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FOREWORD BY PATRICK KY, EXECUTIVE DIRECTOR

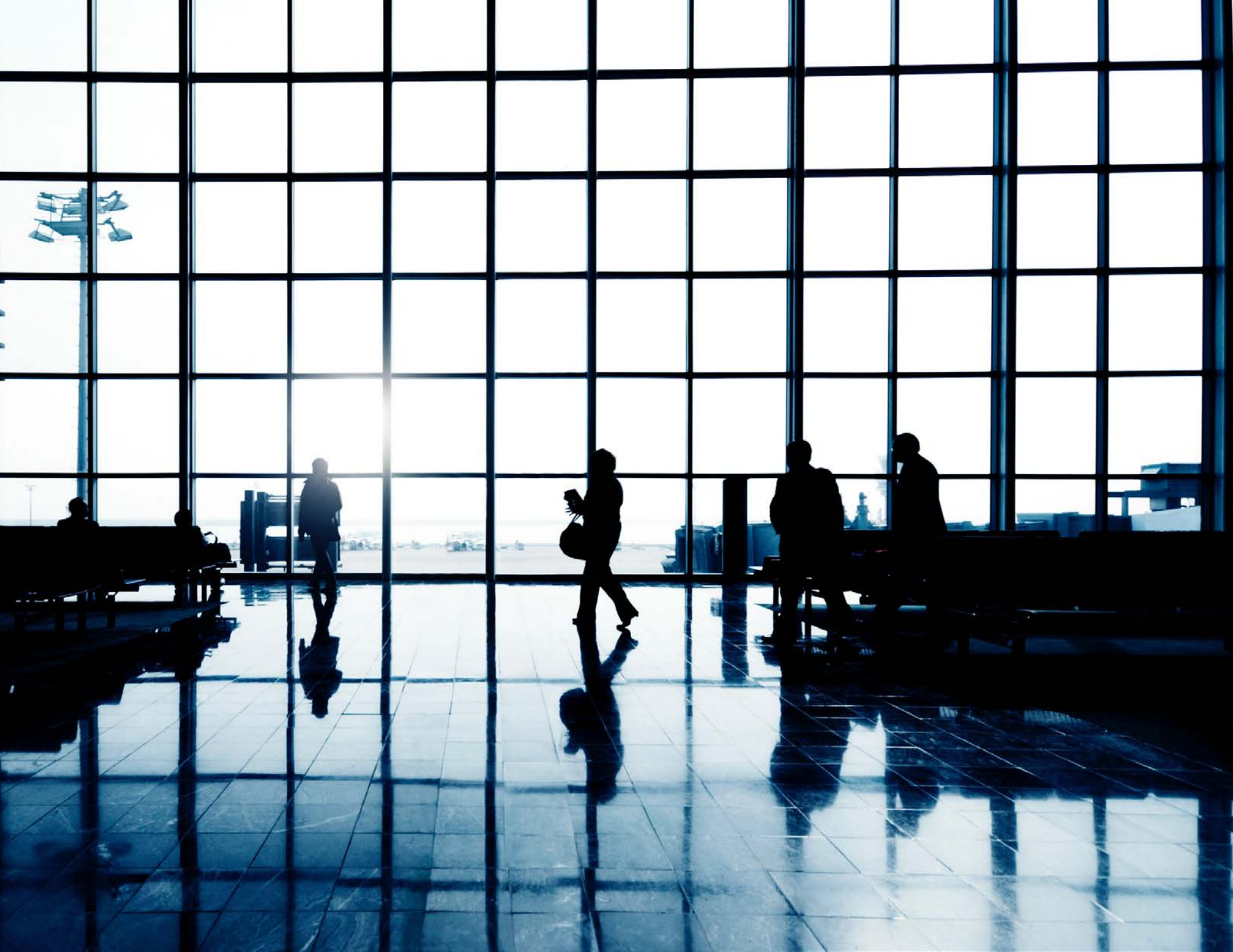
The aviation community must continue to work relentlessly and tirelessly to improve our safety level globally. We can never afford to be complacent.

2018 offered us a stark reminder of this. Following the “safest year, ever” for commercial aviation in 2017, last year’s operations resulted in 586 fatalities out of a total of 4.3 billion passengers transported. For European air carriers alone, the results were more positive, with no fatal accidents and over 1.1 billion passengers.

The aviation industry has put together a systematic and comprehensive safety reporting scheme, which enables us to learn from accidents, but also from incidents where loss of life was avoided. The advent of big data analysis, such as the EASA Data4Safety (D4S) project, means we can go one step further and identify trends even before they generate potentially unsafe conditions.

This year’s safety review has been structured in a way that identifies the key areas of risks and proposed improvements that can increase the level of safety for each type activity. In the area of aerodromes and ground handling, for example, “aircraft movement under its own power” has been identified as the biggest contributor to the risk of collisions on the ground. This issue is now being analysed with a view to developing safety actions that can be published in the European Plan for Aviation Safety.

These reviews are important as they allow the setting of safety actions and priorities, not only for EASA, but for all the different actors of the aviation supply chain. Because aviation safety is not the responsibility of only one actor, it is the duty of all.



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INTRODUCTION

EASA would like to welcome you to the 2019 version of the EASA Annual Safety Review. The review has been published since 2005 and is now in its 14th year. The analysis presented in this review together with the domain-specific safety risk portfolios provide the data-driven input that supports the decision-making in formulating the European Plan for Aviation Safety (EPAS).

This edition provides safety risk portfolios in all 13 of the aviation domains analysed and builds on the work of previous years. As with the previous edition, the ongoing European Safety Risk Management Process, in particular the valuable input from the Network of Analysts (NoA) and Collaborative Analysis Groups (CAGs), means that the analysis in this year's review provides not just a statistical summary of aviation safety in the EASA Member States (MS) but also identifies the most important safety challenges faced in European aviation today. This analysis drives the development of safety actions for the EPAS and harnesses the experience of both the EASA Member States (EASA MS) and industry to connect the data with the current and future priorities of the Agency.

How the Safety Review is Produced

Information Sources

The EASA Annual Safety Review is produced by the Safety Intelligence and Performance Department of EASA. The analysis in the review comes from two specific data sources:

- **EASA's Occurrence Database.** The main source of data is the Agency's own database, which covers occurrences reported to the Agency in its role as competent authority and also accidents and serious incidents reported to the Agency by Safety Investigation Authorities (SIAs) world-wide. This is augmented by information collected by the Agency from other sources.
- **European Central Repository.** The European Central Repository (ECR) is the central database of all occurrences reported to the competent authorities of the EASA MS, the reporting of which is governed by Reg. (EU) 376/2014 on the reporting, analysis and follow-up of occurrences in civil aviation.

Process for Safety Risk Portfolios

The safety risk portfolios are developed through an iterative process, starting with the data available in EASA's occurrence database and in the European Central Repository. This provides the portfolios with a starting list of the safety issues affecting aviation and an indication of the key risk areas that each safety issue relates to. In addition to understanding what the safety issues are, they are risk assessed using the European Risk Classification Scheme (ERCS). EASA has begun applying the ERCS to historical occurrences assessed in this Review and are pleased to provide this additional element in the analysis results. Each occurrence receives an ERCS risk classification and the overall risk level of the safety issue is then calculated. This is then used to define the risk level of the key risk area. Using this data input, the draft portfolios are then discussed within the collaborative analysis groups. This ensures that the safety issues have been correctly defined and assessed and to add any safety issues that may not yet be present in the data, such as emerging issues.

