EASA
European Union Aviation Safety Agency

THE EUROPEAN PLAN FOR AVIATION SAFETY

(EPAS 2022-2026)

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Volume III

Safety Risk Portfolios

European Union Aviation Safety Agency, 10/12/2021

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17. Introduction: the basis of the EPAS safety mitigations

What is this volume about?

Volume III of the EPAS aims to present how aviation safety risks in Europe are analysed and the outcome of these analyses (i.e. where the risks are), with the purpose of providing readers with more insight on where the actions in the EPAS come from.

You can use the volume to:

- understand more about the accident outcomes and safety issues that are the focus of the EPAS;
- use the information on the safety issues to inform decision-making in your own organisation.

The European Safety Risk Management (SRM) process

The main safety risks and corresponding mitigating actions feeding the EPAS are developed through the European SRM process. This comprises a set of processes that aim at identifying the safety issues and their mitigations. It involves analysis of data from different sources and collaboration with safety partners from national aviation authorities and the industry (through the Collaborative Analysis Groups (CAGs) and the Network of aviation safety Analysts (NoAs)[1].

The SRM process follows five specific steps:

Figure 17-1: The European SRM process

1 For easy reference, the 'network of aviation safety analysts', as referred to in Regulation (EU) No 376/2014 of the European Parliament and of the Council, is abbreviated as 'NoAs'.

Identification of safety issues: The identification of safety issues is the first step in the SRM process, and it is performed through the analysis of occurrence data and other safety-related information and supporting information by the CAGs. These candidate safety issues are formally captured by the Agency and are then subject to a preliminary safety assessment. This assessment then informs the decision on whether a candidate safety issue should be formally included within the relevant safety risk portfolio or be subject to other actions. Advice is taken from the NoAs and the CAGs. The output of this step in the process are the domain safety risk portfolios. Within the portfolios, both the key risk areas and safety issues are prioritised.

Assessment of safety issues: Once a safety issue is identified and captured within the safety risk portfolio, it is subject to a technical safety assessment. These assessments are prioritised within the portfolio. The assessment process is led by EASA and is supported by the NoAs and the CAGs. In addition, group members are encouraged to participate in the assessment itself. This collaborative approach with the Agency's safety partners is critical to achieving the best possible results. Together, this forms the Safety Issue Assessment (SIA), which provides potential mitigating actions for the EPAS.

Definition and programming of safety actions: This includes an impact assessment through the best intervention strategy (BIS) document, defining possible mitigation actions, assessing the implications and benefits of each possible action, and making recommendations on the best mitigation action(s) to be implemented in the EPAS. Using the combined SIA/BIS, formal EPAS action proposals are then submitted to the Agency Advisory Bodies (ABs). Once discussed and agreed upon, the actions are then included in the next version of the EPAS. Prior to publication, the EPAS is approved by the EASA Management Board (MB). Actions that are of low cost or require more rapid intervention are often fast-tracked and appear in the next available update of the EPAS. In some cases, more immediate safety actions are needed that may be completed before the next EPAS would be published. Naturally, these are not included within the EPAS. Such actions could include the publication of a safety information bulletin (SIB) or take the form of immediate safety promotion activities.

Implementation and follow-up: The next step in the process involves the implementation and follow-up of the actions that have been included within the EPAS. There are different types of actions within the EPAS, e.g. research, rulemaking, Member State tasks, and safety promotion.

Safety performance measurement: The final stage in the process is then the measurement of safety performance. This serves to monitor:

(1) specific changes that have resulted from the implementation of safety actions; and

(2) the systemic changes that may have occurred in the aviation system and may require additional actions.

The measurement of the performance is done via a safety performance framework that monitors:

(1) transversally the various domains while looking at the key risk areas at domain level; and

(2) the specific safety issues.

The Annual Safety Review (ASR) is the annual review of the safety performance framework. It identifies safety trends, highlights priority domains, key risk areas and safety issues. From this step, the SRM process begins again.

Introducing the Safety Risk Portfolios

The EPAS Volume III provides EASA's Safety Risk Portfolios. In their most simplified versions, the Safety Risk Portfolios are a list of safety issues that need to be mitigated at European level.

Safety Risk Portfolios form an essential component of the European SRM process. In developing the portfolios, safety information is gathered and analysed from sources such as occurrence data, expert judgement, and safety studies. Our safety partners are essential to gathering this safety information.

Safety issues

A safety issue is a safety problem, or a set of related safety problems, defined in a manner specific enough that safety experts can work on it. Examples of safety issues are 'increased presence of wildlife on aerodromes' or 'ACAS RA not followed'. Beyond the name/label of the safety issues, a short description is provided so that the scope of the safety issue is commonly understood.

Safety issues are identified through EASA's analysis of aviation occurrence data and other safety-related information (such as hazards), or submitted as a candidate safety issue through the CAGs, NoAs, EASA's website or internal EASA stakeholders. Safety issues identified through aviation data collected by EASA are published in the EASA's ASR in the form of a data portfolio. The Safety Risk Portfolio is an advanced and processed form of the data portfolio that has been augmented with additional layers of qualitative analysis and subject matter expertise from the CAGs and the NoAs.

The safety issues and Safety Risk Portfolios are grouped by domain as each domain has its particularities and requires specific expertise. The following domains are part of the SRM process:

- Aerodromes and Groundhandling
- Air Traffic Management / Air Navigation Services (ATM/ANS)
- Commercial Air Transport – Aeroplanes
- Human Factors / Human Performance
- Non-Commercial Operations – Small Aeroplanes
- Rotorcraft

Although the analysis and portfolios are organised per domain, some safety issues are relevant to more than one domain. These safety issues have to be analysed from a multi-domain perspective. Within EASA, we ensure that such issues are assessed in a cross-domain manner with one domain taking the lead. Thus, while the safety issue may appear in only one safety risk portfolio, all relevant domains participate in the assessment of the safety issue to ensure the development of a holistic solution. In addition to such efforts, EASA coordinates a multi-domain perspective for such safety issues through the Safety in Aviation Forum for Europe, which is also known as SAFE 360°.

Remark: For more information on the data portfolios mentioned above, please refer to the latest version of the EASA's ASR, which can be accessed through this link. It is important to note that due to additional layers of qualitative assessment, the safety issues presented in the data portfolios may evolve in their scope. Thus, there might be slight differences in how the safety issues are presented in the data portfolio and Safety Risk Portfolio.

Introducing the key risk areas

Key risk areas are the determination of the most likely type of accident that an occurrence could have escalated to. They are another core concept in the European SRM process along with safety issues. The key risk areas provide insights to the most common potential accident outcome and the immediate precursors that may lead to the accident outcome. The set of key risk areas (COMMISSION DELEGATED REGULATION (EU) 2020/2034) provide a common 'taxonomy' for the possible accident outcomes, based on which to structure safety risk management. Prioritisation applies to the safety issues being the safety deficiencies related to one or more hazards. They are the actual manifestation of a hazard or combination of several hazards in a specific context. In prioritising safety issues, key risk areas are considered to determine worst likely accident outcome they may lead to, their severity and likelihood as part of the residual risk classification (refer to the description of the prioritisation). Thus safety mitigating actions will be prioritised in accordance to the priority of safety issues they are intended to address or mitigate.

Each safety issue is therefore associated with one, or most of the time, several key risk areas. For example, the safety issue 'Entry of aircraft performance data' may have as an outcome (i.e. key risk area) 'excursion' or 'aircraft upset'.

The 10 key risk areas are listed below, using the definitions as per the Delegated Act for the European risk classification scheme[2]:

Airborne collision: a collision between aircraft while both aircraft are airborne; or between aircraft and other airborne objects (excluding birds and wildlife).

Aircraft upset: an undesired aircraft state characterised by unintentional divergences from parameters normally experienced during operations, which might ultimately lead to an uncontrolled impact with terrain.

Collision on runway: a collision between an aircraft and another object (other aircraft, vehicles, etc.) or person that occurs on a runway of an aerodrome or other predesignated landing area. This does not include collisions with birds or wildlife.

Excursion: an occurrence when an aircraft leaves the runway or movement area of an aerodrome or landing surface of any other predesignated landing area, without getting airborne. This includes high-impact vertical landings for rotorcraft/VTOL and balloons/airships.

Fire, smoke and pressurisation: an occurrence involving cases of fire, smoke, fumes or pressurisation situations that may become incompatible with human life. This includes occurrences involving fire, smoke or fumes affecting any part of an aircraft, in flight or on the ground, which is not the result of impact or malicious acts.

Ground damage: damage to aircraft induced by operation of aircraft on ground on any other ground area than a runway or predesignated landing area, as well as damage during maintenance.

Obstacle collision in flight: collision between an airborne aircraft and obstacles raising from the surface of the earth. Obstacles include such things as tall buildings, trees, power cables, telegraph wires and antennae as well as tethered objects.

Terrain collision: an occurrence where an airborne aircraft collides with terrain, without indication that the flight crew was unable to control the aircraft. This includes instances when the flight crew is affected by visual illusions or degraded visual environment.

Other injuries: an occurrence where fatal or non-fatal injuries have been inflicted, which cannot be attributed to any other key risk area.

Security: an act of unlawful interference against civil aviation. This includes all incidents and breaches related to surveillance and protection, access control, screening, implementation of security controls and any other acts intended to cause malicious or wanton destruction of aircraft and property, endangering or resulting in unlawful interference with civil aviation and its facilities. It includes both physical and cybersecurity events.

2 Commission Delegated Regulation (EU) 2020/2034 of 6 October 2020 supplementing Regulation (EU) No 376/2014 of the European Parliament and of the Council as regards the common European risk classification scheme (OJ L 416, 11.12.2020, p. 1–10).

Safety issue prioritisation: Introducing the Safety Issue Priority Index (SIPI)

Safety issue prioritisation is a structured approach allowing safety issues to be risk-classified in a consistent manner, regardless of the operational domains they belong to, and regardless of the source of the safety intelligence (safety data, experts' inputs, etc.) through which they have been identified. Some safety issues are identified via occurrence data, others through accident and serious incident investigations, and still more through expert judgement and safety studies.

The approach creates an index that is built upon a residual risk evaluation of the safety issues. 'Residual risk evaluation' means that we consider the worst likely accident outcomes and the effectiveness of their implemented systemic barriers. In other words, a safety issue with the same potential outcome as another one but with some effective mitigations in place will have a lower 'residual risk'.

Other elements that are factored in the prioritisation index are:

- Has the safety issue already resulted in fatalities?
- If there are no fatalities, has the safety issue contributed to a high-energy accident outcome where no other barrier but providence was remaining?
- Is the safety issue an emerging/novel one?
- Is the operational exposure to the safety issue important?

Any positive replies to the above questions will imply a higher priority index.

The resulting index enables us to prioritise the safety issues for further assessment (refer to SRM process step 2) and support the Agency and its safety partners in deciding what safety assessments are to be launched in priority.

As a practical way to support the prioritisation, the safety issues are then split into two categories, an 'elevated' one and a 'normal-to-low' one. The eventual intention is to focus the collaborative resources first on safety issues within the elevated category. Indeed, based on the priority index construction, the 'elevated' category will include safety issues such as emerging ones and/or safety issues for which undesired outcomes have already realised and where the effectiveness of the current systemic barriers is not satisfactory and for those where a significant part of the flights are affected.

Process to handle safety issues in the SRM

Each safety issue is assigned an identification number (SI-DNNN) to facilitate tracking of its progress within the SRM process, as well as its relevance to different aviation domains. The safety issues are then categorised in the Safety Risk Portfolios as follows:

Assess - Elevated priority index

Facilitates Step 2: Assessment of safety issue

Safety issues for which further assessment is or will be launched in higher priority to propose mitigation actions as needed.

Assess - Normal-to-low priority index

Facilitates Step 2: Assessment of safety issue

Safety issues for which further assessment should be launched, when resources allow, to propose mitigation actions as needed.

Mitigate - define

Facilitates Step 3: Definition and programming of safety actions

Safety issues with proposed mitigation actions under validation.

Mitigate - implement

Facilitates Step 4: Implementation and follow-up of safety actions

Safety issues with validated mitigation actions ready for implementation, e.g. in the EPAS

Monitor

Facilitates Step 5: Safety performance measurement

Monitoring the rate of occurrences linked to a safety issue or, more specifically, the effectiveness of the mitigations implemented for a given safety issue

Figure 17-2: Safety issues' categories

The mitigating action for some safety issues in the 'mitigate' or 'monitor' could be a safety promotion item; more information is available on the EASA Together4Safety Community Websites.

How to read this Volume?

This Volume is organised by the domains mentioned earlier in the introduction. For each domain, we present the Safety Risk Portfolios, i.e. the list of safety issues that have been identified at European level using the process explained above. The description of the safety issue can be found by clicking on the safety issue list at the start of the chapter.

Given the unique circumstances in 2020 and 2021, this Volume includes a dedicated chapter on COVID-19, which deals with the specific safety issues that emerged out of the current pandemic.

Presently, the Safety Risk Portfolios and EPAS are at differing levels of maturity and thus some safety issues may reflect different categories in this Volume vis-à-vis Volumes I and II. However, as the Safety Risk Portfolios and the SRM matures, these differences will be progressively reduced, and more links will be drawn between the safety actions in Volume II with this Volume of the EPAS. This provides stronger traceability within the SRM process, especially the genesis of a safety action, and strengthens the impetus for the assigned actors to execute the safety action.

Main changes since the last edition

A dedicated Rotorcraft chapter is added.

Safety issues are presented in order of priority in the domains' lists.

New issues are marked with (New). Safety issues for which definitions were updated, are marked with (Amended).

18. COVID-19

18. COVID-19

2020 and 2021 were exceptional years due to the COVID-19 pandemic. The pandemic resulted in an extreme reduction in operations that began in March 2020. There was no real traffic recovery over summer 2020. With vaccines becoming available and countries lifting some restrictions, traffic increased slightly over summer 2021, however still well below 2019 traffic levels. During the summer 2020 period and after, EASA took the initiative to apply the SRM process to identify and manage safety risks associated with an increase in activity in a pre-emptive manner.

In collaboration with our safety partners, EASA published a review of aviation safety issues arising from the COVID-19 pandemic, where 48 safety issues were identified. Since the publication of the review in June 2020, EASA has worked with Member State competent authorities and industry partners to identify appropriate mitigating actions for 11 safety issues which have been assessed to be of high risk.

In April 2021 EASA published an updated version of Review of Aviation Safety Issues Arising from the COVID-19 Pandemic that in addition to the safety issues, listed the existing and available mitigations, where applicable.

It is also important to note that some safety issues such as 'Reduced available financial resources' cannot be addressed by EASA or EASA Member States but are important for organisations to include in their safety management systems during this period. In addition, not all safety issues may be applicable in the future due to the fluidity of the circumstances.

