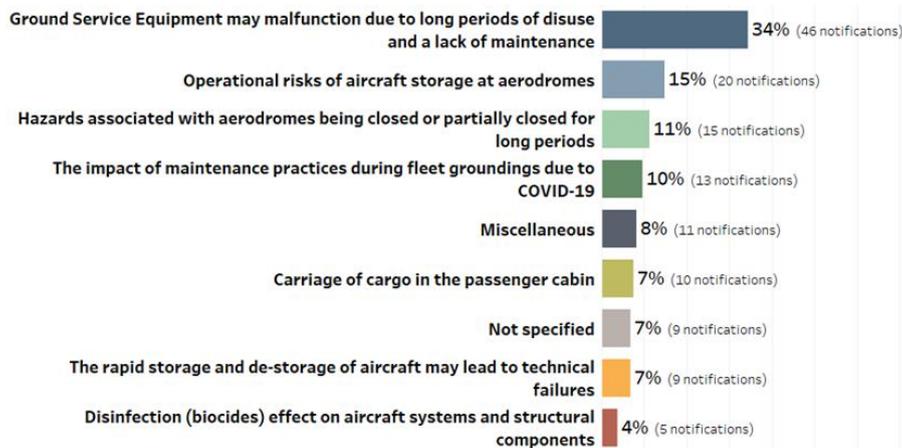
Elements of analysis of the ATC operator: (...) A vehicle was on the runway for a network inspection. Only one aircraft was on arrival. No aircraft was scheduled to depart. At 1430 UTC, with a light traffic load, the controller cleared the pilot of flight AAA to land on the runway [01]. As soon as the instruction was issued, the controller noticed that he had forgotten a vehicle on runway inspection. He informs the pilot of the AAA and asks him to go-around. The vehicle did not clear the runway on the TWY [A]. The pilot requests to continue. The controller prefers to request go around for safety and apologises to the AAA pilot.

Following a request for an explanation from the controller, given the context of low traffic levels, the latter acknowledged that he had been the victim of reduced vigilance. A reminder of the dangers of reduced vigilance was sent to him and will be sent to all controllers to ensure that this event does not reoccur, particularly when air traffic resumes. (...)

Associated COVID portfolio elements: Reduced adherence to procedures in the new working environment

4.3.4. Infrastructure and equipment

Figure 11 - Distribution of topics associated with the "Infrastructure and Equipment" domain of COVID portfolio



Source: Specific reading of the ECCAIRS France database.

A deterioration of certain infrastructures (runway, taxiway, lighting) due to work postponements or lack of personnel was cited in several reports. These facts may be related to a postponement of investments.

At the operational level, a number of events, some of which were highly visible (technical problems after prolonged storage of aircraft due to poorly applied or ambiguous procedures), were noted. The operator was able to react quickly, for example on the subject of obstruction of anemobarometric sensors (by water, dust or insect nests). This risk was quickly taken into account and, in addition to rapid feedback to the EASA in its capacity as certification authority, was one of the main amendments to the [IS 2020-02](#) safety information leaflet produced by the DSAC (V2 published in July 2020).

A significant number of reports related to wildlife hazard have been recorded in this area, which is confirmed by the SSP indicator (3.2.1) and an expert's judgement.

Examples of events reported in the "infrastructure and equipment" category

IAS disagreement during take-off at 80kt - QRF performed

Scenario of the event: After 80kt IAS DISAGREE appeared on both PFD. 10 to 15kt difference was experienced from time to time. Memory item unreliable airspeed was performed after flaps up. Speed discrepancy disappeared after a while and consistency was checked with flight parameters from the QRH. The decision was made to come back to XXX. FEEL DIFF PRESSURE light illuminates for the second time when preparing the approach. IAS DISAGREE appeared again during landing roll out.

Elements of analysis by the operator: (...) FOUND CPT PITOT DAMAGED, FOUND RIGHT ELEV PITOT CLOGGED, Urgent request sent to the aircraft Manufacturer. They immediately decided to modify the procedure to release an aircraft after storage.