European Risk Classification Scheme (ERCS)

Regulation (EU) 376/2014 on the reporting, analysis and follow-up of occurrences in civil aviation introduced the requirement for common occurrence risk classification at national level. The ERCS provides a clear understanding of the true risk of an occurrence leading to a fatal accident, measuring the risk through a matrix covering 2 dimensions. Firstly, the vertical axis considers what the severity would have been if the occurrence being scored had escalated into a fatal accident. This is done by considering both the size of the aircraft involved and how severe the accident outcome could have been. Secondly, the horizontal axis measures how close the occurrence was to that fatal accident outcome based on a weighted barrier model. Therefore the ERCS gives a much better representation of risk than the normal classifiers of accident, serious incident and incident as it provides a proper estimation of the likely risk.

Collaborative Analysis Groups (CAGs)

The CAGs are expert groups, responsible for analysing the safety of European aviation. Each CAG works on a domain and its membership is derived from key stakeholders in the domain. These stakeholders may come from industry or from EASA's regulatory partners. Each CAG meets up to three times per year to review available safety information, arrange in depth safety issue analyses and to identify emerging issues. They monitor the safety performance of their domain and provide feedback on the effectiveness of actions taken.

Chapter Overview

This document is split into a number of chapters, each of which covers the different operational domains in the European Aviation System. The different domains in each chapter cover the areas for which a specific safety risk portfolio has been developed. The scope of each domain chapter (and corresponding safety risk portfolio) is limited to the EASA MS, either as the state of operator or the state of registry. For the Aerodrome and ATM chapters, this scope is limited to the EASA MS as state of occurrence. The chapters of this review cover the following areas:

Chapter 1 Safety Overview

- **Review of Global Airline Safety:** This provides a review of global safety for large commercial air transport aeroplanes.
- **Cross-domain Safety Overview for EASA MS:** This provides an overview of the most important statistics across all the different domains. It helps to identify which domains are likely to need the greatest focus in the EPAS.

Chapter 2 Aeroplanes

- **Chapters 2.1-2.3** – Commercial Air Transport: This covers all commercial air transport airline (passenger and cargo operators) operations involving aeroplanes, as well as Non-commercially operated complex aircraft flown for business operations. The airline and business operations have the same safety risk portfolio due to the strong commonalities in their safety issues and key risk areas.
- **Chapter 2.4** – Specialised Operations: This covers all aerial work/Part SPO operations involving aeroplanes and involves a wide range of different operational activities including aerial advertising, aerial patrol, agricultural, air shows, parachuting and towing (with glider operations).
- **Chapter 2.5** – Non-commercial Operations: The chapter covers all non-commercial operations involving aeroplanes and includes analysis of what would be understood within the traditional definition of general aviation. The chapter also includes flight training and other non-commercial activities.

Chapter 3 Helicopters

- **Chapter 3.1a** - Offshore Commercial Air Transport: This covers operations in the offshore helicopter domain and includes some initial input on offshore renewable operations in addition to the oil and gas industry.
- **Chapter 3.2b** - Other Commercial Air Transport: This covers all other commercial air transport operations involving helicopters such as passenger flights, air taxi and HEMS.
- **Chapter 3.3** – Specialised Operations: This covers all aerial work/ Part SPO operations involving helicopters and includes an even wider range of different operational activities than the equivalent aeroplanes chapter, adding Construction/ Sling Load operations and Logging to the categories already mentioned.

- Chapter 3.4 – Non-commercial Operations: The chapter covers all non-commercial operations involving helicopters and includes analysis of what would be understood within the traditional definition of general aviation. The chapter also includes flight training and other non-commercial activities.

Chapter 4 Balloons

This chapter covers all operations involving hot air balloons.

Chapter 5 Sailplanes

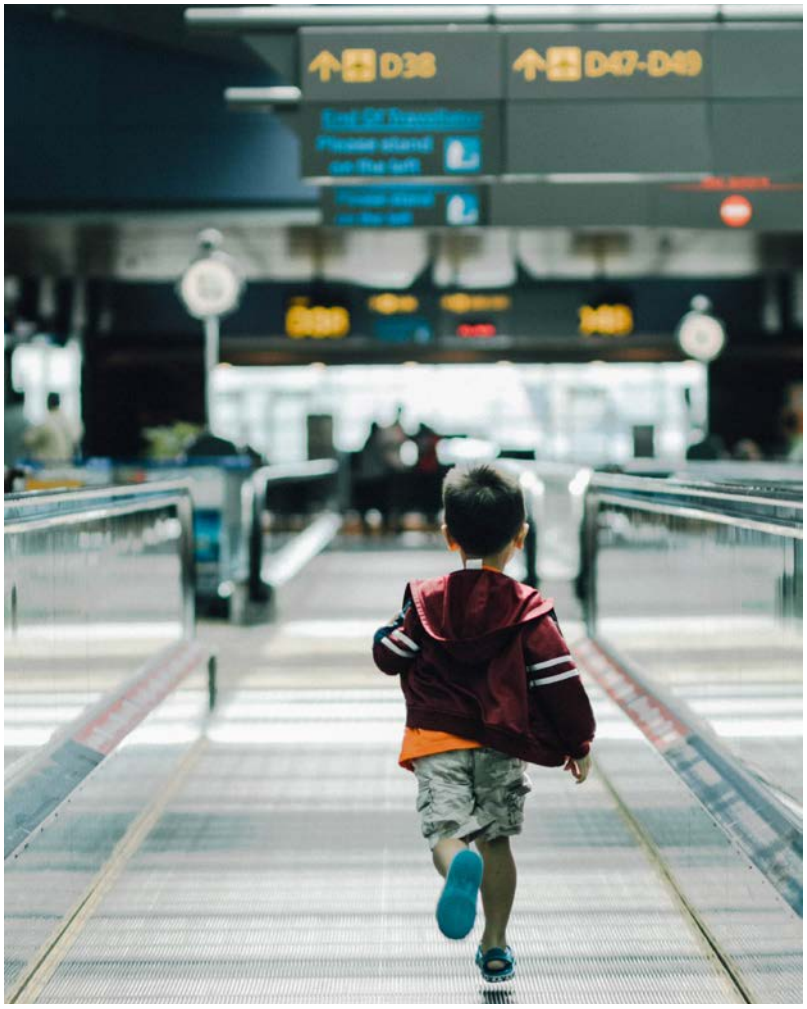
This chapter covers all operations involving gliders and sailplanes.

Chapter 6 Aerodromes and Ground Handling

This chapter covers aerodrome operations that occur within the EASA MS. Therefore the scope for this chapter is EASA MS as state of occurrence.

Chapter 7 ATM/ANS

This chapter covers ATM/ANS occurrences within the EASA MS. Therefore the scope of the chapter is EASA MS as state of occurrence



Typical Structure for Each Chapter

Each of the domain chapters in this Annual Safety Review contains specific information which is useful in understanding the analysis of that domain. The structure of each chapter is as similar as possible, providing the ability to compare information in each domain. Such information includes:

KEY STATISTICS: Every chapter starts with a set of key statistics. This provides information on the Tier 1 SPIs for that domain, which includes details of the number of fatal accidents, non-fatal accidents and serious incidents. It also outlines the number of fatalities and serious injuries in the domain. In all cases, the figures for 2018 are provided followed by comparison with the annual averages over the past 10 years. This helps to provide a reference on how this year's performance relates to historical trends. This information is also provided in a graphical format.

DOMAIN SPECIFIC ANALYSIS: As every domain has different facets to it, a further analysis of useful domain specific information is included. For example, within the areas of special operations it is useful to provide information on the type of operation involved in safety events, while some chapters include an analysis of the type of propulsion.