The safety issues in the portfolio are sorted into the 'Assess – Elevated priority index', 'Assess – Normal-to-low priority index', 'Mitigate – define', 'Mitigate – implement', and 'Monitor' categories, which provide a snapshot of their status within the European SRM process by the priority. The safety issue prioritisation method is described in the Introduction of this Volume. To understand each safety issue better, please click on the safety issue in the list to access their description.

List 18-1: COVID-19 safety issues per category & priority

Assess - Elevated priority index

Facilitates Step 2: Assessment of safety issue

- Unusual approach profiles in the pandemic circumstances (SI-5016)

Assess - Normal-to-low priority index

Facilitates Step 2: Assessment of safety issue

- NIL

Mitigate - define

Facilitates Step 3: Definition and programming of safety actions

- NIL

Mitigate - implement

Facilitates Step 4: Implementation and follow-up of safety actions

- Reduced adherence to procedures in the new working environment (SI-5014)
- Impact of the pandemic on the groundhandling industry – human factors (SI-5022)

Monitor

Facilitates Step 5: Safety performance measurement

- Shortage of operational and technical staff (SI-5018)
- Increase of cybersecurity issues related to the pandemic situation (SI-5017)
- Reduced available financial resources (SI-5019)
- Increased presence of wildlife on aerodromes (SI-5010)
- The scale of aircraft storage and subsequent destorage may lead to technical failures (SI-5011)
- Aviation personnel fatigue (SI-5002)
- Decreased well-being of aviation professionals during shutdown (SI-5006/5007)
- Skills and knowledge degradation due to lack of recent practice (SI-5003)
- Prevention and treatment of unruly passengers in the context of COVID-19 (SI-5021)
- Shutdown, restart and gradual recovery of a complex system is unpredictable (SI-5005)
- Risk assessments based on previous normal operations are no longer valid (SI-5008)
- Reduced focus on, or prioritisation of safety (SI-5009)
- Reduced oversight by competent authorities (SI-5001)
- Extent and duration of COVID-19 exemptions and temporary rules (SI-5012)
- Documentation and database updates may not have been applied (SI-5004)
- Crew fatigue due to unavailability of rest facilities at destination or extended duty period (SI-5013)
- Missing suppliers and difficulty liaising with suppliers (SI-5020)
- Transfer of pilots from one fleet to another resulting in low hours on type (SI-5015)

Aviation personnel fatigue (SI-5002)

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

Crew fatigue due to unavailability of rest facilities at destination or extended duty period (SI-5013)

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 that 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

Decreased well-being of aviation professionals during shutdown (SI-5006/5007)

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 well-being 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' well-being.

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 created a well-being 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 well0being in the section 'Looking after yourself'

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

Another section of the well-being 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

Documentation and database updates may not have been applied (SI-5004)

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.

Extent and duration of COVID-19 exemptions and temporary rules (SI-5012)

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

Impact of the pandemic on the groundhandling industry – human factors (SI-5022)

Groundhandling 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.

Increase of cybersecurity issues related to the pandemic situation (SI-5017)

Organisations are operating with reduced administrative (including Chief Information Security Officer (CISO) & 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.

Increased presence of wildlife on aerodromes (SI-5010)

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

Missing suppliers and difficulty liaising with suppliers (SI-5020)

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

Prevention and treatment of unruly passengers in the context of COVID-19 (SI-5021)

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.

Reduced adherence to procedures in the new working environment (SI-5014)

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

Reduced available financial resources (SI-5019)

A reduction in available financial resources may cause the loss of key personnel and corporate knowledge, increased 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.

Reduced focus on, or prioritisation of safety (SI-5009)

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

Reduced oversight by competent authorities (SI-5001)

Competent authority staff are less available and on-site visits have thus far been difficult or impossible. This means that oversight is not 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.

Risk assessments based on previous normal operations are no longer valid (SI-5008)

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

Shortage of operational and technical staff (SI-5018)

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

Shutdown, restart and gradual recovery of a complex system is unpredictable (SI-5005)

The aviation system is highly interconnected, sophisticated and merges people and technology. This means that the consequences of shutdown, restart and gradual recovery 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

Skills and knowledge degradation due to lack of recent practice (SI-5003)

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 results 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

The scale of aircraft storage and subsequent destorage may lead to technical failures (SI-5011)

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 type certificate (TC) holder usually within the aircraft maintenance manual (AMM). The operators and/or CAMOs, in close relation with the approved 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 operators/AMOs may not have the capacity to carry out the 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

And related SIBs:

EASA SIB 2020-14R1 Contamination of Air Data Systems During Aircraft Parking and / or Storage due to the COVID-19 Pandemic

EASA SIB 2020-18 Nickel-Cadmium Batteries - Risk of Capacity Reduction during Aircraft Parking and Storage

EASA SIB 2020-06 Use of DuPont Kathon FP 1.5 Biocide

EASA SIB 2020-05 on Aircraft Maintenance Programme under Part-ML

Transfer of pilots from one fleet to another resulting in low hours on type (SI-5015)

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.

Unusual approach profiles in the pandemic circumstances (SI-5016)

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.

19. Aerodromes and groundhandling

19. Aerodromes and groundhandling

The Aerodromes and Groundhandling Safety Risk Portfolio was first developed in 2017 by EASA, in conjunction with the Aerodromes and Groundhandling Collaborative Analysis Group, and has since been reviewed annually. Each safety issue contributes to one or more key risk areas as defined in the introduction of this Volume.

Regarding the main key risk areas for this domain, refer to EASA's ASR 2021 Chapter 6 Aerodromes and groundhandling Figure 117 'Key risk areas by aggregated ERCS score and number of risk-scored occurrences involving aerodromes and groundhandling'. These key risk areas are defined by their potential accident outcome and by the immediate precursors of that accident outcome. This figure is obtained by aggregating the ERCS score for the risk-scored occurrences relevant to this domain and plotting it against the number of risk-scored occurrences. The risk picture of this domain identifies the key risk areas of greater concern that are aircraft upset and ground damage.

The safety issues in the portfolio are sorted into the 'Assess – Elevated priority index', 'Assess – Normal-to-low priority index', 'Mitigate – define', 'Mitigate – implement', and 'Monitor' categories, which provide a snapshot of their status within the European SRM process by the priority. The safety issue prioritisation method is described in the introduction of this Volume. To understand each safety issue better, please click on the safety issue in the list to access their description.

List 19-1: Aerodromes and Groundhandling safety issues per category & priority

Assess - Elevated priority index

Facilitates Step 2: Assessment of safety issue

- Baggage and cargo loading in passenger aircraft (SI-1004)
- Ground staff movement around aircraft (SI-1019)
- Unreported events (SI-1038)
- Serviceability of runways/taxiways (SI-1032)
- Coordination and control of turnarounds (SI-1010)
- Parking and positioning of aircraft (SI-1026)
- Condition and serviceability of the aerodrome operating environment (SI-1007)
- Bird/wildlife control (SI-1005)

Assess - Normal-to-low priority index

Facilitates Step 2: Assessment of safety issue

- Operation of vehicles (and other motorised GSE) (SI-1025) (Amended)
- Worker fatigue leading to human error (SI-1039)
- Runway/taxiway design and layout (SI-1029)
- Aircraft movement under its own power (SI-1001)
- Design of ground equipment (non-motorised) (SI-1013)
- Load sheets and other documentation/systems (SI-1022)
- Serviceability of ground support equipment (non-motorised) (SI-1033)
- Design of vehicles (motorised GSE) (SI-1014)
- Serviceability of vehicles (motorised GSE) (SI-1034)
- Apron/stand design and layout (SI-1003)

- Control of passengers on the apron (SI-1009)
- Ground operations in extreme temperatures (SI-1044)
- Positioning and securing of ground support equipment (SI-1027)
- Operation of ground support equipment (non-motorised) (SI-1024) (Amended)
- Control of airside works (SI-1008)
- Pushback operations (SI-1028)

Mitigate - define

Facilitates Step 3: Definition and programming of safety actions

- NIL

Mitigate - implement

Facilitates Step 4: Implementation and follow-up of safety actions

- Operation of air bridges/passenger boarding bridges (PBBs) (SI-1023)

Monitor

Facilitates Step 5: Safety performance measurement

- Fuelling operations (SI-1017)
- Dangerous goods handling and lithium batteries (SI-1011)
- Aircraft towing (SI-1002)
- Jet blast (SI-1021)
- Ground operations in high winds, rain, thunderstorms (SI-1042)
- Serviceability of apron/stand (SI-1031)
- Ground operations in low-visibility conditions (SI-1018)
- Cargo loading in cargo aircraft (SI-1006)
- Ground operations in snow/ice conditions (SI-1043)
- Emergency/abnormal operations (SI-1015)
- Terminal design and layout (SI-1035)

Aircraft movement under its own power (SI-1001)

The management, handling or coordination of aircraft movement under its own power may lead to damage and/or injuries. Aircraft movements under its own power should be correctly managed and coordinated to ensure safe operations. This safety issue covers all potential events that may occur when the aircraft is moving under its own power, such as collisions with ground vehicles, ground equipment and ground infrastructure, injuries and damage due to jet blast and potential foreign object debris (FOD) ingestion in aircraft engines.

Aircraft towing (SI-1002)

The forward movement of an aircraft, usually with engines off, using the power of a specialised ground vehicle attached to or supporting the nose landing gear. It includes both towing performed with nose gear elevation (towbarless, no person in cockpit), as well as towing with towbar (person in cockpit). This safety issue covers all potential events that may occur when the aircraft is being towed, such as collisions with ground vehicles, ground equipment and ground infrastructure, damage to the towing vehicle and/or towing equipment and injuries to towing personnel. In this safety issue, towing operation out of a parking position (pushback) is not included – this is addressed in Pushback operations (SI-1028).

Apron/stand design and layout (SI-1003)

Effective apron/stand design and layout is crucial in ensuring safe operations during aircraft taxiing, aircraft parking and loading/unloading of baggage. Poor design and layout may induce the potential for collisions, aircraft damage, and injuries. Important factors to consider are placement and marking of designated areas for parking of ground equipment, proximity to adjacent stands/buildings/structures, evaluation of needed space against the minimum required space, etc.

Baggage and cargo loading in passenger aircraft (SI-1004)

Inadequate management or handling of the baggage and cargo loading process may lead to ground damage or other safety repercussions. Baggage and cargo loading is correctly managed and handled to ensure that. The issue relates to the inadequate management or handling of the baggage and cargo loading process which may result in a significant change in the centre of gravity of the aircraft or the actual weight of the aircraft without the flight crew becoming aware. This safety issue includes the procedures, training and equipment provided to the groundhandling personnel to perform their duties. It also includes the coordination with other actors (dispatch, flight crews, etc.).

Bird/wildlife control (SI-1005)

Insufficient control of birds and wildlife may lead to either damage to the aircraft or loss of control during take-off or landing. By understanding bird and wildlife habitats in detail, airport operators can develop and implement bird and wildlife hazard management Plans to manage such activity in and around the aerodrome, thereby minimising the risk for bird strikes and bird ingestions in engines, which may lead to critical situations during take-off/climb and approach/landing.

Cargo loading in cargo aircraft (SI-1006)

The management or handling of the cargo loading process that may lead to ground damage or other safety repercussions. Cargo loading is correctly managed and handled to ensure that all activities are carried out effectively in accordance with relevant regulations, procedures and processes. The issue relates to the inadequate management or handling of the cargo loading process, which may result in a significant change in the centre of gravity of the aircraft or the actual weight of the aircraft without the flight crew becoming aware. This safety issue includes the procedures, training and equipment provided to the groundhandling personnel to perform their duties. It also includes the coordination with other actors (dispatch, flight crews, etc.).

Condition and serviceability of the aerodrome operating environment (SI-1007)

The management of the condition and serviceability of the aerodrome operating environment including maintenance of ATM/CNS equipment, aerodrome movement area surfaces, visual aids (markings/signage, lights), snow/ice removal, FOD control and other infrastructure, to assure their availability in every condition. Effective management of the condition and serviceability of the entire aerodrome operating environment includes having maintenance and service plans which are adhered to. This safety issue covers all potential events that may occur due to poor condition of the aerodrome operating environment.

Control of airside works (SI-1008)

Improper supervision, coordination and control of airside works may lead to aircraft damage and/or injuries. Airside works are properly supervised, coordinated, and controlled to ensure safe operations. This safety issue covers all potential events that may occur where airside works are involved, such as ingestion of FOD produced by construction equipment/material, aircraft collisions with vehicles/equipment, etc.

Control of passengers on the apron (SI-1009)

Insufficient control of passengers on the apron or any other operational area of the aerodrome or airport. If passengers move outside of designated areas on the apron, the risk of sustaining injuries increases. In a well-functioning operation, passengers are correctly controlled between leaving the terminal and entering the aircraft and vice versa.

Coordination and control of turnarounds (SI-1010)

Inadequate management or coordination of the turnaround process, covering the period from leaving the centre line of the taxiway until the aircraft leaves under its own power. This includes the non-application or incorrect application of procedures due to mismanagement, in particular those relating to loading and off-loading of passengers and cargo, fuelling operations or those involving coordination with other entities (such as the aerodrome operator or other handling companies).

Dangerous goods handling and lithium batteries (SI-1011)

Fires involving lithium batteries and/or other dangerous goods, both in the aircraft cabin or hold areas, followed by the potential inability to extinguish any subsequent fire may lead to an aircraft environment incompatible with human life. In a well-functioning system, dangerous goods and lithium battery handling is correctly identified and managed to ensure that all activities are carried out effectively in accordance with relevant regulations, procedures and processes.

Design of ground equipment (non-motorised) (SI-1013)

This safety issue covers the design of non-motorised airport ground support equipment (GSE) including steps, baggage trollies/dollies. If the design of the equipment is not fit for purpose, it may lead to damage and/or injuries. Effective design of non-motorised airport GSE will prohibit occurrences where damage and/or injuries are sustained due to improper design of the ground equipment.

Design of vehicles (motorised GSE) (SI-1014)

This safety issue covers the design of motorised airport GSE including belt loaders, baggage trucks, catering trucks, fuel bowsers and pushback equipment, etc. If the design of the equipment is not fit for purpose, it may lead to damage and/or injuries. Effective design of motorised airport GSE will prohibit occurrences where damage and/or injuries are sustained due to improper design of the ground equipment.

Emergency/abnormal operations (SI-1015)

The supervision, coordination and control of emergency/abnormal operations may lead to damage, injuries, and/or impaired responses to emergencies. In a well-functioning operational environment, emergency/abnormal operations are properly supervised, coordinated, and controlled to ensure safe operations.

Fuelling operations (SI-1017)

This safety issue covers the management and handling of the aircraft refuelling process and its coordination/oversight. In a well-functioning operational environment, fuelling operations are correctly managed to ensure that all activities are carried out effectively in accordance with relevant regulations, procedures and processes. Adherence to the procedures and communication with crew (flight/cabin) during fuelling with pax on board or during embarking/disembarking are important factors to avoid fire, spillage, contamination, misfuelling and incorrect fuel load and fuel quality, etc.