Associated COVID portfolio elements: Operational risks of aircraft storage at aerodromes

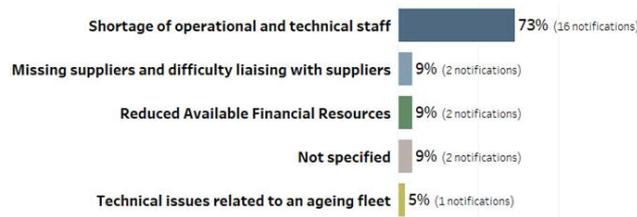
Unsuitable chemical treatment of the cockpit

Scenario of the event: When we look at the aircraft, we see that the cockpit has been chemically treated "anti-covid". The result is a greasy layer on all the controls and screens, which become illegible depending on the lighting. Apart from the time wasted cleaning screens and controls, one can wonder about the harmfulness of this overabundance of chemical sprayed in the cockpit but also in the whole cabin (and also about the possible damage caused to some instruments?). If it is probable that the coronavirus does not survive, has a study been carried out to study the effects on the health of crews and passengers induced by these products spread in abundance in the aircraft? Thank you in advance for your feedback.

Associated COVID portfolio elements: Disinfection (biocides) effect on aircraft systems and structural components

4.3.5. Financial impact

Figure 12 - Distribution of topics associated with the "Financial Impact" domain of COVID portfolio



Source: Specific reading of the ECCAIRS France database.

This sixth and last family of threats is probably the one that generated the most differences between what was expected and the low number of reports, for reasons already mentioned in this study.

However, a few cases were attributed to payment difficulties with suppliers and subcontractors essential to the activity, which were deferred due to the company's financial situation.

4.3.6. Unspecified threats

14% of the reports annotated by the analysts during the specific reading were not linked to one of the portfolio domains. They correspond to the following scenarios:

- Similarity of call signs
- Ferry flights/flights without cabin crew (does not fit in the "Carriage of cargo in the passenger cabin" category)
- Merging/closure of airspaces

In addition to the risks found in safety events, those involved were able to note, via the diversity of offers accessible on Internet, the extremely rapid development of practices that were more marginal before the crisis or of particular services favoured by an unsatisfied need for air transport targeting certain types of customers. This involves requested transport flights and/or putting aircraft owners in touch with potential pilots and passengers. These practices can be explained in the context of a sharp decline in the supply of scheduled transport. Some of them may be similar to illicit public transport and present a lower level of safety.

Examples of reported events

Before flight without attendant

Scenario of the event: After several cargo flights on [Avion1], it has to be said that the crews take into account aircraft with very different cabin configurations despite the mention "Before flight without attendant" on the ATL. Indeed, some aircraft are delivered with the toilets locked (light ON), others with unlocked toilets, some with galleys 1 and 2 doors ON, others galleys 1 ON only, others galleys 2 ON only, some with all galley and/or cabin lights ON, others half ON, others OFF....Some water supply taps have been found to be cut off...Apart from the risk of flooding, the main risk is fire on board caused by faulty lighting. However, there is no automatic extinguishing system in the cabin...or even an effective detection system. It therefore seems essential that the checklist be systematically carried out more rigorously by Maintenance and, above all, that it requires all lighting to be switched OFF in the cabin and in the crew rest stations: a simple neon light that burns out could indeed have immeasurable consequences. Please send me the current Maintenance checklist "Before flight without attendant".

Elements of analysis by the operator: Subject followed. Documents sent to the editor as requested. Checklists were harmonised and communications were made on the maintenance side.

Associated COVID portfolio elements: Atypical flights, During reduced operations, new SOPs may be introduced that require risk assessment