SAFETY RISK ANALYSIS: The next part of the analysis, and the most important in each chapter, is the domain safety risk analysis. This section provides an overview of the relative risk level and frequency of each key risk areas, as well as outlining the high risk safety issues for the domain. The full safety risk portfolio is then provided. These safety risk portfolios show a snapshot in their development, taken at the point where occurrence data and CAG inputs have identified the safety issues, but without further consideration of the potential mitigating effects of forthcoming safety actions or the worsening effects of other circumstances.

The safety risk portfolio tables have 2 axes. Along the top, information is provided on the key risk areas, which are the most frequent accident outcomes or potential accident outcomes in that domain. In the context of the safety performance framework, the key risk areas are the Tier 2 safety performance indicators (SPIs) for the domain. The key risk areas are, in most cases, ordered on the basis of their risk levels, determined using the ERCS. On the left hand axis of the portfolio are the safety issues, which relate to the causal and contributory factors to the key risk areas (accident outcomes). In terms of safety performance, these are the Tier 2+ SPIs. These are prioritised on the basis of their high, medium or low risk using ERCS. The occurrences related to the individual safety issues and are identified by mapping event types in the ECCAIRS taxonomy to each safety issue.

The Connection with the European Plan for Aviation Safety

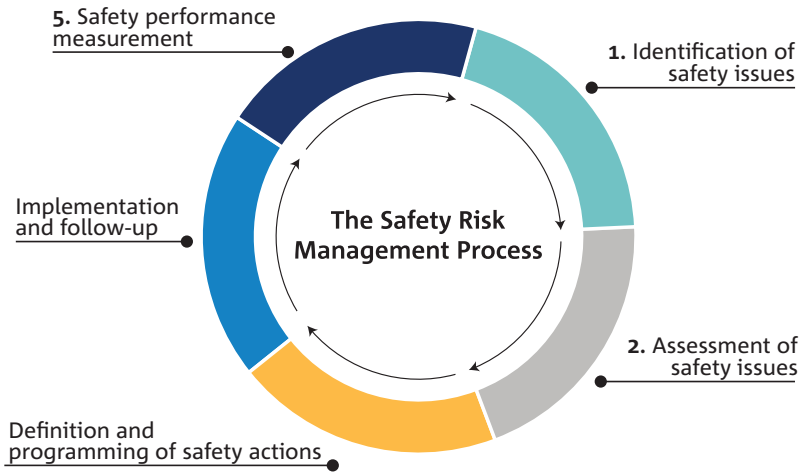
The European Plan for Aviation Safety

The European Plan for Aviation Safety (EPAS) is a coordinated safety action plan that is prepared by EASA each year with the support and technical inputs from our member states. It seeks to further improve aviation safety throughout Europe. The Plan looks at aviation safety in a systemic manner by analysing data on accidents and incidents. It considers not only the direct reasons, but also the underlying or hidden causes behind an accident or incident. Moreover, the Plan takes a longer term view into the future. Although the Plan is originated from EASA MS, it intends to be a valid reference for all States in ICAO EUR Region.

The EPAS is a key component of the Safety Management System at the European level, and it is constantly being reviewed and improved. As an integral part of EASA's work programme, the Plan is developed by EASA in consultation with the EASA Member States and industry. It is implemented by the EASA Member States on a voluntary basis through their State Programmes and Plans. The current EPAS edition covers the 5-year period from 2019 to 2023.

The Safety Risk Management Process

The EPAS is developed through the European safety risk management (SRM) process, which is defined in 5 clear and specific steps as shown below:



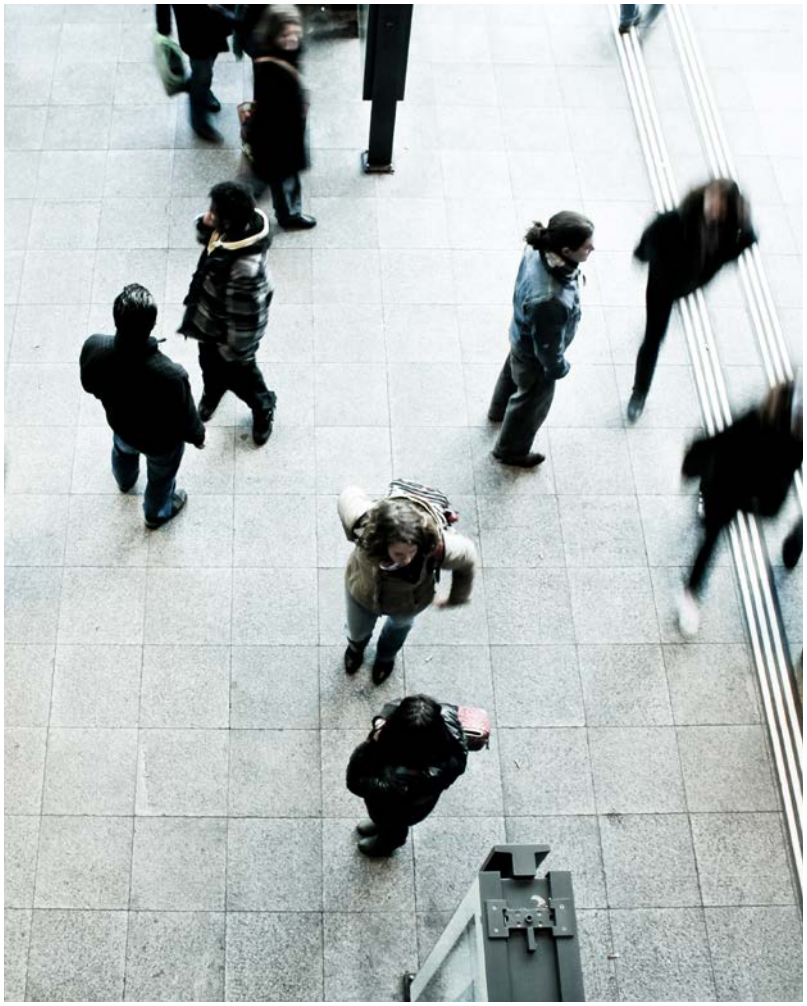
Identification of Safety Issues: The identification of safety issues is the first step in the SRM process and it is performed through analysis of occurrence data and supporting information from the Collaborative Analysis Groups. These candidate safety issues are formally captured by the Agency and are then subject to a preliminary safety assessment. This assessment then informs the decision on whether a candidate safety issue should be included formally within the relevant safety risk portfolio or be subject to other actions. Advice is taken from the Network of Analysts[1] and 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 formal safety assessment. These assessments are prioritised within the portfolio. The assessment process is led by EASA and is supported by the NoA and the CAGs. In addition, group members are encouraged to participate in the assessment itself; this external support is vital to achieving the best possible results. The result of the assessment is the production of scenario based bow tie models that help to identify weak controls for which potential actions can be identified. Together this forms the Safety Issue Assessment (SIA), which provides potential actions for the EPAS.

This is followed by the Best Intervention Strategy (BIS) assessment, which considers the wider implications and benefits of the proposed actions and makes recommendations on the actions to be implemented in the EPAS.

Definition and Programming of Safety Actions: Using the combined SIA/BIS, formal EPAS actions proposals are then made to the advisory bodies. 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.

1 See Article 14(2) of REGULATION (EU) No 376/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 3 April 2014 on the reporting, analysis and follow-up of occurrences in civil aviation



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 a number of different types of action within the EPAS. These include focussed oversight, research, rulemaking and safety promotion.