Ground operations in extreme temperatures (SI-1044)

Negative effects of extreme temperatures (high or low) on ground operations may lead to unsafe situations in the airside operational environment. In a well-functioning operational environment, the effective handling and management of ground operations in extreme temperatures will mitigate the risks of unsafe situations.

Ground operations in high winds, rain, thunderstorms (SI-1042)

Negative effects of high winds, intense rain, thunderstorms on ground operations may lead to unsafe situations in the airside operational environment, such as equipment malfunctions (e.g. non-functioning windscreen wipers on vehicles) or equipment caught by winds, as well as danger of staff and/or passengers being struck by lightning. In a well-functioning operational environment, the effective handling and management of ground operations in high winds, intense rain, thunderstorms, etc. will mitigate the risks of unsafe situations.

Ground operations in low-visibility conditions (SI-1018)

Negative effects of low visibility in ground operations may lead to unsafe situations in the airside operational environment. In a well-functioning operational environment, the effective handling and management of ground operations in low-visibility conditions will mitigate the risks of unsafe situations.

Ground operations in snow/ice conditions (SI-1043)

Negative effects of winter conditions on ground operations may lead to unsafe situations in the airside operational environment. In a well-functioning operational environment, the effective handling and management of ground operations in winter conditions will mitigate the risks of unsafe situations.

Ground staff movement around aircraft (SI-1019)

This safety issue covers the movement of personnel that takes place around an aircraft during the turnaround process, especially while engines are running, or an aircraft is about to move (anti-collision beacon on) or within extended danger zones during cross-bleed engine starts. In a well-functioning operational environment, ground staff are able to move safely around the aircraft without the risk of injuries whilst being aware of the risks involved.

Jet blast (SI-1021)

This safety issue covers the management of ground running or taxi patterns, which may lead to injuries or damage due to jet blast. In a well-functioning operational environment, ground running and taxi patterns are properly managed to mitigate the consequences of jet blast.

Load sheets and other documentation/systems (SI-1022)

This safety issue covers errors and omissions in load systems and documentation or systems for recording loading of aircraft. Errors in the load sheets and other documentation can lead to incorrect pre-flight calculations of flight parameters, which may put the aircraft in an unsafe state. In a well-functioning operational environment, the completion and reconciliation of load sheets and other documentation or systems for recording loading of aircraft are carried out properly.

Operation of air bridges/passenger boarding bridges (PBBs) (SI-1023)

This safety issue covers the operation of air bridges or passenger boarding bridges (PBBs), which, if done incorrectly, may lead to collisions between aircraft and PBBs or injuries to personnel or passengers. In a well-functioning operational environment, the operation of air bridges follows effective user training and the correct use of effective procedures and processes.

Operation of ground support equipment (non-motorised) (SI-1024) (Amended)

This safety issue covers the operation of non-motorised ground support equipment (GSE) on the aerodrome movement area, which, if done incorrectly, may lead to collisions between aircraft and non-motorised GSE or injuries to personnel or passengers. In a well-functioning operational environment, the operation of non-motorised GSE follows effective user training and the procedures and processes are applied correctly and effectively.

Operation of vehicles (and other motorised GSE) (SI-1025) (Amended)

This safety issue covers the operation of vehicles/motorised ground support equipment (GSE) on the aerodrome movement area, which, if done incorrectly, may lead to collisions between aircraft and vehicles/motorised GSE or injuries to personnel or passengers. In a well-functioning operational environment, the operation of vehicles/motorised GSE follows effective user training and the procedures and processes are applied correctly and effectively.

Parking and positioning of aircraft (SI-1026)

This safety issue covers the procedures and processes of marshalling, parking or positioning of aircraft which, if done incorrectly, may to lead to damage or injuries. It includes issues related to visual parking aids, manual marshalling and stand allocation. In a well-functioning operational environment, aircraft are marshalled, parked and positioned on an aerodrome such that sufficient clearance from other aircraft and objects is ensured.

Personal pressure and arousal (SI-1307)

This safety issue covers the inability of individuals to perform to their best due to pressure or lack of/excessive arousal, in an aerodrome and groundhandling operational environment. In a well-functioning operational environment, personnel are not put under undue pressure or are able to handle low-arousal states so that they can perform their duties effectively when needed.

Positioning and securing of ground support equipment (SI-1027)

This safety issue covers the positioning or inadequate securing of ground support equipment (GSE) such as baggage trolleys/dollies, unit load devices (ULDs), steps, etc. when they are not in use. If done incorrectly, GSE may be blown around the apron due to bad weather, jet blast or other external influence and consequently, cause damage to aircraft or injuries to passengers or personnel. In a well-functioning operational environment, GSE is parked in designated areas and properly secured in order to prevent it from being blown around the apron.

Pushback operations (SI-1028)

This safety issue covers the management, handling and coordination of the pushback, which, if done incorrectly, may lead to collisions with other aircraft or ground vehicles/equipment and/or injuries to ground personnel. In a well-functioning operational environment, pushbacks are correctly managed and coordinated to ensure safe operations.

Runway/taxiway design and layout (SI-1029)

Complex runway/taxiway design and layouts may induce a higher probability of runway incursions or the potential for collisions and aircraft damage. In a well-functioning environment, the design of runways/taxiways minimises the likelihood of incursions and/or collisions.

Serviceability of apron/stand (SI-1031)

This safety issue covers the serviceability and maintenance of aprons/stands which, if not performed correctly, may lead to collisions, damage, and/or injuries. In a well-functioning operational environment, the serviceability and maintenance of aprons/stands are performed effectively and thus facilitate safe operations at aprons/stands.

Serviceability of ground support equipment (non-motorised) (SI-1033)

This safety issue covers the serviceability and maintenance of non-motorised airport ground support equipment (GSE) including steps, baggage trollies/dollies, ULDs, which, if not performed correctly, may lead to damage and/or injuries. In a well-functioning operational environment, the serviceability and maintenance of non-motorised airport GSE are performed effectively and thus facilitate safe operations of non-motorised airport GSE.

Serviceability of runways/taxiways (SI-1032)

This safety issue covers the serviceability and maintenance of runways/taxiways which, if not performed correctly, may lead to collisions, damage, and/or injuries. In a well-functioning operational environment, the serviceability and maintenance of runways/taxiways are performed effectively and thus facilitate safe operations on runways and taxiways.

Serviceability of vehicles (motorised GSE) (SI-1034)

This safety issue covers the serviceability of vehicles/motorised airport ground support equipment (GSE) including belt loaders, baggage trucks, catering trucks, fuel bowsers and pushback equipment, etc. which, if not done correctly, may cause damage and/or injuries. In a well-functioning operational environment, the serviceability and maintenance of vehicles/motorised airport GSE are performed effectively and thus facilitate safe operations of vehicles/motorised GSE.

Terminal design and layout (SI-1035)

When planning and (re-)designing the airport, terminal design and layout problems may induce the potential for collisions, aircraft damage, and injuries. In a well-functioning risk-based design process, the design and placement of terminals are done effectively, thereby minimising the likelihood of taxiway incursions, injuries, and/or collisions.

Unreported events (SI-1038)

In a non-functioning or badly functioning operational environment, events go unreported due to fear of repercussions, lack of awareness of and training on occurrence reporting and just/learning culture, etc. In particular, damages to composite structures tend to be under-reported as such damage, which sometimes can be significant and may not be visible on the surface. In a well-functioning operational environment, the just culture within the organisation facilitates the accurate reporting of events by ground staff to ensure that an assessment is carried out.

Worker fatigue leading to human error (SI-1039)

The inability to recruit and retain groundhandling staff is leading to staff shortages, long working hours and an ageing workforce. In the long term, if left unchecked, commercial growth and expectations will exceed human resources, resulting in unsustainable operations with possible safety-critical impact on flight safety due to human error.

20. ATM/ANS

20. ATM/ANS

The ATM/ANS Safety Risk Portfolio was first developed in 2017 by EASA, in conjunction with the ATM/ANS Collaborative Analysis Group and has since been reviewed annually. Each safety issue contributes to one or more key risk areas as defined in the introduction of this Volume.

Regarding the main key risk areas for this domain, refer to EASA's ASR 2021 Chapter 7 ATM /ANS Figure 132 'Key risk areas by aggregated ERCS score and number of risk-scored ATM/ANS occurrences'. These key risk areas are defined by their potential accident outcome and by the immediate precursors of that accident outcome. This figure is obtained by aggregating the ERCS score for the risk-scored occurrences relevant to this domain and plotting it against the number of risk-scored occurrences. The risk picture of this domain identifies the key risk areas of greater concern that are airborne collision, runway excursion, and aircraft upset.

The safety issues in the portfolio are sorted into the 'Assess – Elevated priority index', 'Assess – Normal-to-low priority index', 'Mitigate – define', 'Mitigate – implement', and 'Monitor' categories, which provide a snapshot of their status within the European SRM process by the priority. The safety issue prioritisation method is described in the Introduction of this Volume. To understand each safety issue better, please click on the safety issue in the list to access their description.

List 20-1: ATM/ANS safety issues per category & priority

Assess - Elevated priority index

Facilitates Step 2: Assessment of safety issue

- Airspace infringement (SI-2025)
- Deconfliction with aircraft operating with a malfunctioning or non-operative transponder (SI-2002) (Amended)
- Conflict detection with the closest aircraft (SI-2003) (Amended)
- High energy runway conflict (SI-2005)
- Landing/take-off/crossing without clearance (SI-2007)

Assess - Normal-to-low priority index

Facilitates Step 2: Assessment of safety issue

- Airborne collision with an unmanned aircraft system (UAS) (SI-2014) (Amended)
- Undetected occupied runway (SI-2006)
- Level bust (SI-2004)
- New technologies and automation (e.g. remote tower, SWIM) (SI-2015)
- Cybersecurity (SI-2013)
- Mass diversions (SI-2032) (Amended)
- Provision of weather information (turbulence/windshear/convective weather) (SI-2008)
- Failure of air-ground communication service (SI-2018) (Amended)
- Provision of weather information (wind at low height) (SI-2009)
- Failure of surveillance service (SI-2017) (Amended)
- Understanding and monitoring system performance interdependencies (SI-2022)
- Failure of navigation service (SI-2016) (Amended)
- Sector overload (SI-2019) (Amended)

Mitigate - define

Facilitates Step 3: Definition and programming of safety actions

- ACAS RA not followed (SI-2001)

Mitigate - implement

Facilitates Step 4: Implementation and follow-up of safety actions

- Deconfliction between IFR and VFR traffic (SI-4009)
- Effectiveness of safety management system (SI-2026)

Monitor

Facilitates Step 5: Safety performance measurement

- ATCO-pilot operational communication (SI-2027)
- Procedure design and obstacle publication (SI-2028)

ACAS RA not followed (SI-2001)

The anti-collision avoidance system (ACAS) is considered one of the last lines of defence in preventing an airborne collision. This safety issue pertains to the situations where the flight crew of one or both aircraft ignore the ACAS RA, react excessively late, do not follow the instruction regarding vertical rate precisely or respond in opposite direction. Flight crew are required to comply immediately with all resolution advisories (RAs), unless doing so would endanger the aircraft. Similarly, air traffic controllers (ATCOs) are required not to provide further air traffic control (ATC) instructions once the flight crew reports the RA. The appropriate responses which flight crew and ATCOs are expected to demonstrate in the event of an ACAS RA are outlined in ICAO and EU regulatory documentation.

Airborne collision with an unmanned aircraft system (UAS) (SI-2014) (Amended)

The increasing popularity of drones, especially drones of less than 25 kg operating in the 'open' category, has inadvertently led to an increase of airborne collision risk between drones and manned aircraft. This is largely due to unauthorised activity of drones in both take-off and approach paths of commercial airlines up to 5 000 ft. While less common, unauthorised activity of drones may also pose a collision hazard when an aircraft is flying en-route. Authorised UAS operations in the 'specific' category may include UAS flights at altitudes at which other (manned) aircraft will fly, and therefore these could possibly pose risks as well. For example, failure of the UAS guidance and control system or degradation of technical systems supporting e-identification, geo-fencing, detect and avoid, (self)-separation or collision avoidance, could increase the risk of airborne collision with a UAS. Also, human factors (HF) issues and unintended remote pilot/operator errors could result in airspace violations, procedural deviations, and altitude deviations (thereby increasing the risk of airborne collision).

This safety issue is exacerbated by the fact that UAS are often not detected by ground equipment and/or on-board conspicuity devices of other aircraft.

As a result of a drone sighting, aerodrome traffic may be stopped or diverted, leading to secondary risks, such as fuel shortages, airspace capacity saturation and an increased workload of air traffic controllers and pilots.

Airspace infringement (SI-2025)

Airspace infringement occurs when an aircraft enters notified airspace without previously requesting and obtaining clearance from the controlling authority of that airspace or enters the airspace under conditions that were not contained in the clearance. Such infringements pose a safety risk to traffic within the controlled airspace and increase the air traffic controller's workload. The safety issue addresses infringements by aircraft flying using VFR in controlled airspace (Class A to D), aircraft accessing airspace without ATC clearance, and infringements of restricted airspaces such as danger areas, restricted areas, prohibited areas and temporary segregated/reserved areas by all types of traffic.

ATCO-pilot operational communication (SI-2027)

Good communication between air traffic controllers (ATCOs) and flight crew is essential in ensuring clear understanding of instructions and maintaining situational awareness. ATCO-pilot communication deficiencies may lead to all types of serious incidents and accidents. Common issues include three or more instructions in a single clearance, incorrect use of standard phraseology, misuse of the aircraft emergency frequency (121.5 MHz), and the uncoordinated introduction of phraseology. This safety issues also addresses the use of native language between local ATCOs and flight crew which reduces the situational awareness of all other users on the frequency.

Conflict detection with the closest aircraft (SI-2003) (Amended)

Air traffic controllers (ATCOs) may not detect a conflict between one aircraft and another aircraft close to it due to attention failure. Attention is a limited resource and numerous processes compete for it. In blind spot events the needed elements of attention — vigilance (maintaining awareness) and focus (concentration on the task) —are adversely affected by:

(1) competition for the attention resources from other tasks, attempts to remember, increased mental workload; and

(2) erosion of the attention resources by filtering mechanisms and physiological factors like distraction and fatigue.

ATCOs usually experience this loss of separation 'blind spot' after an incorrect descent or climb clearance in the context of a rapidly developing situation. There is normally very little or no time to react and most of the conflicting clearances result in an incident. The scope of this safety issue is limited to controlled airspace. While airspace infringements may potentially result in a controller blind spot, these events are excluded from this safety issue as they are addressed in the 'Airspace Infringement (SI-2025)' safety issue.