Inconsistency of basic weights

Scenario of the event: Cargo flight in [Aircraft1]. Basic weight OFP (Operational flight plan) around 139t. The preliminary Loadsheets comes out with a DOW (Dry Operating Weight) around 135t. Difference of 4t due to the catering load of the aircraft. In practice, the aircraft is fully loaded and its actual basic weight is closer to 139 than 135t. The catering is disembarked by the ground assistant because the aircraft has to be disinfected "COVID". Finally we ask not to reload the unnecessary catering and we coordinate with the CLD to determine a realistic DOW. On the next step ([XXX]-[YYY]), again a mistake: the state of the load comes out with a DOW taking into account the catering while the plane is empty. Same problems on the two legs of the next day [XXX123] [XXX]-[UUU]-[ZZZ] forcing us to correct by sending an ACARS message: no anticipation at CLD level. There is a real risk of taking off with a 4t weight error in either direction. Low perceived SV impact given the non-limiting conditions. Heavy crew workload: numerous telephone and ACARS exchanges with the CLD and reception of numerous Final Load States linked to successive corrections. The weight and balance process needs to be more robust, in particular through more effective communication between the different entities responsible (...). The managers also lack a realistic vision of the aircraft's condition: catering load, disinfection procedure, etc. Valuable help provided by the Operations Control Centre Pilot in coordinating these services.

Elements of analysis by the operator: Return from the CLD: not authorised to modify the catering masses (pantry). The weights are available in the DOW module of the [software]. It is updated by the application. However, if there is reliable information about the actual catering mass on board that differs from the one selected via the standard process, the technician can correct it. We have also agreed with the VSOs that a pilot/CLD telephone contact is useful in these troubled times. A piece of information in the file of these specific flights is imperative (CLD contact for DOW confirmation).

Associated COVID portfolio elements: Atypical flights, During reduced operations, new SOPs may be introduced that require risk assessment

Similarity of callsigns

Scenario of the event: Similarity of callsigns between [XXX2952] and [XXX2950]

Elements of the operator's analysis (summary of exchanges):

The ATC informs the airline of this similarity of callsigns between two aircraft of the same type. After analysis, the airline provides an explanation:

[XXX2952] is a special flight between [XXX] and [YYY] with schedules 1000Z-1300Z. Outside the COVID context, when the borders are not closed, the scheduled flight callsign for this flight is [XXX952] (without prefix 2) and is scheduled from 1220Z - 1520Z.

[XXX2950] is a special flight between [XXX] and [ZZZ] with flight times 1030Z-1325Z. Outside the COVID context, when the borders are not closed, the scheduled flight callsign for this flight is [XXX950] (without prefix 2) and is scheduled from 1230Z - 1540Z.

Thus outside the COVID context, when the borders are open, the risk of confusion between the callsigns of these two flights is mitigated by the use of different suffixes at the end of the two callsigns (e.g. [XXX952Z] and [XXX950C]). The use of a single numeric prefix (the number 2) for commercial flights in the COVID context did not allow for an additional suffix to be added at the end of the designator because the software used by the airline only allows designators with 4 alphanumeric characters. The following correction has been made for flights during this period: change from callsign [XXX952] to [XXX942]. In addition, the company will enquire about the code similarity deconfliction tool developed by Eurocontrol.

Associated COVID portfolio elements: Risk assessments based on previous normal operations are no longer valid

5. Recommendations for operators

Each operator is invited to take into account the recommendations addressing safety management issues and the recommendations specific to its domain of activity.

5.1. Safety management recommendations

- Notwithstanding the provisions of Regulation (EU) 376/2014 and Regulation (EU) 2015/1018, operators are invited to strengthen the report of events, including voluntary reports, in order to improve the risk assessments associated with the low activity period for both operators and DSAC.
- To this end, operators should endeavour, when a link has been identified between an event and the context of low activity and/or the health crisis, to highlight this link more precisely in the analysis sent to DSAC.
- Operators are invited to share their experiences with the aeronautical community on emerging risks related to low activity.
- Operators should take into account in their SMS or safety policy the list of threats in the annexed portfolio. In addition, threats to interface partners and their evolution over time should also be taken into account.
- With regard to resources, the threat of erosion of skills should be given particular attention by operators.
- Since SMS have proven their effectiveness since the beginning of the crisis in dealing with new threats, operators are invited to preserve their capacities despite the difficult economic and financial context, and to strengthen the use of feedback as a lever for sharing information on the specific risks of this period.
- In the face of the erosion of the skills of frontline actors that has sometimes been observed, adherence to procedures has proved to be a particularly effective defence. Operators are therefore invited to recall the necessity and usefulness of adherence to operational procedures. Operators are invited to take this erosion into account during situation re-training for all trades and, in the case of pilots, particularly during manual flight training.
- Operators are invited to make their agents aware of the increased risks linked to the themes of wildlife hazard, runway incursion and NSA/NCA and to define the most appropriate and effective barriers in their own field.
- Finally, adapting to the operational requirements of the period calls for new operating methods for operators (special flights, such as transporting freight in the cabin, evacuation of a significant number of patients on board the same aircraft, or cargo flights without cabin crew, for example). Operators, their subcontractors and their partners are invited to pay greater attention to this type of operation and to address all the issues involved with their agents or those with whom they interact in their implementation, for example in their safety studies and/or through guides.