Safety Performance Measurement: The final stage in the process is then the measurement of safety performance. This serves two purposes, firstly to monitor the changes that have resulted from the implementation of safety actions. Secondly, it also serves to monitor the aviation system so that new safety issues can be identified. To ensure that there is a systematic approach to the work in this step of the SRM process, a Safety Performance Framework has been developed that identifies different tiers of Safety Performance Indicators (SPIs). Tier 1 transversally monitors all the domains and the overview of the performance in each domain. Tier 2 then covers the key risk areas at domain level, whilst Tier 2+ monitors the safety issues. The Annual Safety Review 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.

More information on the EPAS can be found here:

https://www.easa.europa.eu/easa-and-you/safety-management/european-plan-aviation-safety

CHAPTER 1
CROSS DOMAIN OVERVIEW

1.1 Global Airline Fatal Accidents

This section covers large aeroplane passenger and cargo operations worldwide.
The figures below show the EASA Member States' operators contribution to the number of fatal accidents and fatalities. The relative contribution to the number of fatalities is mainly driven by the size of aircraft and nature of flight (passenger or cargo) involved. In 2018, there were 14 fatal accidents and 586 fatalities, compared with a mean average of 512 fatalities per year over the preceding decade (2008-2017). None of these accidents involved an EASA MS airline.

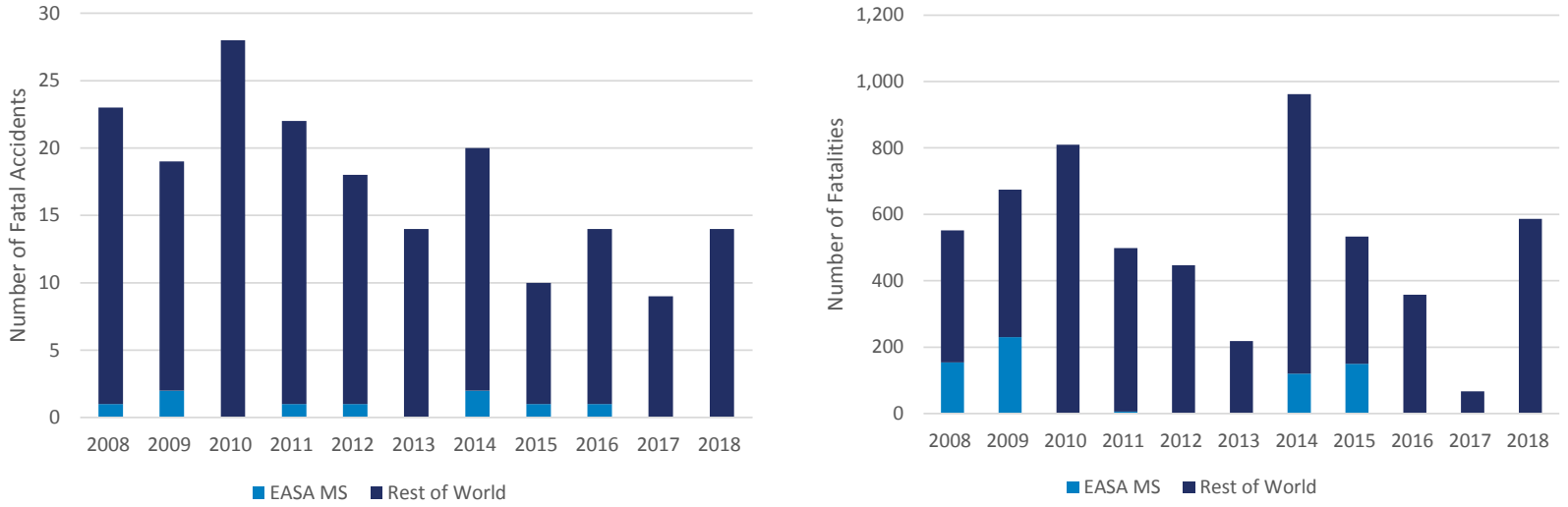


Figure 1. Number of Fatal Accidents and Fatalities Involving Large Aeroplane Passenger and Cargo Operations, EASA MS and Rest of the World, 2008-2018

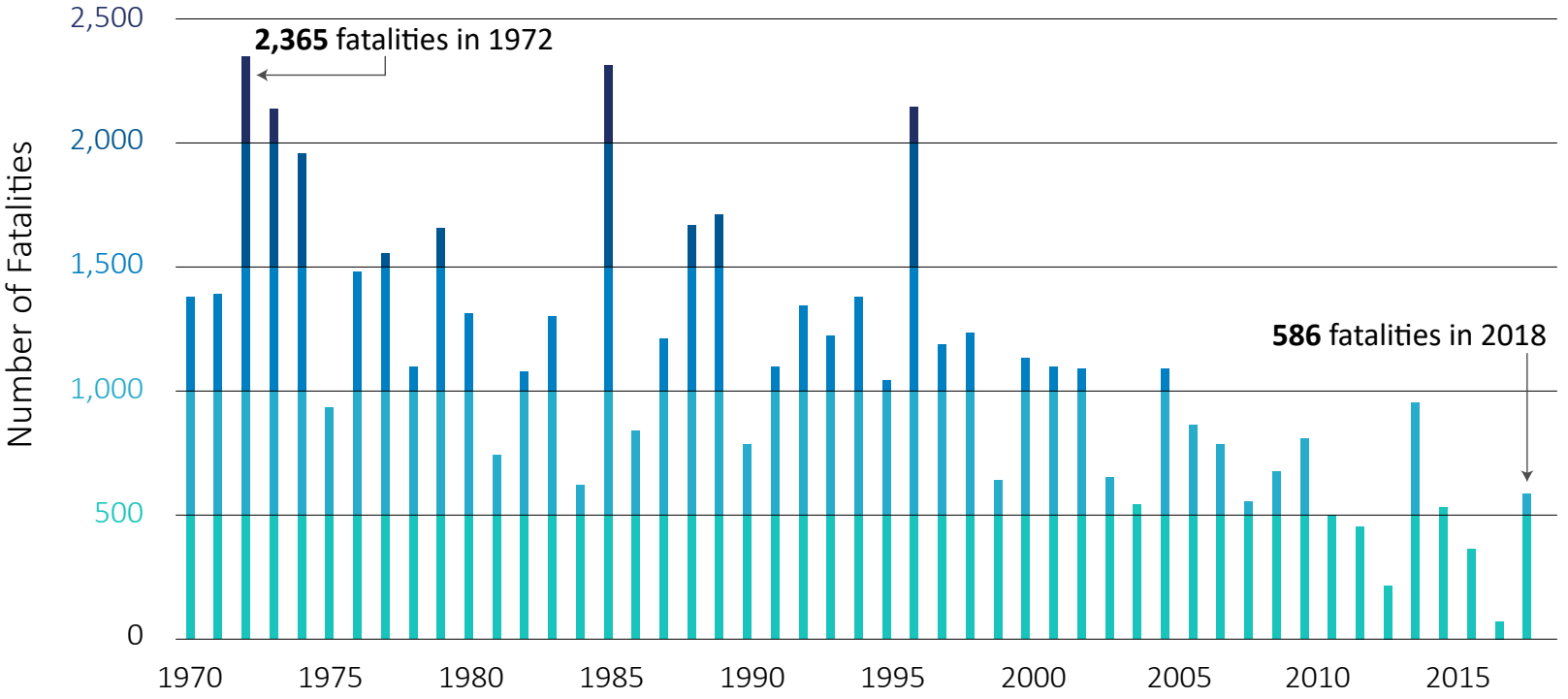


Figure 2. Number of Fatalities Involving Large Aeroplane Passenger and Cargo Operations Worldwide, 1970-2018

1.2 EASA Member States Cross Domain Safety Overview

For each domain analysed in this Annual Safety Review, the number of fatal accidents and fatalities for 2018 has been compared with the preceding ten years, 2008-2017. The table reflects the chapter structure and definitions of the Annual Safety Review. For the aircraft chapters (aeroplanes, rotorcraft, balloons and gliders), the definition relates to aircraft operated by an EASA member state AOC holder or registered in an EASA Member State.