Cybersecurity (SI-2013)

ATM systems have become increasingly digitalised to reap efficiency gains. However, a move towards the digital sphere exposes ATM systems to more vulnerabilities and threats to confidentiality, integrity and availability of the systems. Given the strong interdependence of the different domains in the aviation industry, a cyberattack on ATM systems may compromise safety and integrity of the aviation system as a whole. In addition to terrorist-related attacks, the safety issue is concerned with how ATM systems can remain resilient in the face of attacks perpetrated by hackers to gain access to systems or cause disruption for non-terrorist purposes and attacks carried out for commercial espionage.

Deconfliction between IFR and VFR traffic (SI-4009)

Ineffective deconfliction of flights adhering to instrument flight rules (IFR) and visual flight rules (VFR) in an airspace class where at least one of the flights is not under air traffic control (ATC) separation has been identified as a strong contributor to airborne collision risk. Such airspace classes include class E, controlled airspace where VFR flights are not subject to ATC clearance and no IFR-VFR separation is provided by ATC, and class G, where neither IFR flights nor VFR flights are subject to ATC clearance and ATC does not provide any separation service. The safety issue arises due to the fragmented knowledge of the traffic situation as some traffic is subject to ATC clearance (i.e. IFR) and some traffic is not (i.e. VFR). ATC may not be aware of VFR flights or their intentions and potentially may not pass traffic information to the IFR traffic. In addition, some of the VFR traffic may not be equipped with airborne collision avoidance system (ACAS) or even a transponder (C or mode-S), reducing the conspicuity of VFR traffic. As a result, both IFR and VFR traffic have to rely solely on the visual acquisition by the flight crew to maintain separation. This safety issue addresses how the conspicuity of VFR traffic can be improved as well as best practices to underscore the importance of existing procedures in maintaining airborne separation. This safety issue is captured in the Non-Commercial Operations – Small Aeroplanes Safety Risk Portfolio and is also relevant to the Commercial Air Transport – Aeroplanes domain.

Deconfliction with aircraft operating with a malfunctioning/non-operative transponder (SI-2002) (Amended)

When an aircraft with a non-operative transponder or malfunctioning transponder operates in an airspace where aircraft must be equipped with a secondary surveillance radar (SSR) transponder, the incorrect information transmitted by the transponder increases the risk of airborne collision or terrain collision. Without a functioning transponder, ATC may be misled by the incorrect data on the aircraft's position, and this may result in ATC issuing a clearance which poses a safety risk to another aircraft or to the aircraft itself if the clearance directs it into a terrain e.g. a mountain. As the operation of ACAS is contingent on a functioning transponder, other nearby aircraft will not be able to receive traffic advisories or RAs to maintain separation with the aircraft without a functioning transponder should the need arise. This safety issue explores the frequency of such occurrences and whether the existing procedures suffice in mitigating the risk posed by aircraft operating without a functioning transponder.

Effectiveness of safety management system (SI-2026)

Ineffective implementation of safety management systems may lead to deficient management of ATM/ANS risks within the service provider organisations. The complex nature of aviation safety and the significance of addressing HF aspects justify the need for an effective management of safety by the aviation organisations. Shared understanding between regulatory/competent authorities and air navigation service providers is imperative for an effective SMS functioning in an already ultra-safe industry, like aviation. However, the lack of competent and experienced inspectors and regulatory authorities lead to the risk of bureaucratising SMS seeing it only as a compliance system. This safety issue covers the regulatory requirements and promotion of SMS principles, on both aviation authorities and organisations, and the capability to detect and anticipate new emerging threats and associated challenges.

Failure of air-ground communication service (SI-2018) (Amended)

Failure of the air-ground communication system may degrade the performance of the communication service and increase safety risk to an unacceptable level. Air-ground communication refers to aeronautical fixed and mobile services to enable air-to ground voice or data communication for air traffic control (ATC) purposes. Common failures in voice communications include radio equipment malfunction (air and on ground), loss of communication, blocked frequency, radio interference, and sleeping VHF receiver problem. Another key mode of air-ground communication service is controller pilot data link communications (CPDLC) which allows air traffic controllers to transmit non-time-critical messages to an aircraft as an alternative to voice communications. Common failures in CPDLC include technical failure of data link equipment (air and ground) and disconnections known as provider aborts. This safety issue explores how such failures can be prevented using pre-emptive measures and the best practices to manage such failures on a tactical basis when they occur. The impact of the failure of air-ground communication service includes the entire provision of air traffic service (ATS).

Failure of navigation service (SI-2016) (Amended)

Failure of the navigation service can lead to the loss of the facilities and services (VOR, DME, ILS, GNSS, NDB) that support aircraft with positioning and time and thus increase safety risk to an unacceptable level.

This leads potentially to the situation that the crew does not know the correct position of the aircraft, or the indicated position is not correct. This could lead to the overload of the air traffic controllers when they are required to provide the missing information verbally or via the system. For example, a corrupted/interrupted ILS signal can lead to an unstabilised approach, go-around and even CFIT.

This safety issue covers appropriate maintenance, procedures to identify failures and their impact on ATS, procedures to operate in degraded modes of operation, and training of staff to deal with abnormal situations.

Failure of surveillance service (SI-2017) (Amended)

Failure of the surveillance service may degrade the performance of ATS and increase safety risk to an unacceptable level. Surveillance systems are used by air traffic control to determine the respective positions of aircraft to allow safe separation. Such systems include PSR, SSR, GNSS and Automatic Dependent Surveillance – Broadcast (ADS-B), Wide Area Multilateration (WAM) and systems for processing and displaying surveillance data.

Effective management of these systems is essential in minimising the impact on ATS. This safety issue covers appropriate maintenance, procedures to identify failures and their impact on ATS, procedures to operate in degraded modes of operation, and training of staff to deal with abnormal situations.

High-energy runway conflict (SI-2005)

A high-energy runway conflict occurs when there is little or no time for the air traffic controllers to react to a potential conflict between a high-energy landing (indicated airspeed (IAS) of 100 knots or more) or take-off (IAS of 80 knots or more) and an aircraft which has infringed an active runway, which is also known as a runway incursion. Runway incursion is defined as any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft. Thus, this safety issue addresses a specific subset of runway incursions.

Landing/take-off/crossing without clearance (SI-2007)

Aircraft landing, taking-off and crossing runways without clearance from the air traffic controller (ATCO) poses a significant runway collision risk. Such events typically happen during critical and high-workload stages of the flight and can result in similar hazardous outcomes, such as runway incursion and runway collision. The safety issue covers contributory factors from both the flight crew and ATCOs ranging from call sign confusion, runway confusion, incorrect phraseology and expectation bias to cockpit overload.

Level bust (SI-2004)

Level bust is defined as any unauthorised vertical deviation of more than 300 ft from an ATC flight clearance. Within reduced vertical separation minima (RVSM) airspace, this limit is reduced to 200 ft. Level bust contributes towards the airborne collision and CFIT key risk areas when the aircraft fails to fly at the level to which it has been cleared. Such events may occur due to communication error, flight crew error in entering the clearance in the flight control unit and insufficient time for the flight crew to react to a late re-clearance.

Mass diversions (SI-2032) (Amended)

Mass diversions due to airspace and/or airport closure have pervasive repercussions on various aviation domains, ranging from ATC to flight operations, due to their extensive nature. The large amount of displaced traffic results in an overload for ATC and increase workload for the flight crew. This carries the potential for loss of separation as well as other risks related to high-workload tasks and situational awareness. This safety issue covers policies regarding fuel emergencies, air traffic flow management, ensuring that alternate aerodromes have sufficient capacity, and diversions from many airports to one.

New technologies and automation (SI-2015)

This safety issue refers to the potential increase in safety risks due to the complexities arising from the introduction of new technology and concepts in ATM such as remote tower operations and system wide information management (SWIM). With more complex automation, it is important to address the relationship between humans and automation within the framework of a contemporary safety management system.

Procedure design and obstacle publication (SI-2028)

With the advent of new navigation systems, the design of instrument flight procedures (IFPs) and its publications have become key enablers of the ATM system globally. They must therefore be managed to ensure that quality-assured procedures are provided in support of ATM operations. Poorly designed IFPs can increase the risk of loss of separation, level bust and CFIT. In addition to well-designed IFPs, it is also essential to ensure that information relating to the IFP is accurate and updated in a timely manner. This reduces potential discrepancies during the take-off/approach of the flight.

Provision of weather information (turbulence/windshear/convective weather) (SI-2008)

Inaccurate or missing weather information on weather phenomena such as turbulence, windshear, and convective weather on board the aircraft (flight crew) and on ground (ATCOs) may lead to aircraft flying through weather phenomena without warning. Depending on the severity of the weather phenomena, passengers or cabin crew may sustain injuries on board. This safety issue is focused on IFR flights in the en-route/approach environment, where improvement in the provision of meteorological information will enable controllers to better manage traffic flows and pass weather information to pilots.

Provision of weather information (wind at low height) (SI-2009)

The landing phase is considered one of the highest-risk phases of flight due to the high cockpit workload and execution of difficult tasks such as the landing flare. Weather information near the surface of the runway such as tail wind on ground and cross wind is crucial to assist flight crew during the landing phase. Inaccurate weather information may contribute to non-stabilised approaches and increase the risk of runway excursions. As this topic spans across several aviation domains, the scope of this safety issue is focused on the ANSPs' and ATC's role in ensuring that accurate and timely weather information is provided to flight crew during the landing phase.

Sector overload (SI-2019) (Amended)

Sector overload refers to a complex situation where the ATCO on operational duty can no longer manage the existing levels of air traffic in a safe manner. As ATCOs are personnel responsible for the safe, orderly and expeditious flow of air traffic, it is important to address any situation which impairs the controller's ability to achieve the desired levels of safety. A complex situation may arise due to a confluence of external or internal factors. External factors include aircraft deviation from the planned trajectory, unexpected bad weather conditions, reduction of available airspace, amongst others. Internal factors include degradation of ATM system performance, parallel system maintenances, blocked runway, amongst others. When assessed individually, some of these contributory factors may have a minor impact on safety. However, when compounded, these factors may manifest in unsafe management of the traffic demand.

Understanding and monitoring system performance interdependencies (SI-2022)

The safety performance of the ANSPs can be affected by a multitude of internal and external factors. While most ANSPs are adept at managing the safety hazards related to their provision of services, it is also important to consider the impact of external factors such as commercial pressure and demands related to increasing capacity and environmental protection on the safety performance of ANSPs. It is important to strike a balance between the competing priorities of safety, efficiency, capacity and environment protection, especially in view of limited resources in most ANSPs. To understand such trade-offs better, regulators and ANSPs should analyse safety performance using a dynamic safety model, such as Rasmussen's Migration Model, and develop guidelines to prevent ANSPs from drifting towards unsafe operations under the influence of competing priorities. Metrics related to factors that have not been traditionally linked to safety performance can be developed to monitor this practical drift and serve to provide 'weak signals' in ATM safety performance.

Undetected occupied runway (SI-2006)

This safety issue pertains to runway incursions by an aircraft landing on or taking-off from an already occupied runway. This could be due to oversight by air traffic controllers, aerodrome design or other organisational factors. Especially during periods of high workload, the controller may accidentally clear an aircraft or a vehicle to enter a runway even though they had already cleared another aircraft to land on or take-off from the same runway. Aerodrome design is also another key contributor to this safety issue as flight crew or manoeuvring area vehicle drivers may navigate onto the wrong surface if the design of the aerodrome may lead to disorientation.

21. Commercial air transport — aeroplanes (CAT A)

21. Commercial air transport — aeroplanes (CAT A)

The CAT A Safety Risk Portfolio was first developed in 2016 by EASA, in conjunction with the CAT A Collaborative Analysis Group, and has since been reviewed annually. Each safety issue contributes to one or more key risk areas as defined in the Introduction of this Volume.

Regarding the main key risk areas for this domain, refer to EASA's ASR 2021 Section 2.3 Safety risks for large aeroplanes (CAT airlines, air taxi and NCC business) Figure 24 'Key Risk Areas by aggregated ERCS score and number of risk-scored occurrences, involving commercial air transport – airlines and air-taxi'. These key risk areas are defined by their potential accident outcome and by the immediate precursors of that accident outcome. This figure is obtained by aggregating the ERCS score for the risk-scored occurrences relevant to this domain and plotting it against the number of risk-scored occurrences. The risk picture of this domain identifies the key risk areas of greater concern that are airborne collision, runway excursion, and aircraft upset.

The safety issues in the portfolio are sorted into the 'Assess – Elevated priority index', 'Assess – Normal-to-low priority index', 'Mitigate – define', 'Mitigate – implement', and 'Monitor' categories, which provide a snapshot of their status within the European SRM process by the priority. The safety issue prioritisation method is described in the Introduction of this Volume. To understand each safety issue better, please click on the safety issue in the list to access their description.

List 21-1: Commercial Air Transport – Aeroplanes (CAT A) safety issues per category & priority

Assess - Elevated priority index

Facilitates Step 2: Assessment of safety issue

- Approach path management (SI-0007)
- Inappropriate flight control inputs (SI-0010)
- Adverse convective weather (Turbulence, Hail, Lightning, ice) (SI-0003)

Assess - Normal-to-low priority index

Facilitates Step 2: Assessment of safety issue

- Management of repetitive defects on safety-critical systems (SI-0050) (New)
- Congestion/interference of the electromagnetic spectrum (5G) (SI-0053) (New)
- Safety education of air passengers (SI-0052) (New)
- Reliance on satellite navigation (SI-0034)
- False or disrupted ILS signal capture (SI-0035)
- Encoding of RNP APP in FMS (SI-0051) (New)
- Gap between certified take-off performance and take-off performance achieved in operations (SI-0017)
- Non-precision approaches (SI-0037)

Mitigate - define

Facilitates Step 3: Definition and programming of safety actions

- Entry of aircraft performance data (SI-0015)
- Poor language proficiency causing communication breakdown (SI-0054) (New)
- Alignment with the wrong runway (SI-0014)
- Volume and quality of the information in NOTAMs (SI-0044)
- Emergency evacuation (SI-0042)

Mitigate - implement

Facilitates Step 4: Implementation and follow-up of safety actions

- Icing in flight (SI-0001)
- Effectiveness of safety management (SI-0041)
- Deconfliction between IFR and VFR flights (SI-0043)
- Clear air turbulence and mountain waves (SI-0018)

Monitor

Facilitates Step 5: Safety performance measurement

- Crew resource management (CRM) (SI-0009)
- State of well-being and fit for duties (SI-0005)
- Fatigue (FTL) (SI-0039)
- Fuel management (SI-0025)
- Flight crew incapacitation [considering single-pilot operations (SiPo) or reduced-crew operations (RCO)] (SI-0049)
- Explosive door openings on parked aeroplanes (SI-0048)
- Icing on ground (SI-0002)
- Wake vortex encounter (SI-0012)
- Handling and execution of go-around (SI-0019)
- Wind shear (SI-0024)
- Carriage and transport of lithium batteries (SI-0027)
- Runway surface condition (SI-0006)
- Bird/wildlife strikes (SI-0045)
- Excessive speed in the manoeuvring area (SI-0028)
- Fuel contamination and quality (SI-0011)
- Disruptive passengers (SI-0047)
- Laser illumination (SI-0046)

Adverse convective weather (turbulence, hail, lightning, and ice) (SI-0003)

The ability and capability of the flight crew to manage the entire flight, including dispatch, and the possibility to detect, avoid and/or mitigate the effects of adverse convective weather on the flight. If not managed well, a flight crew may experience aircraft upset after being forced out of its flight envelope by a severe atmospheric phenomenon, or a significant degradation in performance or the handling qualities of the aircraft, or injuries due to abrupt movements. It also reviews the requirements for the aircraft to fly in certain atmospheric conditions. The main threats of convective phenomena affecting the flight, such as convective turbulence, up/down-drafts, wind shear, hail precipitation, lightning, and icing are reviewed in this safety issue.