5.2. Air operations

In addition to the recommendations contained in the safety information leaflets "Threats related to the resumption of air operations" ([2020/02 for aeroplanes](#) and [2020/03 for helicopters](#)), operators are invited to take into account the following recommendations:

- Operators had to make their pilots aware of the risks induced by late changes in the approach path (shortening, sidestep, high speed, etc.).
- Operators should ensure that the risks associated with similar callsigns are properly taken into account in their SMS, in particular in the event of a change in the callsign of a scheduled flight, an unusual flight or the introduction of a new route.
- As the sub-activity is likely to become entrenched over time, it could lead to a lasting erosion of skills, including reappropriation or re-acquisition of slower standard operating procedures (SOPs).

Faced with this risk, in addition to training and controls, operators are invited to consider the relevance of additional measures such as operational recommendations, guidance or guides.

- Stabilisation criteria could be revised to enhance the safety of approaches, for example by uniformly raising the stabilisation heights to 1000 ft, both IFR and VFR.
- Operators should encourage, in the context of a low volume of activity, crews to give priority, through TEM (Threat and Error Management, which was the subject of [JFRISafety Info Leaflet 2020-01](#)), to the application of procedures with a sufficient margin and not in competition with performance and compliance with schedules.
- In the area of crew pairing, operators should avoid simultaneously programming pilots close to their recent experience limits.

5.3. Continuing Airworthiness

On its website, OSAC had made recommendations for users, which are still relevant today. The documents containing these recommendations are listed here:

- Newsletter n°2020/04 of 10 June 2020: "Threats and risks related to the resumption of continuing airworthiness management and maintenance activities"
<https://documentation.osac.aero/view/288663>
- Safety Flash n°1: "Taking into account the risks related to the resumption of activity after lockdown" (<https://documentation.osac.aero/view/288771>) on the risks related to the return to service of stored aircraft.

5.4. Air navigation

- Air traffic service providers are invited to make their staff aware of the phenomenon of reduced vigilance, which is likely to increase the risk of runway incursions and unstabilised and/or non-compliant approaches.
- Air traffic service providers should ensure that the risks associated with similarity of callsigns, particularly in the event of unusual air sectors being merged together in the event of low traffic levels, are properly taken into account by their SMSs.
- Against a background of a risk of reduced adherence to operational procedures, air traffic service providers should make their staff aware of the need to pay greater attention to readback.
- Despite the significant decline in the total number of movements, traffic peaks remain. Despite the difficulties associated with the limited availability of simulation tools, air traffic service providers should endeavour to maintain their staff's ability to cope with the workload caused by these peaks.

5.5. Aerodromes

- The study highlighted that the control of wildlife hazards, when limited to providing a real-time service on an operations-based basis, is not fully effective. As a result, aerodrome operators are invited to maintain the means of preventing wildlife-related risks even during periods of light traffic.
- Aerodrome operators are invited to pay particular attention to the evolution of the level of competence of agents entering the manoeuvring area, especially in the knowledge/respect of procedures and phraseology.
- Aerodrome operators should ensure that particular attention is paid to monitoring the skills and capacity of the staff dedicated to the ARFFS and wildlife control functions and their availability in relation to the operational staff required to carry out these functions.
- Aerodrome operators are invited, in coordination with the operators, to pay particular attention to the consequences of changes in the conditions under which air carriers are handled at their platforms (e.g.: withdrawal of activities at certain terminals) for ground handling activities. This overall analysis could, among other things, focus on the organisation of the surroundings of

the ground area (storage of equipment which, due to the concentration of operations in certain terminals, may accumulate there).