Both the mean average and the median number of fatalities are shown for the period 2008-2017. This is because for some aircraft domains the median provides a better representation of the number of accidents per year. This is typically related to the number of passengers on board aircraft involved in fatal accidents. Gliders usually only have one person on board and the number of fatal accidents and both the mean and median number of fatalities are very similar. By contrast, commercial air transport (CAT) airline accidents may involve one or several hundred fatalities, therefore the annual number of fatalities and the mean and median figures are quite different.

It can be seen in Table 1 that the highest number of fatal accidents and fatalities in 2018 occurred in the Non-commercial aeroplane domain, although the figure is close to the ten-year mean average. The highest number of fatalities was also in the non-commercial aeroplane domain, and in this case the figure was slightly above the mean and median averages of the preceding ten years.

Table 1. Cross Domain Comparison of EASA MS Aircraft Fatal Accidents and Fatalities, 2008-2018

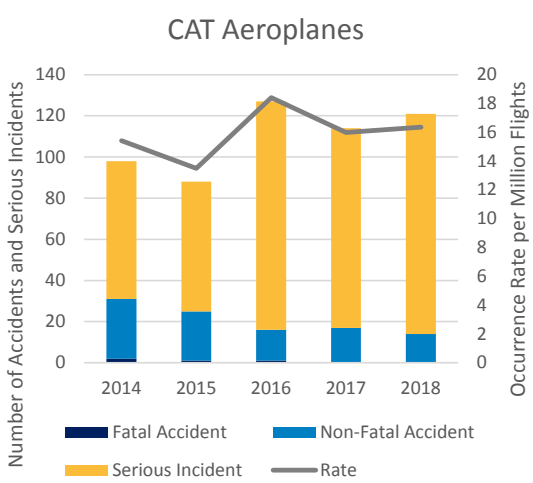
AIRCRAFT DOMAIN	Fatal Accidents 2018	Fatal Accidents 2008-2017 Mean	Fatalities 2018	Fatalities 2008-2017 Mean	Fatalities 2008-2017 Median
AEROPLANES					
CAT Airlines	0	0.8	0	66.1	4.0
NCC Business	1	0.4	1	0.9	0
Specialised Operations	6	6.8	7	13.8	13.0
Non-commercial Operations	49	47.1	95	86.0	82.0
HELICOPTERS					
Offshore CAT	0	0.4	0	3.6	0
Onshore CAT	2	1.6	8	5.2	6.0
Specialised Operations	2	3.8	2	7.1	6.5
Non-commercial Operations	6	5.5	15	11.8	10.5
BALLOONS	0	1.3	0	2.2	1.0
SAILPLANES	16	24.9	17	28.6	29.0

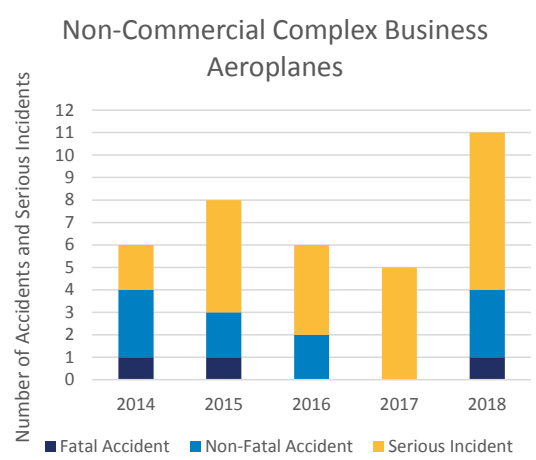
Table 2. Cross Domain Comparison of EASA MS Infrastructure Fatal Accidents and Fatalities, 2008-2018

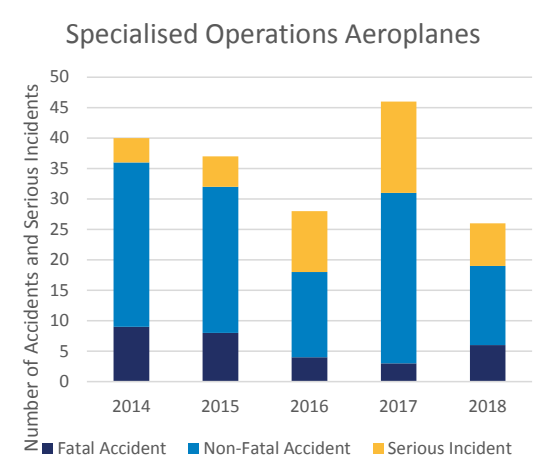
INFRASTRUCTURE DOMAIN	Fatal Accidents 2018	Fatal Accidents 2008-2017 Mean	Fatalities 2018	Fatalities 2008-2017 Mean	Fatalities 2008-2017 Median
AERODROME AND GROUND HANDLING	0	0.7	0	1.7	0.5
AIR TRAFFIC MANAGEMENT & AIR NAVIGATION SERVICES	2	0.7	12	2.4	0.5

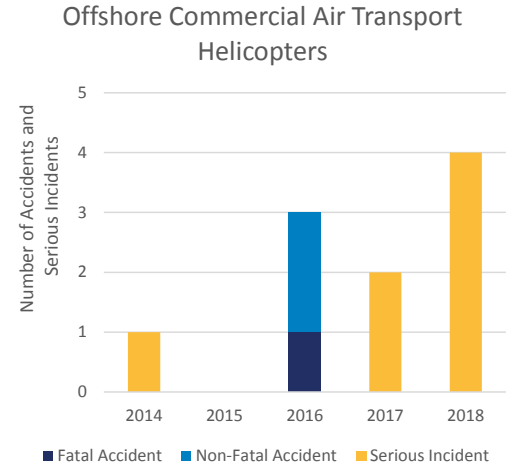
A separate table has been used for aerodromes and ground handling and ATM/ANS, reflecting the fact that the definition here is different: it includes all fatal accidents and fatalities that happened at aerodromes or in airspace in an EASA member state. Therefore the infrastructure table not only counts fatal accidents and fatalities that are already in the table for the aircraft chapters, but also some that involve operators or aircraft registered outside of a member state.

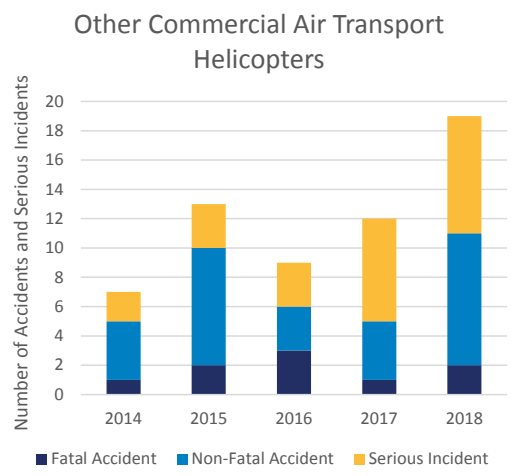
The graphs that follow show the number of fatal accidents, non-fatal accidents and serious incidents for each aircraft domain, providing a visual comparison.