Alignment with the wrong runway (SI-0014)

Unintended landing, approach, or take-off of an aircraft on/to/from a wrong landing/take-off surface can lead to excursions or collisions. It includes cases of landing on/take-off from a taxiway or other surface mistakenly identified by the flight crew as the assigned runway. The mistake could be due to visual acquisition, wrong data entered in the flight management system (FMS) or miscommunication between ATC and the flight crew. Other contributing factors include complex aerodrome design, multiple runway thresholds located near one another and other aerodrome-design-related complexities. The safety issue includes the relevant standard operating procedures (SOPs) and the flight crew training, the ATS procedures and the lighting and marking of the aerodrome surfaces.

Approach path management (SI-0007) (Amended)

This safety issue addresses the inappropriate execution of an approach at any point from FL100 until reaching safe taxiing speed. This can lead to runway excursions, aircraft upset, terrain collision, or airborne collision. It covers all types of instrumental and visual approaches. The following areas are reviewed in this safety issue:

- Management of the energy of the aircraft and the influence of external factors affecting the approach, such as tail or crosswind, windshear, down/up drafts and other weather-related factors;
- Decision-making process of the flight crew to go around or continue with the approach; and
- SOPs and the relevance of those procedures for the approach flown, flight crew training and the existing regulatory framework.

In addition to addressing this safety issue from a flight crew perspective, this safety issue also explores ATM-related factors that may lead to non-stabilised approaches. These include ATCO instructions (e.g. vectoring, intermediate level-off) that result in a high descent profile for the flight crew or bring the aircraft too close to the runway. This safety issue is linked to the 'ATM influence on non-stabilised approaches (SI-2010)' in the ATM/ANS Safety Risk Portfolio.

Bird/wildlife strikes (SI-0045)

Insufficient control of birds and wildlife may lead to either damage to the aircraft or loss of control during take-off or landing. This safety issue addresses the inadequate uncontrolled/excessive presence of birds/wildlife in the aerodrome vicinity, and reviews the controls in place by the different stakeholders e.g. aerodrome operators, aircraft operators, aircraft/engine manufacturers, certification authorities, environment protection agencies, etc.

Carriage and transport of lithium batteries (SI-0027)

Lithium batteries carried or contained in electronic devices on board carry a risk of fire in the aircraft. These batteries may potentially ignite due to a thermal runaway, self-ignition or other heat sources. Lithium batteries may be carried on board an aircraft as part of a cargo shipment, check-in luggage of the passengers in the cargo holds or in the cabin in personal electronic devices carried by the passengers or crew.

Clear air turbulence and mountain waves (SI-0018)

Clear air turbulence and turbulence generated by high mountains (mountain waves) are weather phenomena that may result in aircraft upset or injuries/damages. To cope with the effects of such turbulence and mountain waves, it is important to train flight crew to identify and avoid such phenomena and ensure that the relevant SOPs are implemented. These efforts should be complemented by the provision of information from external sources, such as ATC or pilot reports (PIREP), during the flight. The issue also covers the preparation of the flight and the availability of information to enable the flight crew to foresee a possible encounter with such phenomena during the flight.

Congestion/interference of the electromagnetic spectrum (5G) (SI-0053) (New)

The electromagnetic spectrum is crucial to the management of aviation activity as frequencies are required for ATM and ground movements control, navigation aids, weather and ATC radars, radio-altimetry, air-air communications, terrain and ground collision avoidance systems. The spectrum is becoming increasingly congested as traffic levels grow and the increasing demand for bandwidth from other users such as telecoms, radio and television services have led to some portions of the spectrum previously allocated to aviation being diverted for this purpose. This in turn leads to equipage changes (e.g. radar frequencies) and radiotelephony (RTF) frequency congestion. The proximity of competing users can have interference effects that cannot be managed or controlled by either user.

The roll-out of 5G across the world will have an impact on navigational equipment. The issue is that the equipment may not be robust enough against certain 5G frequency bandwidths. In some countries the two (aircraft navigational equipment and 5G networks) may not be able to co-exist.

It also includes the potential for interference from 5G transmissions from the passenger cabin.

Crew resource management (CRM) (SI-0009)

The issue encompasses all aspects of the communication that may impact the situational awareness of the crew members and/or the conduct of the flight, including lack of a common action plan, inadequate division of duties, poor coordination between crew members, use of non-standard phraseology, sensory overload (loss of communications, multiple aural messages, etc.), etc. Good CRM can be achieved by implementing relevant training for flight crew and an effective regulatory framework for CRM requirements. The goal of CRM is to maximise the available resources, through effective communication and efficient workload management.

Deconfliction of IFR and VFR traffic (SI-4009)

Ineffective deconfliction of flights adhering to instrument flight rules (IFR) and visual flight rules (VFR) in an airspace class where at least one of the flights is not under air traffic control (ATC) separation has been identified as a strong contributor to airborne collision risk. Such airspace classes include class E, controlled airspace where VFR flights are not subject to ATC clearance and no IFR-VFR separation is provided by ATC, and class G, where neither IFR flights nor VFR flights are subject to ATC clearance and ATC does not provide any separation service. The safety issue arises due to the fragmented knowledge of the traffic situation as some traffic is subject to ATC clearance (i.e. IFR) and some other traffic is not (i.e. VFR). ATC may not be aware of VFR flights or their intentions and potentially may not pass traffic information to the IFR traffic. In addition, some of the VFR traffic may not be equipped with airborne collision avoidance system (ACAS) or even a transponder (C or mode-S), reducing the conspicuity of VFR traffic. As a result, both IFR and VFR traffic have to rely solely on the visual acquisition by the flight crew to maintain separation. This safety issue addresses how the conspicuity of VFR traffic can be improved as well as best practices to underscore the importance of existing procedures in maintaining airborne separation. This safety issue is captured in the Non-Commercial Operations – Small Aeroplanes Safety Risk Portfolio and is also relevant to the ATM/ANS domain.

Disruptive passengers (SI-0047)

Disruptive passengers are defined as passengers who do not follow safety procedures or instructions from the cabin crew. Such behaviour is normally associated with the consumption of alcohol, drugs and certain types of medication. However, it may be also the result of stress or emotional distress. It is important to subdue these passengers as they may pose a safety threat to other passengers or the cabin crew. To achieve this, airlines have to design effective procedures and train cabin crew to handle such situations in a safe manner.

Effectiveness of safety management (SI-0041)

Aviation organisations are required to implement safety management systems as part of their safety programmes. This issue reviews an ineffective implementation of safety management system by the aviation organisations. The complex nature of aviation safety and the significance of addressing HF aspects show the need for an effective management of safety by the aviation organisations. This issue covers the regulatory requirements and promotion of SMS principles, for both aviation authorities and organisations, and the capability to detect, anticipate and act upon new emerging threats and associated challenges. It also includes the settling of the adequate safety culture in organisations and authorities. This issue has deteriorated in the context of COVID-19 pandemic; refer to Reduced focus on, or prioritisation of safety (SI-5009).

Emergency evacuation (SI-0042)

The safety issue refers to the unsuccessful evacuation of an aircraft after an emergency. The areas of risk identified are:

- hand luggage amount blocking the aisle preventing or slowing down the evacuation;
- passengers taking hand luggage preventing or slowing down the evacuation; and
- emergency evacuation with the aircraft engine still running.

This safety issue considers the passenger behaviour and compliance with safety instructions, the decision-making for the flight crew to command the evacuation, the cabin crew to adequately execute it, and the certification requirements to ensure the adequacy of equipment and aircraft systems. As such, relevant SOPs, training for both flight and cabin crew, and the relevant regulatory requirements have to be reviewed to ensure the safe and efficient egress of all passengers during an emergency.

Encoding of the required navigation performance approaches (RNP APP) in flight management systems (FMS) (SI-0051) (New)

The naming of the performance-based navigation (PBN) approach procedure is not standardised throughout the world. It is also inconsistent with the PBN navigation specifications. Examples of different naming: RNAV (GPS) RWY XX, RNAV (GNSS) RWY XX, RNAV (RNP) RWY XX. Chart identification and FMS encoding differences may lead to confusions and misunderstanding amongst crew. Procedure requirements are not always clearly understood e.g. specifications versus requirements (RF, RNP, missed approach RNP). The situation is the same as regards understanding of the minima (LNAV, LNAV/VNAV and LPV).

Another issue will be the data storage capacity and encoding capability of the on-board equipment against the number of approaches and different encoding requirements (e.g. letter designator for circling approaches, Z – Y, etc. when more than one approach exists).

Entry of aircraft performance data (SI-0015)

The incorrect entry of data into the FMS that is used to set the take-off or landing performance parameters of the aircraft can have catastrophic consequences. This can potentially occur due to miscommunication errors, errors in electronic flight bags (EFBs), entry of data into FMS, last-minute changes by ATC and load masters, and the incorrect calculation of the performance parameters. To mitigate this safety issue, technical solutions are being considered for the long term; in the short to medium term, the focus will be on improvements to SOPs.

Excessive speed in the manoeuvring area (SI-0028)

Excessive ground speed of the aircraft during taxiing at the aerodrome before take-off or after landing may lead to collision on ground, injuries or damages. This safety issue includes also taxiing phases on the runway e.g. back tracking. Such occurrences may occur due to lapses in SOPs and the associated trainings for the flight crews as well as due to poorly designed aerodrome procedures.

Explosive door opening (SI-0048)

When an aeroplane is parked, cooling or heating of the aeroplane cabin can be provided through the air-conditioning system powered up by the auxiliary power unit (APU) or by an external source of air (e.g. ground air-conditioning cart) ducted to the aeroplane cabin. Closing all aeroplane doors helps to reach and maintain the desired temperature. However, it may also result in an undesired build-up of excessive differential pressure between the cabin and the outside environment if the outflow valve is closed. As a result, this may cause an explosive door opening that can lead to injuries or damages. This may happen during normal operation of the aeroplane, during maintenance activities, or when conducting practical training of personnel on the aeroplane on ground.

False or disrupted instrument landing system (ILS) signal capture (SI-0035)

Aircraft on approach may potentially capture a false or disrupted ILS or localiser signal due to several factors:

- technical issues with the ILS; or
- interference of the ILS signal by obstacles, aircraft, and vehicles in the sensitive ILS areas; or
- inadequate approach procedures leading to the capture of upper/lower/side lobes.

A false or disrupted capture may lead to terrain collision or runway excursion. Due to its multi-faceted nature, this safety issue also includes the review of existing safety barriers implemented by different stakeholders, such as the CNS providers, aerodrome operators, ATS, aircraft operators, manufacturers as well as regulators.

Fatigue (SI-0039)

Fatigue can negatively affect aircrew performance in the aircraft and pose a hazard to flight safety. In commercial air transport, aircrew rosters are traditionally developed on the basis of prescriptive duty time limits, flight time limits, minimum rest requirements and other constraints such as minimum notification times and prohibition to combine certain duties, to name a few. These limits and requirements, referred to as flight time limitations (FTL), are presumed to be adequate for maintaining aircrew fatigue at levels that will not put at risk the safety of flight operations. Note that general fatigue issues that are not limited to flight crew fatigue, such as quality sleep, are managed under Fatigue and quality sleep (SI-3005) in the Human Factors Safety Risk Portfolio.

Flight crew incapacitation (SI-0049)

With reduced- and single-pilot operations, a new certification requirement is needed for normal aircraft conditions. This will ensure the continued safe flight and landing in the event of pilot incapacitation. The concept of continued safe flight and landing currently applies only in the determination of airworthiness of aircraft structures and systems. A new requirement could engender pilot incapacitation detection, alerting, and recovery requirements, and be used as a reference for the certification of a possible ground-assistance element.

Fuel contamination and quality (SI-0011)

This safety issue relates to the upload of contaminated fuel in the aircraft or to fuel being contaminated once stored in the aircraft fuel system. This safety issue covers all types of contamination from water, algae, polymers, etc.; anything that is sufficient to cause an in-flight shutdown of the engines or to affect adversely the delivery of power from the engines. It also includes the supply chain of fuel that may be the cause of the contamination, the oversight capabilities of the aircraft operators and the regulatory framework of both the fuel supply and the operators' oversight.

Additionally, it includes the non-compliance with the technical specification for specific fuel type, resulting in wrong flash point, wrong concentration of any required chemical component, etc.

Fuel management (SI-0025)

Inadequate management of the fuel to perform the flight that may lead to aircraft upset or collision with terrain. This involves fuel planning, calculation, and the management once the flight has commenced i.e. defined as the point when the first engine has started. It includes the communication and coordination of the flight crew with ATC and the operations department of their organisation, the relevant SOPs, fuel policy and training of the flight crew.

Gap between certified take-off performance and take-off performance achieved in operations (SI-0017) (Amended)

One type of incorrect rotation is slow rotation rate performed by the flight crew at take-off, with the aim of avoiding tail strikes. This is especially critical in short- and high-altitude runways as too slow rotations there can lead to runway excursions, aircraft upset, or terrain collision. The most critical scenario is a heavy aircraft, typically a long-haul flight by a large four-engine aircraft with high payload, in short high-altitude runways. Relevant SOPs and training for flight crew have to be reviewed and implemented to ensure that flight crew rotate the aircraft at the correct rate during take-off.

Handling and execution of go-arounds (SI-0019)

Inadequate execution of the go-around manoeuvre may lead to aircraft upset, runway excursion, injuries or damages, or collision with terrain. It is the deviation from the SOPs and published go-around procedures. It covers the HF relevant during this manoeuvre (e.g. somatogravic illusion, breakdown of CRM). It includes the procedures and training of the flight crew, and the adequacy of those, regarding go-around with all engines operating (workload).

Icing in flight (SI-0001)

Icing in flight may occur due to various reasons, however, this safety issue is focused on the manifestation of icing during flight caused by an atmospheric icing phenomenon. The typical manifestation is the accretion of ice on aerodynamic surfaces, probes, engine parts or flight control system, leading to degradation of handling quality or performance issues, system failures or malfunctions, or damages on aeroplane's structure. When such icing occurs, it is important to ensure that the flight crew is able to recognise the situation and manage the flight in adverse icing conditions. Other sources of icing, such as frozen water leaks from the waste water aircraft system, are excluded from this safety issue. This safety issue is also relevant to the Non-Commercial Operations – Small Aeroplanes domain.