5.6. Ground handling

- Ground handlers should ensure that they maintain among their staff a satisfactory awareness of the risks associated with their activity, continuing the work started before the health crisis. This awareness-raising, which was fruitful, should encourage adherence to procedures and the maintaining of acquired reflexes with regard to the reporting of events.

5.7. General aviation

The study showed that the risk of collision in the air or on the ground did not decrease during the period of low activity.

- DSAC draws users' attention to the need to comply with the regulations, in particular on radio contact and the turning on of transponders. To this end, the portal <http://securitedesvols.aero> in particular the "[aero culture](#)" section", contains numerous resources that pilots are invited to consult or reread, dealing in particular with the use of the radio and the proper use of airspace.

6. Conclusions

The coronavirus crisis has changed the personal and professional lives of all of us and has led to overnight changes and disruptions in business continuity and recovery, but also in our personal lives. After almost a year of managing the health crisis and stopping a large part of operations, now comes the time to rebuild a stable and perennial activity within the aeronautics industry enlightened by the experience of this crisis.

In order to ensure the continuity of essential aviation activities during the crisis and to accompany the return to normal when the time comes, DSAC has taken a number of measures to waive or adjust the conditions for maintaining the validity of licences or the conditions for carrying out operations in coordination with EASA, while ensuring an acceptable level of safety thanks to the mitigation measures put in place.

SMSs, which are becoming increasingly widespread among operators, have contributed to a strong adaptability on their part in the face of the crisis and to the resilience of the aeronautical system in general. While formulating recommendations in each area, this study, based on the information available at the time of its completion, did not highlight any major threat that had not been identified beforehand by DSAC or EASA.

However, as the light traffic situation associated with the crisis is long-term, particular attention must be paid to the conditions that prevailed when the exemptions were granted to ensure that they remain valid in the event that they are extended.

In addition, the mechanisms deployed by the authority in the framework of the SSP have proven to be effective in the continuous management of risks.

At the time of writing, the health crisis is taking on new forms, but it is far from over. There is a resurgence of a form of uncertainty comparable to the one that prevailed at the beginning of the health crisis. It is difficult to anticipate the duration and scale of this new phase, which is already producing further marked drops in activity. It is therefore to be feared that the risks identified in this study will be prolonged, or even that new threats to civil aviation will emerge.

Overall, the expert judgement that led to the categorisation of areas where threats were likely to emerge was effective, but some categories were predominant to the detriment of a few others that were ultimately overestimated, and further categorisation was necessary to capture certain families of adverse events and contexts generating increased risk.

This study showed that several areas for improvement needed to be considered. As the period of low activity is set to last, vigilance is still required, and DSAC will continue to support operators in analysing these risks during this delicate phase.

Annex: COVID portfolio

Domain	Threats	Definition
Management system	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.
	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.
	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 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.
	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.
	Restarting a complex system is challenging	The aviation system is highly interconnected, sophisticated and merges people and technology, meaning that the consequences of shutdown 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.
	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.

	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.
	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.
	Reduced Availability of Aviation Professionals	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. Note: "Reduced Availability of Critical Aviation Occupations" has been expanded by DSAC to "Reduced Availability of Aviation Professionals".
	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.
	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.
	Establishment by organisations of non-compliant procedures"	
Human performance	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.
	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.

	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.
	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.
	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.
	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.
	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.
Training, Checking and Recency	Degradation of skills and knowledge	Generic undesirable event which groups together all the undesirable events related to skills problems. Includes knowledge degradation due to lack of recent experience.
	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.
	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.
	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.

	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.
	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.
Outdated Information	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 may not have been updated, such as TCAS, TAWS Nav DB, charts, etc. Manufacturers and data service providers may not be able to produce and deliver updates within the necessary timescales.
	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.
	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.
Infrastructure and equipment	Increased presence of wildlife on aerodromes	Already included in DSAC Safety Risk Portfolio Horizon 2023 – not take into account in COVID portfolio 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.
	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.

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.
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.
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.
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.
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.
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.
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.

	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.
	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.
	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.
	The impact of fewer aircraft observations on Meteorological modelling	Not included in DSAC COVID portfolio
	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.
Financial impact	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.
	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.
	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.
	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.