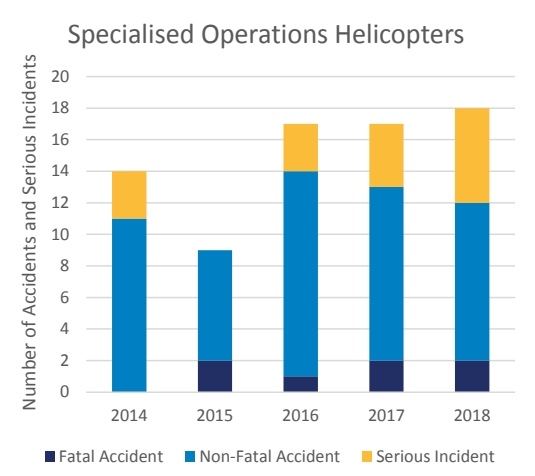

CAT Aeroplanes
Number of Accidents and Serious Incidents
Occurrence Rate per Million Flights
140
120
100
80
60
40
20
0
20
18
16
14
12
10
8
6
4
2
0
2014
2015
2016
2017
2018
Fatal Accident
Non-Fatal Accident
Serious Incident
Rate


Non-Commercial Complex Business Aeroplanes
Number of Accidents and Serious Incidents
12
11
10
9
8
7
6
5
4
3
2
1
0
2014
2015
2016
2017
2018
Fatal Accident
Non-Fatal Accident
Serious Incident


Specialised Operations Aeroplanes
Number of Accidents and Serious Incidents
50
45
40
35
30
25
20
15
10
5
0
2014
2015
2016
2017
2018
Fatal Accident
Non-Fatal Accident
Serious Incident


Offshore Commercial Air Transport Helicopters
Number of Accidents and Serious Incidents
5
4
3
2
1
0
2014
2015
2016
2017
2018
Fatal Accident
Non-Fatal Accident
Serious Incident


Other Commercial Air Transport Helicopters
Number of Accidents and Serious Incidents
20
18
16
14
12
10
8
6
4
2
0
2014
2015
2016
2017
2018
Fatal Accident
Non-Fatal Accident
Serious Incident


Specialised Operations Helicopters
Number of Accidents and Serious Incidents
20
18
16
14
12
10
8
6
4
2
0
2014
2015
2016
2017
2018
Fatal Accident
Non-Fatal Accident
Serious Incident