Icing on ground (SI-0002)

Icing on the ground may occur due to an atmospheric icing phenomenon and the adverse effect of the de-/anti-icing fluids. If managed poorly, the flight crew may experience aircraft upset or collision with terrain after take-off, runway excursion, injuries or damages. It is crucial to ensure relevant SOPs and training are implemented to ensure that flight crew are able to recognise and manage the effects of adverse icing conditions experienced during the ground phases of flight. This safety issue is also relevant to the Non-Commercial Operations – Small Aeroplanes domain.

Inappropriate flight control inputs (SI-0010)

Flight crew may inadvertently introduce flight control inputs which may result in a deviation from actual or intended immediate flight path. Depending on the circumstance and magnitude of input, inappropriate flight control inputs may result in an undesirable safety consequence, such as aircraft upset, runway excursion, injuries or damage. It also addresses the HF affecting the flight crew performance, for instance, by reducing their cognitive capacity to recognise the situation and react appropriately.

Laser illumination (SI-0046)

Even though it is illegal to shine a laser device at an aircraft in most countries, such errant behaviour still occurs and puts flight crews at risk of temporary or permanent blindness. It may result in pilot distraction, temporary vision impairments and, in serious cases, ocular injury. These effects may pose significant flight safety hazards in critical phases of flight during approach and landing near airports.

Management of repetitive defects on safety-critical systems (SI-0050) (New)

The safety issue refers to the complex and repetitive defects on safety-critical systems. Although this safety issue may be seen as part of the safety issue 'Handling of Technical Failures', this particular safety issue focuses on the critical interface between flight crew and engineering/maintenance staff. While there are clear requirements about the process of recording and rectifying defects (including deferred defects), management of repetitive defects (identification, recording and communication with the flight crew) is a challenge many operators face on a daily basis. For example, while the flight crews have the visibility of deferred defects in the Tech Log system, in many cases / organisations, they have no visibility of repetitive defects. Therefore, they do not have the opportunity to conduct their own risk assessments, make go/no-go decisions and/or be prepared to deal with the consequences of a repetitive defect recurring particularly at a critical phase of the flight e.g. radio altimeter failure during approach / landing.

Non-precision approaches (SI-0037)

The safety issue refers to the erosion of pilot skills to conduct non-precision approaches as most airline pilots are not required to conduct such approaches frequently. The high standards and wide spread of precision approaches, including the increasing number of performance-based navigation (PBN), are reducing the exposure, and limiting non-precision approaches to isolated cases (e.g. en-route diversion). The safety issue covers the training and SOPs for the flight crews on non-precision approaches. This safety issue is linked with Approach path management (SI-0007).

Poor language proficiency causing communication breakdown (SI-0054) (New)

The use (or misuse) of language can contribute directly or indirectly to an accident. Therefore, a minimum standard level of knowledge of the language used for communication mainly between pilots and Air Traffic Controllers (ATCOs) is critical to flight safety.

ICAO standardised phraseology should be used whenever possible. Also, when phraseology is not applicable, pilots and ATCOs should demonstrate a minimum level of proficiency in plain language.

The effective use of plain language is vital in routine operational situations in which phraseology provides no 'ready-made' form of communication and is especially critical in unusual or emergency situations.

Inevitable language errors should always be considered and judged in the wider context of miscommunication or failure to communicate successfully. The recognition of these errors contributed to the construction of ICAO Operational Level 4 which is considered to be the minimum level acceptable to ensure safe operations.

Reliance on satellite navigation (SI-0034)

The safety issue refers to the increasing reliance on satellite-based navigation and the potential impact of the associated vulnerabilities on the safety of the flight. Such vulnerabilities include jamming, spoofing and over-reliance of flight crew on satellite-based navigation. Over-reliance on satellite-based navigation may lead to complacency resulting in inadequate pre-flight preparation and potential loss of orientation when the GNSS unit fails. It covers the equipment on board, the SOPs, training and navigation procedures published. The procedure of key interest is the procedure to revert to other means of navigation in critical flight phases should the GNSS unit malfunction in flight. Wrong position information has severe repercussions as it can lead to airspace infringement or trigger false TAWS events which might result in increased mid-air collision risk.

Runway surface condition (SI-0006)

The mismatch between the actual status of the runway surface condition and the one used to calculate the aircraft landing performance may lead to runway excursions. This includes the measurement systems, the methodology to assess the runway surface condition and the reporting methods used to communicate said condition to the flight crews in approach. This safety issue also addresses the calculation methods used by the flight crew provided by the operator in the AFM/FCOM and the performance data provided by the aircraft manufacturer.

Safety education of air passengers (SI-0052) (New)

Poor air passenger understanding of residual risks inherent in commercial air transport operations is likely to result in failure to comply with safety instructions and advice, with a consequent increase in the risks borne by crew and other passengers.

The understanding by the passengers of the cabin crews' safety role in the cabin (that is not only limited to assistance and selling). Instructions need to be obeyed, the safety purpose understood, attention to briefings paid, especially when relevant to coping with potential distress situations/evacuation.

State of well-being and fit for duties (SI-0005)

Flight crew have to be fit and well both physically and mentally to conduct a flight safely. This is achieved by ensuring the well-being of flight crew through the introduction of procedures for airlines to assess the conditions of flight crew and well-being initiatives in the airline. These efforts should be undergirded by an effective regulatory framework. Refer also to Decreased well-being of aviation professionals during shutdown (SI-5007).

Volume and quality of the information in NOTAMs (SI-0044)

With the steady growth in the number of notices to airmen (NOTAMs), flight crew are increasingly challenged in processing the volume of information during their pre-flight preparation. It is hard to identify the most important and relevant information, which may result in the flight crew overlooking safety-critical information. This is also exacerbated by the inconsistent quality of the information provided in NOTAMs. The content of a NOTAM does not always adhere to ICAO standards and the use of non-standard acronyms may create confusion or a delay in understanding the content. The safety issue explores the different mitigations which can be adopted in the short to medium term while the long-term solution of digital NOTAMs is implemented incrementally across Europe.

Wake vortex (SI-0012)

The safety issue refers to the encounter with the wake turbulence of a preceding aircraft, which may lead to the upset of the trailing aircraft. It includes the possible ATS role in providing separation of the traffic, the SOPs for flight crews to stay away from the wakes of other aircraft and their associated training. Due to the differences in ATS procedures, encounter geometries and mitigation strategies, the safety issue can be divided in two scenarios: 'encounters during arrival and departure' and 'en-route encounters'.

Windshear (SI-0024)

The encounter with windshear on final approach, landing, take-off, and initial climb may lead to aircraft upset or runway excursions. Effective SOPs and the training for the flight crew should be implemented by airlines to ensure that flight crew are well-equipped to avoid or deal with those conditions. Such efforts should also be supplemented by detection of potential windshear by third parties, such as ATC, and the effective relay of this information to the flight crew.

22. Human Factors / Human Performance

22. Human Factors / Human Performance

The Human Factors (HF) / Human Performance (HP) Safety Risk Portfolio developed in 2017 by EASA, in conjunction with the HF Collaborative Analysis Group, and has since been reviewed annually. Due to the broad nature of HF/HP safety issues, they contribute to most, if not all key risk areas.

The safety issues in the portfolio are sorted into the 'Assess – Elevated priority index', 'Assess - Normal-to-low priority index', 'Mitigate – define', 'Mitigate – implement', and 'Monitor' categories, which provide a snapshot of their status within the European SRM process by the priority. The safety issue prioritisation method is described in the Introduction of this Volume. To understand each safety issue better, please click on the safety issue in the list to access their description.

List 22-1: Human Factors / Human Performance safety issues per category & priority

Assess - Elevated priority index

Facilitates Step 2: Assessment of safety issue

- Staff support programmes (SI-3012)
- Training effectiveness and competence (SI-3011) (amended)
- Fatigue and quality sleep (SI-3005)

Assess - Normal-to-low priority index

Facilitates Step 2: Assessment of safety issue

- Senior management knowledge, competence and commitment to HF/HP (SI-3001)
- Impact of culture on human performance (SI-3002)
- Decision-making in complex systems (SI-3016)
- Attention and vigilance (SI-3015)
- Error mitigation by design (maintenance and production) (SI-3017)
- Organisational and individual resilience (SI-3009)
- Evaluation of effect of HF activities on safety, efficiency, effectiveness and the project timeline of HF specialist involvement (SI-3014)
- Workload (SI-3006)
- Knowledge development and sharing (SI-3008)
- Integration of practical HF/HP into the organisation's management system (SI-3004)
- Startle and surprise (SI-3010)
- Root cause analysis (SI-3018)

Mitigate - define

Facilitates Step 3: Definition and programming of safety actions

- NIL

Mitigate - implement

Facilitates Step 4: Implementation and follow-up of safety actions

- Human factors competence for regulatory staff (SI-3003)
- Design and use of procedures (SI-3007)

Monitor

Facilitates Step 5: Safety performance measurement

- Human factors of multiple remote towers (SI-3022) (amended)
- Alignment between OSD and equivalent processes at other authorities (SI-3023) (amended)

Alignment between OSD and equivalent processes at other authorities (SI-3023) (Amended)

The EASA operational suitability data (OSD) and FAA Flight Standardisation Board (FSB) processes both aim to ensure that flight crew training takes appropriate consideration of the aircraft design. Misalignments between EASA OSD and equivalents at other authorities could potentially create training discrepancies. This safety issue has been categorised as 'monitor' because it is believed that the issue has been resolved through coordination between EASA and the other authorities.

Attention and vigilance (SI-3015)

Maintaining appropriate levels of attention and vigilance supports situational awareness. It is important to ensure that the working environment, equipment and processes support attention, vigilance and by extension situational awareness. An issue that stands the test of the pandemic situation as well.

Decision-making in complex systems (SI-3016)

Decision-making in aviation activities can be complex, pressured and bear a high risk. This by definition means that assessing trade-offs and interdependencies, or making the right decisions can be difficult. Structures and processes to support decision-making can be helpful; however, the complexity of the system means that it is difficult to create such structures and processes with the necessary level of detail.

Design and use of procedures (SI-3007)

Procedures are used throughout the aviation industry to describe the correct actions and sequence of actions to perform a task. Out of necessity, procedures are designed using assumptions about the circumstances in which they will be applied. While this frequently produces well-designed procedures, the complex nature of the aviation working environment means that not every circumstance can reasonably be accounted for. Regardless of whether the procedure has been designed well or badly, rapid changes in the aviation system can mean that a procedure becomes more difficult to use over time.

Error mitigation by design (maintenance and production) (SI-3017)

Incorrect assembly in production or maintenance may lead to an unsafe condition for the aircraft. It is inappropriate to rely solely on warnings in maintenance instructions, markings and independent inspections to detect misassembly, when the hazard can be eliminated by careful design in most cases.

Evaluation of effect of HF activities on safety, efficiency, effectiveness and the project timeline of HF specialist involvement (SI-3014)

When a HF intervention is proposed, there are implicit questions including 'Will that enhance safety?' and 'Can that be measured/qualified with respect to safety effectiveness and operational efficiency?'. Succinctly, what is the cost and safety impact of investments in HF and HF-related organisational interventions? Being able to evaluate the effect of HF activities and knowing at which point in a process to involve HF professionals is an important element of a successful project.

Fatigue and quality sleep (SI-3005)

Fatigue is repeatedly identified as one of the most serious challenges within the aviation industry. The signs of fatigue are subtle and will lower human performance in all the known areas of human limitations. Preventing fatigue is dependent on obtaining both a sufficient quantity and quality of sleep.

Human factors competence for regulatory staff (SI-3003)

Competencies are observable and measurable patterns of knowledge, skills and attitude that an individual is expected to demonstrate in relation to required task performance. It is important for regulatory staff to have specific HF competencies to be able to perform their duties. This also provides an added benefit of improving the conversation on safety and human factors between regulatory staff and people at different levels in industry.

Human factors of multiple remote towers (SI-3022) (Amended)

Remote tower operations are increasingly being used, as a means of effectively and efficiently providing ATS at an aerodrome. Multiple remote tower operations are also now being introduced, and the HF associated with this type of work needs thorough consideration.

Impact of culture on human performance (SI-3002)

The pandemic of 2020/2021 made it clearer — organisational culture is an important element in supporting human performance in the workplace. Culture depends on the historical context and the socio-technical environment and economic context in which we live. For example, with the 'economic survival' effect — or when the 'commercial benefit' dictates the running of the organisation too much, leading to a lack of resources; stressful environment; no training policy; too much operational pressure and time pressure; too many subcontracting activities; insufficient maintenance of airport or ATC equipment; etc.

Integration of practical HF/HP into the organisation's management system (SI-3004)

An organisation is made up of humans, procedures and processes that work together, often in a hierarchical manner and interacting to achieve a common goal. As such, the organisation's management system cannot be fully effective unless it has integrated HF considerations and human performance principles in a practical manner.

Knowledge development and sharing (SI-3008)

Knowledge sharing, particularly of tacit knowledge, is difficult to do well. This makes knowledge retention in situations of increased staff turnover very difficult. Knowledge development and sharing is about developing the right knowledge and making this knowledge available to the right people at the right time.

Organisational and individual resilience (SI-3009)

Organisational resilience is a key factor in successfully managing safe operation, but there is scant regulatory guidance on how to apply the concept. Resilience comprises both a system's ability to withstand disturbances, challenges and change, and to recover and sustain operations thereafter. The positive contribution to safety of each and every staff member is a key component in an organisation's resilience.

Root cause analysis (SI-3018)

Investigations of incidents and hazard observations often result in poor or ineffective interventions because investigations do not uncover or address the root causes of the issue. Shallow investigations often address symptoms of the event rather than the causes and consequently rarely prevent reoccurrence.

Senior management knowledge, competence and commitment to HF/HP (SI-3001)

Operators, maintenance organisations, manufacturers, national aviation authorities, and other entities that contribute to continuing safety and efficiency strive to promote the process of positive organisational cultural change. Positive cultural evolution requires cooperation and shared values across all levels of management and staff. Corporate safety culture is significantly affected by the values and actions of senior management. Those senior leaders need to understand and communicate the critical significance of HF and human performance to all members of staff.

Staff support programmes (SI-3012)

The EASA-led Task Force on Germanwings Flight 9525 identified a number of safety risks, including the need for pilot support programmes. However, humans throughout the aviation system need such support programmes. This has been highlighted in particular throughout the COVID-19 pandemic, when aviation professionals have worked under high pressure and often in isolating circumstances.

Startle and surprise (SI-3010)

Surprise and its consequent reaction, startle, is a significant impediment to managing safety-critical situations but not enough is known about how to mitigate it. Research shows that cognitive impairment, particularly in the working memory, can be significant. Narrowed attention, decreased search behaviour, longer reaction time to peripheral cues, decreased vigilance, degraded problem-solving, performance rigidity, degraded working memory function and critical effects on psychomotor skills are just some of the impairments noted under the effects of startle and surprise.

Training effectiveness and competence (SI-3011) (Amended)

Despite the obvious technological advances that have made the aviation industry safer and more efficient in the last few decades, the way that those working in the industry are trained has not changed significantly. Recently, ICAO has sought to address this through the development of competency frameworks; however, organizations and States should obtain assurance that competency frameworks are utilised to their best advantage, whilst striving for a shared understanding of terms and concepts.

Workload (SI-3006)

At its broadest, workload can be considered as being made up of two major components, physical workload and cognitive workload. High physical and mental workload situations often coincide, causing a significant degradation to cognitive capacity and consequently to one's ability to execute a task correctly

23. Non-commercial operations — small aeroplanes

23. Non-commercial operations — small aeroplanes

The Non-Commercial Operations (NCO) – Small Aeroplane Safety Risk Portfolio was first developed in 2016 by EASA, in conjunction with the General Aviation Collaborative Analysis Group, and has since been reviewed annually. Each safety issue contributes to one or more key risk areas as defined in the Introduction of this Volume.

Regarding the main key risk areas for this domain, refer to EASA's ASR 2021 Section 2.5 Non-commercially operated small aeroplanes Figure 45 'Key Risk Areas by aggregated ERCS score and number of risk-scored occurrences, involving non-commercially operated small aeroplanes'. These key risk areas are defined by their potential accident outcome and by the immediate precursors of that accident outcome. This figure is obtained by aggregating the ERCS score for the risk-scored occurrences relevant to this domain and plotting it against the number of risk-scored occurrences. The risk picture of this domain identifies the key risk area of greater concern that is aircraft upset.

The safety issues in the portfolio are sorted into the 'Assess – Elevated priority index', 'Assess - Normal-to-low priority index', 'Mitigate – define', 'Mitigate – implement', and 'Monitor' categories, which provide a snapshot of their status within the European SRM process by the priority. The safety issue prioritisation method is described in the Introduction of this Volume. To understand each safety issue better, please click on the safety issue in the list to access their description.

List 23-1: Non/Commercial Operations – Small Aeroplanes safety issues per category & priority

Assess - Elevated priority index

Facilitates Step 2: Assessment of safety issue

- Parachuting operations (SI-4023) (Amended)
- In-flight decision-making and planning (SI-4003)
- Training, experience, and competence of individuals (SI-4004)
- Pre-flight planning and preparation (SI-4007)
- Handling of technical failures (SI-4001)
- Approach path management on GA aeroplanes (SI-4005) (Amended)

Assess - Normal-to-low priority index

Facilitates Step 2: Assessment of safety issue

- Inadvertent flight into IMC/scud running (SI-4008) (Amended)
- Inappropriate control input (SI-4029)

Mitigate - define

Facilitates Step 3: Definition and programming of safety actions

- NIL

Mitigate - implement

Facilitates Step 4: Implementation and follow-up of safety actions

- Airborne separation (SI-4010)
- Icing in flight (SI-0001)
- Deconfliction between IFR and VFR traffic (SI-4009)

Monitor

Facilitates Step 5: Safety performance measurement

- Engine system reliability (SI-4012) (Amended)
- Other aircraft system reliability (SI-4028) (Amended)
- Operational communications (SI-4021) (Amended)
- Maintenance of GA aeroplanes (SI-4018)
- Fuel management in flight (SI-4011)
- Turbulence (SI-4016)
- Damage tolerance to UAS collisions (SI-4019)
- Knowledge of aircraft systems and procedures (SI-4017)
- Mass and balance (SI-4014) (Amended)
- Crosswind (SI-4015)
- Bird and wildlife strikes at smaller aerodromes/airfields (SI-4013) (Amended)
- Icing on ground (SI-0002)

Airborne separation (SI-4010)

Maintaining airborne separation is one of the key contributory factors in reducing mid-air collision risk. This relies on the pilot's ability to detect and avoid loss of separation and maintain safe distance between the aircraft and the surrounding traffic. This involves the adherence to separation minima and visual separation.

Approach path management on GA aeroplanes (SI-4005) (Amended)

This safety issue addresses the inappropriate execution of an approach at any point from the IAF until reaching safe taxiing speed after landing. This can lead to runway excursions, aircraft upset, terrain collision, or airborne collision. It covers all types of instrumental and visual approaches. The following areas are reviewed in this safety issue:

- Management of the energy of the aircraft and the influence of external factors affecting the approach, such as tail or crosswind, windshear, down/up drafts and other weather-related factors;
- Decision-making process of the flight crew to go around or continue with the approach; and
- SOPs and the relevance of those procedures for the approach flown, pilot training and the existing regulatory framework.

The main objectives are to train pilots to achieve stabilised approaches on correct speeds, enhance pilots' go-around decisions when the approach is unstable and the deployment of PBN approaches.

Bird and wildlife strikes at smaller aerodromes/airfields (SI-4013) (Amended)

This safety issue considers the following contributory factors:

- Pilot's ability/inability to detect, recognise and avoid bird strike or wildlife strike;
- ATC's ability/inability to report the likelihood of bird strikes or wildlife strikes; and
- Aerodrome operator's ability/inability to control the population of birds and other wildlife in the vicinity of the airport.

For pilots experiencing a bird strike or a wildlife strike, the main goal is to enable them to manage the startle effect and control the aircraft correctly to achieve a safe landing.

Crosswind (SI-4015)

Crosswind conditions increase the complexity of a landing or take-off procedure as the pilot has to consider the crosswind conditions to avoid an aircraft upset or runway excursion. It includes the preparation of the approach and landing and the take-off, and the information received on crosswind, either from external sources or from the aircraft systems. It also includes the certified capabilities of the aircraft type to perform the landing in crosswind conditions (limitations), the Standard Operating Procedures (SOPs) and training of the pilot. It also includes the accuracy of the measurement of the wind conditions and the relay of that information to the pilot prior to landing or take-off.

Damage tolerance to UAS collisions (SI-4019)

Unmanned aircraft systems (UAS) are a growing airborne collision threat to manned aircraft due to their growing popularity among the public who may not be aware of UAS regulations. It is important to consider the structural tolerance of a general aviation aircraft to withstand impact with UAS and its ability to maintain controllability to enable a safe landing after a collision with a UAS. The damage tolerance has a direct relationship with the weight and size of the UAS.

Deconfliction between IFR and VFR traffic (SI-4009)

Ineffective deconfliction of flights adhering to instrument flight rules (IFR) and visual flight rules (VFR) in an airspace class where at least one of the flights is not under air traffic control (ATC) separation has been identified as a strong contributor to airborne collision risk. Such airspace classes include class E, controlled airspace where VFR flights are not subject to ATC clearance and no IFR-VFR separation is provided by ATC, and class G, where neither IFR flights nor VFR flights are subject to ATC clearance and ATC does not provide any separation service. The safety issue arises due to the fragmented knowledge of the traffic situation as some traffic is subject to ATC clearance (i.e. IFR) and some other traffic is not (i.e. VFR). ATC may not be aware of VFR flights or their intentions and potentially may not pass traffic information to the IFR traffic. In addition, some of the VFR traffic may not be equipped with airborne collision avoidance system (ACAS) or even a transponder (C or mode-S), reducing the conspicuity of VFR traffic. As a result, both IFR and VFR traffic have to rely solely on the visual acquisition by the flight crew to maintain separation. This safety issue addresses how the conspicuity of VFR traffic can be improved as well as best practices to underscore the importance of existing procedures in maintaining airborne separation. This safety issue is also relevant to the Commercial Air Transport – Aeroplanes and ATM/ANS domains.

Engine system reliability (SI-4012) (Amended)

The reliability and handling of any hardware/software system on board the aeroplane is crucial for a safe flight. This issue is focused on the engine and its operation. Failure of any of these hardware/software systems can result in loss of power, leading to loss of control while the pilot is trying to solve the problem.

Fuel management in flight (SI-4011)

This safety issue includes the fuel planning, calculation and the management once the flight has started. Examples are pre-flight visual fuel quantity inspections including test for water in the fuel, correct mixture leaning during the flight, correct use of fuel valves, pumps and switches. Fuel management is important to ensure that there is sufficient fuel for the flight or different legs of the flight. Poor fuel management may result in high workload and stress for the flight crew as they have to look for alternate aerodromes/airfields to land at a short notice.

Handling of technical failures (SI-4001)

Pilots may suffer from non-catastrophic technical failure(s) in the aircraft systems from time to time. It is important for the pilot to have the ability and capability to manage such failures to avoid an aircraft upset. This includes, for example, handling of engine failures, flight control problems as well as failures in navigation systems. Occurrence data shows that the pilot's focus is often fixed on resolving the technical issue instead of flying the aircraft towards the safest landing site. This often results in loss of control and, potentially, fatal accidents.

Icing in flight (SI-0001)

Icing in flight may occur due to various reasons; however, this safety issue is focused on the manifestation of icing during flight caused by an atmospheric icing phenomenon. The typical manifestation is the accretion of ice on aerodynamic surfaces, probes, engine parts or flight control system, leading to degradation of handling quality or performance issues, system failures or malfunctions, or damages on the aeroplane's structure. When such icing occurs, it is important to ensure that the pilot is able to recognise and manage the flight in adverse icing conditions. Aircraft specifically with carburettors are most prone to engine icing in flight. Proposed mitigations include the promotion of knowledge on icing conditions and how to handle the aircraft when icing occurs. This safety issue is captured in the Commercial Air Transport – Aeroplanes Safety Risk Portfolio.

Icing on ground (SI-0002)

Icing on the ground may occur due to an atmospheric icing phenomenon and the adverse effect of the de-/anti-icing fluids. If managed poorly, the pilot may experience aircraft upset or collision with terrain after take-off, runway excursion, injuries or damages. It is important for the pilot to detect and handle icing on the aircraft's fuselage, wings and control surfaces before the flight is initiated. This safety issue is captured in the Commercial Air Transport – Aeroplanes Safety Risk Portfolio.

Inflight decision making and planning (SI-4003)

To effectively respond to dynamic situations or changes during the flight, the pilot needs to possess the ability to correctly gather information and re-plan in flight. This includes decisions involving navigational matters, problem-solving and avoiding or recovering from low- or no-visibility conditions. This is exacerbated by social and commercial pressures (e.g. pressure from the passenger) to reach the planned destination, pushing the pilot to take unnecessary risks, instead of turning around and try another time. A wrong decision based on incorrect evaluation of the circumstances has caused fatal accidents. Proposed actions are to provide/promote education in the use of available information to enhance the decision-making process. This includes increasing the availability of information and simplifying the presentation of this information to the pilot to facilitate understanding.

Inadvertent flight into IMC/scud running (SI-4008) (Amended)

A poorly executed planned low-altitude flight may result in the aircraft's collision with objects or surface. This includes also what is called 'scud running' where the pilot flies under low clouds close to the ground to reach his planned destination. This also captures the 'press-on-it' mentality during a VFR flight where pilots put themselves into unnecessary danger trying to reach their destination.

Inappropriate control input (SI-4029)

This issue refers to the pilot introducing flight control inputs which result in a deviation from the actual or intended immediate flight path. Depending on the circumstance and magnitude of input, inappropriate flight control inputs may result in an undesirable safety consequence such as aircraft upset, runway excursion, injuries or damage.

Knowledge of aircraft systems and procedures (SI-4017)

This issue refers to the pilot's ability/inability to apply formerly acquired knowledge and training to the current event. This is evident when pilots fly aircraft that they do not have much experience on – i.e. transitional training has not been or inadequately performed resulting in incorrect actions causing even cascade of other problems and inadequate decision-making. It is important for pilots to understand the characteristics of the different systems on board the aircraft. Pilots who are proficient in their knowledge of systems should instinctively use the correct systems; otherwise, they may lose precious time in searching for the correct systems or use the wrong system.

Maintenance of GA aeroplanes (SI-4018)

This issue refers to aircraft maintenance performed incorrectly, or the lack thereof, leading to a technical occurrence or failure. This issue involves both certified technicians as well as GA pilots performing part of the aircraft maintenance in accordance with their training.

Mass and balance (SI-4014) (Amended)

The mass and balance of the aircraft may be adversely affected by inadequate or incorrect loading of the aircraft by the pilot. GA pilots usually load their aircraft by themselves and do not use groundhandling services. The objective is to improve the calculation of load and balance sheets and ensure that the baggage and cargo are securely fastened to prevent them from shifting and changing the aircraft's centre of gravity.

Operational communication (SI-4021) (Amended)

Ineffective communication, including language proficiency (all languages), use of standard terminology, hand signals, visual communication, distraction from outer sources (e.g. mobile phones) are all factors that may lead to unsafe situations in the airside operational environment. In a well-functioning operational environment, individuals have the necessary skills to communicate effectively.

Other aircraft system reliability (SI-4028) (Amended)

This issue refers to the reliability of all aircraft systems, other than the engine and propeller.

Parachuting operations (SI-4023) (Amended)

Parachuting operations are flights which are specifically chartered/operated to transport parachutists (called 'skydivers' in sport parachuting) to a designated altitude for jumping out from the aircraft. These operations, usually entailing short flights, are exposed to a range of operational hazards that may relate to changes in weight and balance, possible interference of the parachute deployment devices with structural elements of the aircraft upon exit, insufficient communication between the pilot and the parachutists, non-adherence to SOPs leading to convergent aircraft descent- and free-falling parachutist trajectories (a risk in particular in the case of wing suit or large formation skydiving), etc. This type of operation may also be exposed to organisational hazards such as commercial pressure, lack of or inadequate safety briefings, and inadequate monitoring of continuing airworthiness.

Pre-flight planning and preparation (SI-4007)

Effective pre-flight planning and preparation is achieved by ensuring that the correct processes, tools and information are used by the flight crew/operator to plan the flight. It includes the adequacy, accuracy and timeliness of the information used, how this is processed and digested by the flight crew and their training and SOPs. It includes the dispatch of the aircraft and the flight preparation steps before the flight is initiated.

Training, experience, and competence of individuals (SI-4004)

This safety issue relates to the pilot's training, experience, and competence to handle the required tasks in flying the aircraft from engine start-up till engine shutdown, as well as their ability to address occurrences they may face during the flight. This issue also addresses training aspects and planning within training organisations.

Turbulence (SI-4016)

This issue addresses turbulence-induced occurrences caused either by clear air turbulence, mountain waves or rotors as well as wake turbulence induced by large aircraft. All phases of flight are considered. The outcome of turbulence occurrences can be loss of control and g-force overload even causing structural damage or injuries to persons on board.