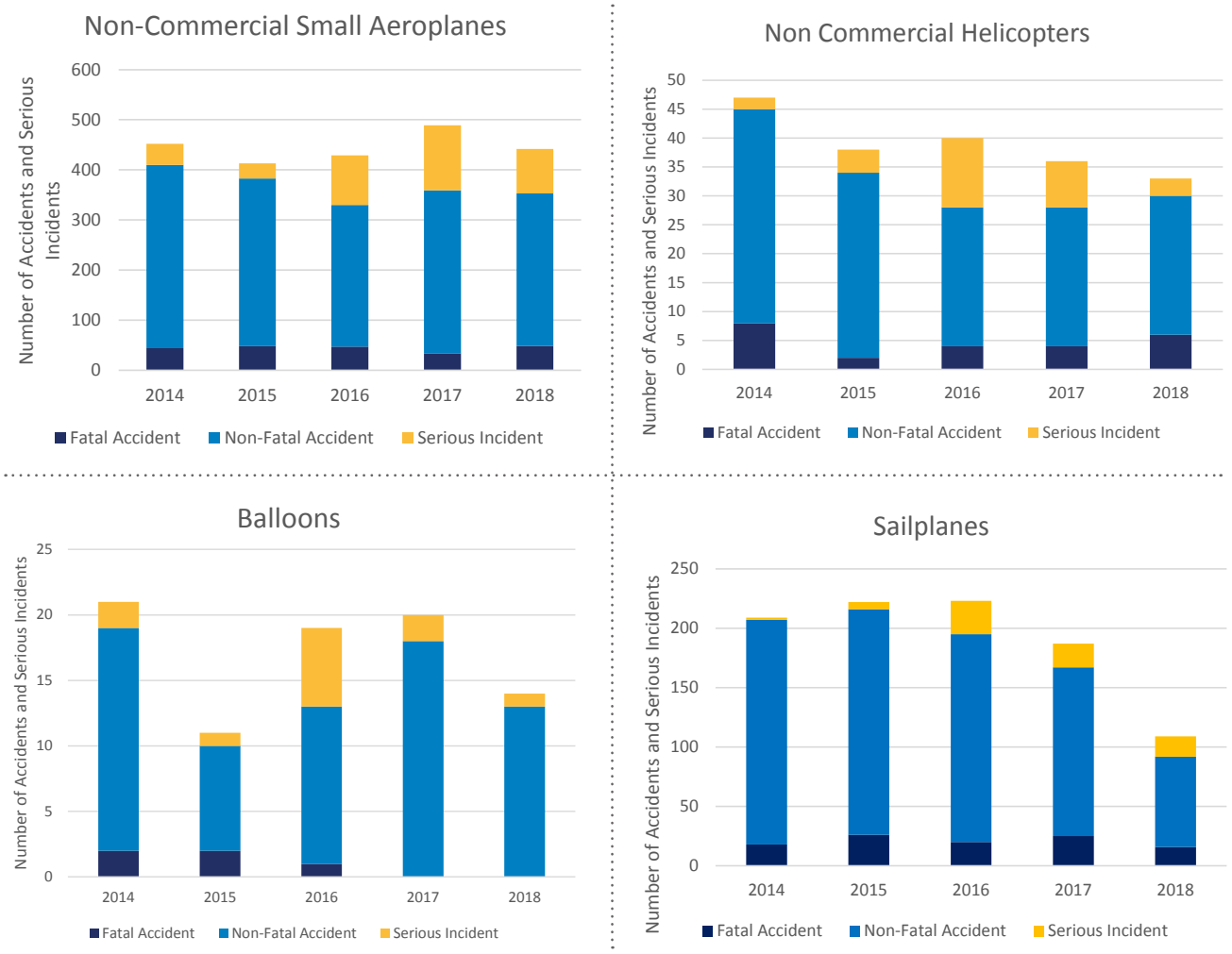


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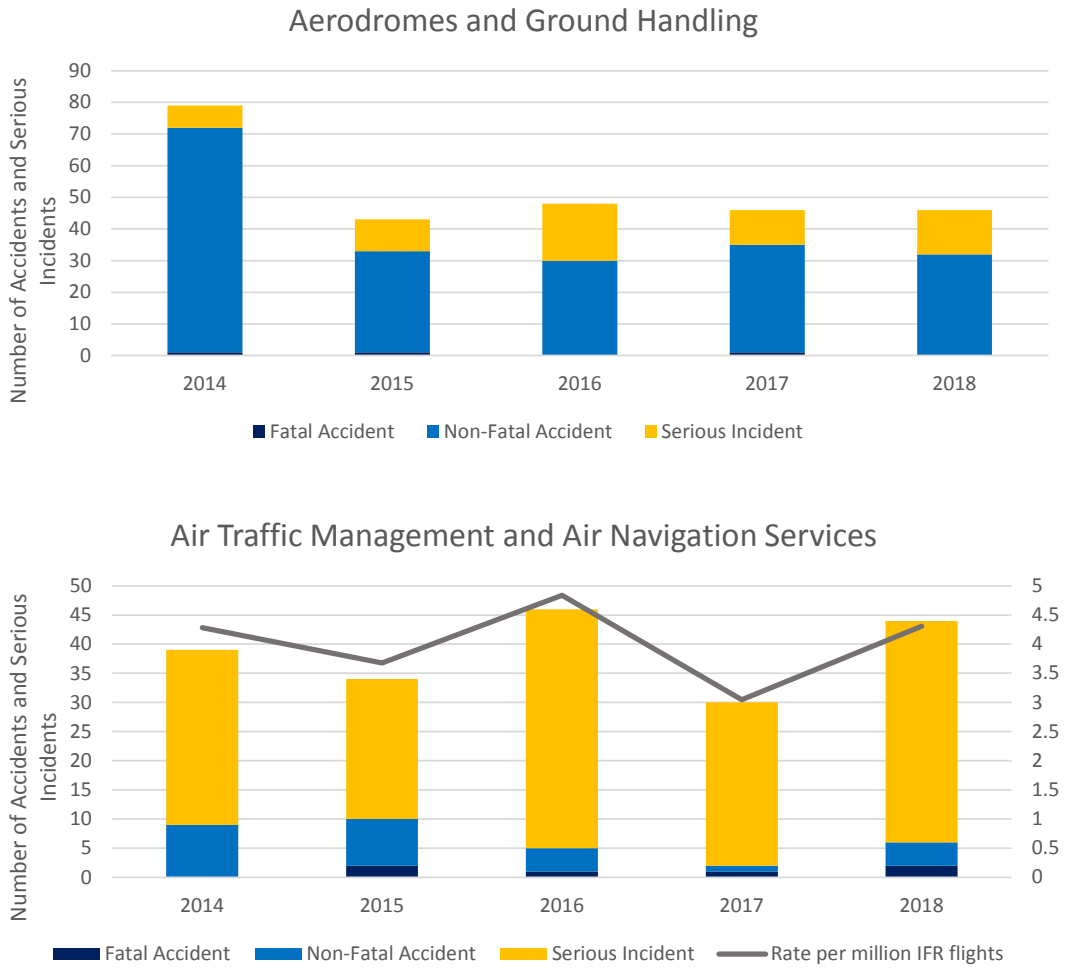
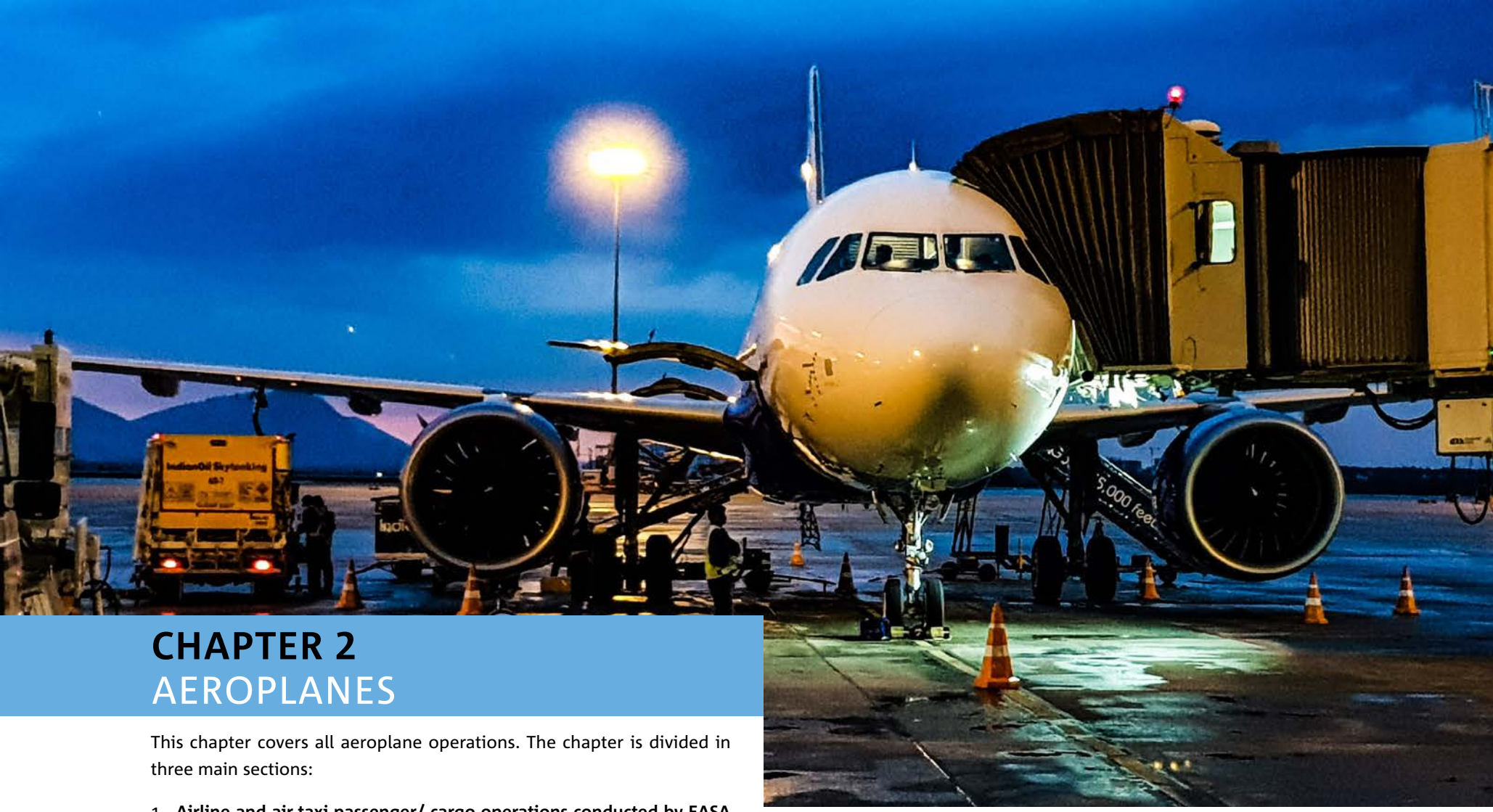
Figure 3. Number of Accidents and Serious Incidents by Domain, 2014-2018

Figure 4. Number of Infrastructure Related Fatal Accidents and Serious Incidents, 2014-2018





CHAPTER 2
AEROPLANES

This chapter covers all aeroplane operations. The chapter is divided in three main sections:

1 **Airline and air-taxi passenger/ cargo operations conducted by EASA Air Operators Certificate (AOC) holders** with aeroplanes of a maximum take-off weight above 5700 kg and EASA MS registered complex aeroplanes operating non-commercial operations (NCC)

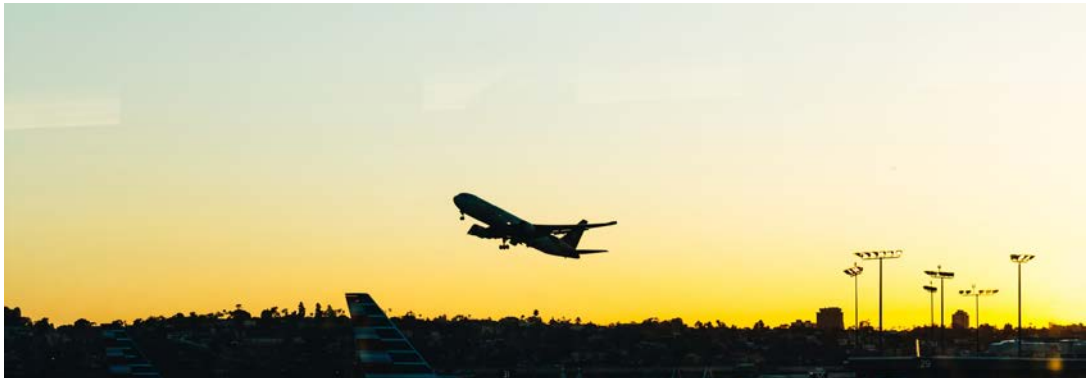
2 **Specialised Operations (SPO) conducted by EASA MS** registered aeroplanes or EASA MS AOC holders. Examples include as air ambulance, advertisement, photography, etc. with aeroplanes of maximum take-off weight below 5700 kg

3 **Non-commercial operations conducted by EASA MS** registered non-complex aeroplanes, having a maximum take-off weight below 5700 kg and not covered in the sections above.