24. Rotorcraft

24. Rotorcraft

The Rotorcraft Safety Risk Portfolio was first developed in 2021 by EASA, in conjunction with the European Safety Analysis Group for Rotorcraft (ESAG-R). This is therefore the first time this portfolio is published in the EPAS. This initial version will be further developed, refined, and amended from 2022 onwards. Each safety issue contributes to one or more key risk areas as defined in the Introduction of this Volume.

Regarding the main key risk areas for this domain, refer to EASA's ASR 2021 Sections: 3.2 Safety risks for commercial air transport helicopters Figure 69 'Key risk areas by aggregated ERCS score and number of risk-scored occurrences, involving commercial air transport helicopters'; 3.3 Safety risks for specialised operations helicopters Figure 78 'Key risk areas by aggregated ERCS score and number of risk-scored occurrences, involving specialised operations helicopters'; and 3.4 Safety risks for non-commercially operated helicopters Figure 87 'Key risk areas by aggregated ERCS score and number of risk-scored occurrences involving non-commercial operations helicopters'. These key risk areas are defined by their potential accident outcome and by the immediate precursors of that accident outcome. This figure is obtained by aggregating the ERCS score for the risk-scored occurrences relevant to this domain and plotting it against the number of risk-scored occurrences. The risk picture of this domain identifies the key risk areas of greater concern that are aircraft upset for commercial air transport helicopters, specialised operations with helicopters, and non-commercially operated helicopters.

The safety issues in the portfolio are sorted into the 'Assess – Elevated priority index', 'Assess - Normal-to-low priority index', 'Mitigate – define', 'Mitigate – implement', and 'Monitor' categories, which provide a snapshot of their status within the European SRM process by the priority. The safety issue prioritisation method is described in the Introduction of this Volume. To understand each safety issue better, please click on the safety issue in the list to access their description.

List 24-1: Rotorcraft safety issues per category & priority

Assess - Elevated priority index

Facilitates Step 2: Assessment of safety issue

- Inadequate obstacle clearance during low-altitude operation, take-off and landing (SI-8031)
- Unanticipated yaw / loss of tail rotor effectiveness (SI-8024)
- Poor pre-flight planning and preparation (SI-8017)

Assess - Normal-to-low priority index

Facilitates Step 2: Assessment of safety issue

- Poor management of take-off and landing sites (SI-8034)
- Inadequate flight path management during manual control (SI-8023)
- Insufficient safety culture of organisation (SI-8045)
- E-VTOL-systems-related issues (SI-8008)
- Helicopter-maintenance-related issues (SI-8005)
- Lack of knowledge of aircraft systems and application of procedures (SI-8011)
- Inadequate flight path management with the use of automation (SI-8022)

Mitigate - define

Facilitates Step 3: Definition and programming of safety actions

- NIL

Mitigate - implement

Facilitates Step 4: Implementation and follow-up of safety actions

- Inadequate airborne separation under VFR operation (SI-8028)
- External-sling-load-operations-related issues (SI-8038)
- Degraded visibility conditions (SI-8019)
- Inadequate handling of simulated technical failures and abnormal procedures during a training flight (SI-8027)
- Hazardous conditions following ditching (SI-8039)
- Helicopter rotor and transmission system failures (SI-8001)
- Ineffective safety management systems (SI-8044)
- Inadequate training and competence transfer — initial and recurrent training (SI-8015)
- Pilot fatigue (SI-8016)
- Bird and other wildlife hazard (SI-8030)
- Deficiencies / inconsistencies in operating manuals (SI-8046)
- Vortex ring state (SI-8025)
- Hoist-operations-related issues (SI-8037)

Monitor

Facilitates Step 5: Safety performance measurement

- Adverse weather encounter — effects other than on visibility (SI-8021)
- Dynamic rollover (SI-8040)
- Incorrect application of operational rules and procedures (SI-8012)
- Inadequate handling of engine loss of power in flight (SI-8026)
- Incorrect in-flight decision-making (SI-8014)
- Helicopter system failures -— other than rotor and transmissions (SI-8002)
- Improper management of helicopter continuing airworthiness (SI-8004)
- On-board carriage of PEDs with lithium batteries (SI-8048)
- Ineffective application of crew resource management and multi-crew cooperation (SI-8013)
- Downwash adverse effects (SI-8041)
- Interference by lasers (SI-8049)
- ADELTs, ELTs and PLBs malfunctions (SI-8043)
- Navigation-related issues (SI-8036)
- Unruly passengers (SI-8042)

ADELTs, ELTs and PLBs malfunctions (SI-8043)

This issue refers to failures and malfunctions of automatically deployable emergency locator transmitters (ADELTs), emergency locator transmitters (ELTs) and personal locator beacons (PLBs). It includes, in particular, the cases when these systems do not perform as required after impact, or when there is an unintentional deployment or activation of these systems. The failure of activation of these systems can increase the risk of post-impact fatalities.

Adverse weather encounter — effects other than on visibility (SI-8021)

This issue refers to environmental conditions encountered during the flight and contributing to aircraft upset situations. It includes icing conditions, lightning strikes, high winds, convective weather phenomena such as windshear, up and down drafts or microburst, and obstacle induced turbulence. The safety issue addresses the identification, avoidance and recovery of such conditions.

Bird and other wildlife hazard (SI-8030)

This issue refers to proximity or actual collision with bird and other wildlife during flight operations, contributing to a possible unsafe outcome. It also includes the lack of control or inadequate warning of bird and wildlife hazard at an aerodrome or any take-off and landing sites.

Deficiencies and inconsistencies in operating manuals (SI-8046)

This issue refers to operating manuals not appropriate, not accurate or out of date. It encompasses the pilot's operating handbook (POH), the rotorcraft flight manual (RFM), the flight crew operating manual (FCOM), the Standard Operating Procedures (SOPs), the quick reference handbook (QRH) and the company operating manual Part B.

Degraded visibility conditions (SI-8019)

This safety issue relates to all operational situations where the visibility of the flight crew is degraded, causing a loss of visual cues and situational awareness, leading potentially to obstacle collision, terrain collision or aircraft upset. It includes the inadvertent entry into clouds during VFR flights, night conditions, but also degraded visibility conditions caused by dust or sand (brownout), snow (whiteout), smoke, salt spray or any element that degrades the use of visual cues.

Downwash adverse effects (SI-8041)

This safety issue relates to helicopter downwash effects such as the blowing of FOD which can lead to injuries or damage to third parties on ground, or the recirculation of the snow/dust causing possible damages to the helicopter own engines. This safety issue does not include the effect of degraded visibility (addressed in SI-8019).

Dynamic rollover (SI-8040)

This issue refers to inability to prevent helicopter rollover during take-off, landing or air taxiing / hovering phases. It includes, in particular, the inadequate knowledge of the operating environment (soft landing surface, obstacles), and the inadequate skills to recover after the skid or landing gear enters in contact with possible obstacles and the aircraft started to roll.

E-VTOL-systems-related issues (SI-8008)

This issue includes any potential issues specific to the emerging electric vertical take-off and landing (eVTOL) aircraft technologies, both from a design and an operational point of view, which can have an impact on operational safety.

External-sling-load-operations-related issues (SI-8038)

This safety issue gathers all operational scenarios specific to helicopters flying with external sling load, for both human and non-human cargo, which can contribute to an unsafe outcome. It includes, in particular, sling load falling or contacting terrain or obstacles, sling load contacting the tail rotor, main rotor or fuselage. Unnoticed exceed of the maximum all up mass (MAUM) is also addressed.

Hazardous conditions following ditching (SI-8039)

This safety issue includes all hazards endangering the survivability of the helicopter occupants after a ditching has been performed. In addition to the helicopter emergency floatation system (EFS) malfunctions, it includes the hazards related to an evacuation after a helicopter capsizing such as issues with the emergency exit suitability, signage, the internal and external emergency lighting, the life raft deployment from the cabin or externally, defective or unsuitable survival suits, the inadequate crew and passenger training for underwater escape and the use emergency and safety equipment such as life jackets and emergency breathing systems.

Helicopter-maintenance-related issues (SI-8005)

This safety issue relates to incorrect, incomplete or deficient maintenance actions contributing to an unsafe operational outcome. It also includes the human factors aspects when performing maintenance tasks.

Helicopter rotor and transmission system failures (SI-8001)

This safety issue relates to technical failures, malfunctions and defects of the helicopter main rotor (ATA 62), main rotor drive system (ATA 63), tail rotor (ATA 64) and tail rotor drive system (ATA 65), contributing to an unsafe operational outcome.

Helicopter system failures — other than rotor and transmissions (SI-8002)

This safety issue relates to technical failures, malfunctions and defects of any helicopter systems other than the rotor and transmissions systems (addressed in SI-8001) and contributing to an unsafe operational outcome. It includes, for example, the helicopter power plant system, flight controls system, electrical system and avionics system. It does not include the helicopter hoist systems (addressed in SI-8037) and the external sling load systems (addressed in SI-8038).

Hoist-operations-related issues (SI-8037)

This safety issue encompasses both technical and operational issues specific to hoist operations. It includes hoist malfunctions such as loss of reel in/out functions, hoist cable break due to design issues or due to damages from operational events or inadequate maintenance, but also cable contacts with obstacle or fuselage.

Improper management of helicopter continuing airworthiness (SI-8004)

This safety issue relates to management of the helicopter which negatively affects its airworthiness, contributing to an unsafe operational outcome. It includes the improper management of the helicopter configuration, and in particular its mass and balance configuration.

Inadequate airborne separation under VFR operation (SI-8028)

This safety issue relates to the inability, during a VFR flight, to detect, avoid or maintain sufficient airborne separation with other manned or unmanned aircraft, increasing the risk of airborne collision. The safety issue addresses both design and operational aspects involved.

Inadequate flight path management during manual control (SI-8023)

This safety issue relates to the inability to follow the intended helicopter flight path when flying with manual control, contributing to an unsafe outcome. The safety issue encompasses both technical and operational aspects leading to this situation.

Inadequate flight path management with the use of automation (SI-8022)

This safety issue relates to the inability to follow the intended helicopter flight path with the automatic flight control system (AFCS) being active, contributing to an unsafe outcome. The safety encompasses both technical and operational aspects leading to this situation. It includes, in particular, the ineffective use or monitoring of flight parameters and automation modes, and the inadequate management of the transition manual-automated flight.

Inadequate handling of engine loss of power in flight (SI-8026)

This safety issue relates to the inability to safely continue the flight once a power loss occurs. It includes, for example, inefficient CRM, inadequate training, or abnormal procedures not followed, leading to hard landings or total loss of control in flight.

Inadequate handling of simulated technical failures and abnormal procedures during a training flight (SI-8027)

This safety issue relates to the inability, during a training flight, to handle simulated technical failures such as power loss or hydraulic system failures, contributing to unsafe outcomes. It includes, in particular, the diagnosis of system failures in flight, and the handling of autorotation and forced landing, leading to hard landings or total loss of control in flight.

Inadequate obstacle clearance during low-altitude operation, take-off and landing (SI-8031)

This safety issue relates to the inability to identify and safely avoid obstacles during the helicopter take-off and landing phase, as well as during low-level operations such as agricultural work or power lines check, both in urban and natural environments.

Inadequate training and competence transfer — initial and recurrent training (SI-8015)

This safety issue relates to the incomplete or inadequate training content as well as ineffective delivery of training for any personnel involved in helicopter operations, including both initial and recurrent training, causing a degradation of competence transfers within an organisation, impacting the necessary knowledge and skills required to operate safely in normal and emergency operational situations.

Incorrect application of operational rules and procedures (SI-8012)

This safety issue relates to the flight crew not complying with SOPs or operational manuals, contributing to an unsafe operation outcome. It includes, for example, operating below weather minima, altitude minima, or beyond the helicopter flight envelope.

Incorrect in-flight decision-making (SI-8014)

This safety issue relates to the cases where flight crew decisions during the flight negatively affect the operational safety. It includes, in particular, the decisions on diversions, or on contingency plans.

Ineffective application of crew resource management and multi-crew cooperation (SI-8013)

This safety issue relates to deficiencies in flight crew coordination, integration, communications and workload management, affecting the decision-making and problem-solving capacity, necessary to operate safely the aircraft.

Ineffective safety management systems (SI-8044)

This safety issue relates to ineffective or incomplete application of safety management systems within organisations, in particular change management, SRM, and safety reporting tools and processes.

Insufficient safety culture of organisation (SI-8045)

This safety issue relates to lack of safety policy, leadership and management, resulting in poor staff engagement for safety in the organisation, as well as poor knowledge of safety reporting and 'just culture' principles.

Interference by lasers (SI-8049)

This safety issue relates to events that involve the unintentional or malicious shining of a laser at an aircraft in flight leading to flight crew disorientation or distraction.

Lack of knowledge of aircraft systems and application of procedures (SI-8011)

This safety issue relates to the flight crew lacking the knowledge of the helicopter systems and related procedures necessary to operate safely these systems in normal and abnormal situations, in particular when frequently changing of aircraft types, variants, or configuration/equipment flown.

Navigation-related issues (SI-8036)

This safety issue relates to inadequate or incorrect navigation of the helicopter, both in VFR and IFR operations. It includes, for example, deviations from nominal track, interferences or losses of the radio navigation source as well as issues related to helicopter PBN operations.

On-board carriage of PEDs with lithium batteries (SI-8048)

This safety issue relates to carrying on board of personal electronic devices (PEDs) powered by lithium batteries which contain a risk of overheat and fire ignition in the cargo compartment or in the cockpit.

Pilot fatigue (SI-8016)

This safety issue relates to flight crew fatigued by the duration of the flight or length of the duty period, affecting its performance and contributing to an unsafe outcome. It also includes non-compliance with the approved FTL scheme, or an FTL scheme not fit for purpose.

Poor management of take-off and landing sites (SI-8034)

This safety issue relates to poor or inadequate management of take-off and landing sites, including aerodromes, heliports, helidecks, and any other urban or natural sites. It includes the management of vehicles, persons, obstacles, the training of ground operations personnel as well as the selection of a suitable landing site.

Poor pre-flight planning and preparation (SI-8017)

This safety issue relates to the inability to carry-out appropriate pre-flight planning due to pilot insufficient knowledge and/or lack of planning resources and information. It includes, in particular, the planning of the weather conditions, navigation, fuel, weight and balance, aircraft performance, and risk assessment for the planned flight.

Unanticipated yaw / loss of tail rotor effectiveness (SI-8024)

This safety issue relates to the inability to detect, control and recover from an unanticipated yaw or a loss of tail rotor effectiveness (LTE) during low-speed phases of flight, leading to the helicopter loss of control.

Unruly passengers (SI-8042)

This safety issue relates to passengers who, during commercial or private flights, do not respect or follow safety procedures, or cause disturbance to the flight crew. It also includes passengers overriding or pressuring professionals. The lack of adequate passenger pre-flight briefing is also addressed within this safety issue.

Vortex ring state (SI-8025)

This safety issue relates to the inability to detect, control and recover from an inadvertent vortex ring state (VRS) condition in flight, leading to the helicopter loss of control.

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