For each section, the key statistics are presented. Each section contains an individual safety risk portfolio, providing an overview of the main risks for these types of operations at the European level.

2.1 COMMERCIAL AIR TRANSPORT – AIRLINES AND AIR-TAXI

This section covers the airline and air-taxi passenger/ cargo operations of EASA AOC holders with aeroplanes of a maximum take-off weight above 5700 kg. Data is based on the accidents and serious incidents collected by the Agency as per Annex 13 investigations1 or by the active search of those events from other official sources.



2.1.1 Key Statistics

The key statistics for this domain are in the tables below and include comparison of the number of accidents (fatal and non-fatal) and serious incidents for the 10-year period (2008-2017) and the last year (2018). It also includes the comparison of the fatalities and serious injuries sustained in those accidents during the same timeframe.

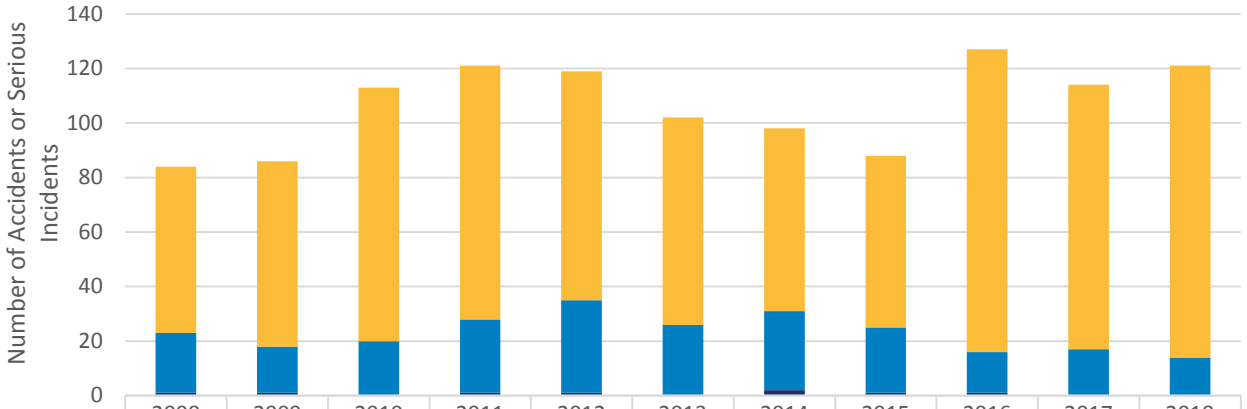
In 2018, there was no fatal accident involving a European CAT AOC Holders[2] and the number of non-fatal accidents was lower than the average of the previous 10-year period. In 2018, there was an increase in serious incidents in comparison with the average of the previous 10-year period.

2008 - 2017 total	TIMESPAN	2018	
8	FATAL ACCIDENTS	0	↓
231	NON-FATAL ACCIDENTS	14	↓
813	SERIOUS INCIDENTS	107	↑

Table 3. Key statistics for Commercial Air Transport

1 The term "Annex 13 investigations" refers to both the investigations carried out under the Regulation (EC) 996/2010 by the European Safety Investigation Authorities and by non-European authorities following ICAO Annex 13 standards.

2 On August 4th, a Junker-52 crashed in the Swiss Alps while performing a sightseeing flight resulting in 20 fatalities. Due to the type of aircraft involved (not certified by EASA and so-called "Annex I aircraft" of the Regulation (EU) 2018/1139,) and the specific type of operation being carried, this accident has not been included in the statistics of this chapter.

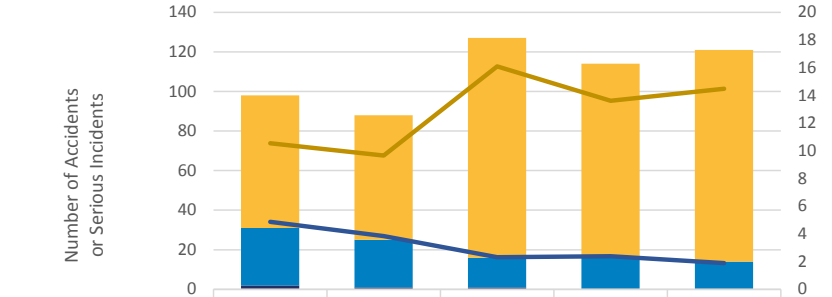


	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Serious Incident	61	68	93	93	84	76	67	63	111	97	107
Non-Fatal Accident	22	17	20	27	34	26	29	24	15	17	14
Fatal Accident	1	1	0	1	1	0	2	1	1	0	0

Figure 5. Accidents And Serious Incidents Per Year 2008- 2018

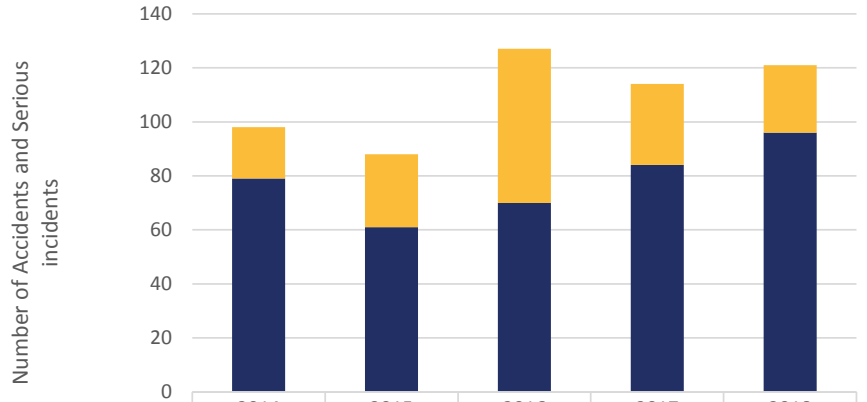
The rate of accidents continues to decrease since 2014, while the rate of serious incidents has stabilised after a peak in 2016. This peak is the result of the more stringent classification of separation minima infringements by the Members States Aviation and Safety Investigation Authorities, after the entry into force of the Regulation (EU) 376/2014. In addition, updates and improvements in the accuracy of the exposure data used has had an impact on the calculated accident and serious incident rates.

The use of the classification of accidents and serious incidents does not necessarily provide an accurate picture of the risk of those events. As example, a very close near-mid air collision would be classified as a serious incident, while a collision between ground handling vehicle and an aircraft leading to substantial damages of the later would be classified as an accident. It is clear that in terms of risk, the serious incident in this example would be of higher risk than the accident. The combination of probability and severity (worse possible outcome) would significantly differ. This



	2014	2015	2016	2017	2018
Serious Incident	67	63	111	97	107
Non-Fatal Accident	29	24	15	17	14
Fatal Accident	2	1	1	0	0
Serious Incident Rate	10.5	9.7	16.1	13.6	14.5
Accident Rate	4.9	3.8	2.3	2.4	1.9

Figure 6. Number And Rate Of Accidents And Serious Incidents Per Year 2014 -2018.

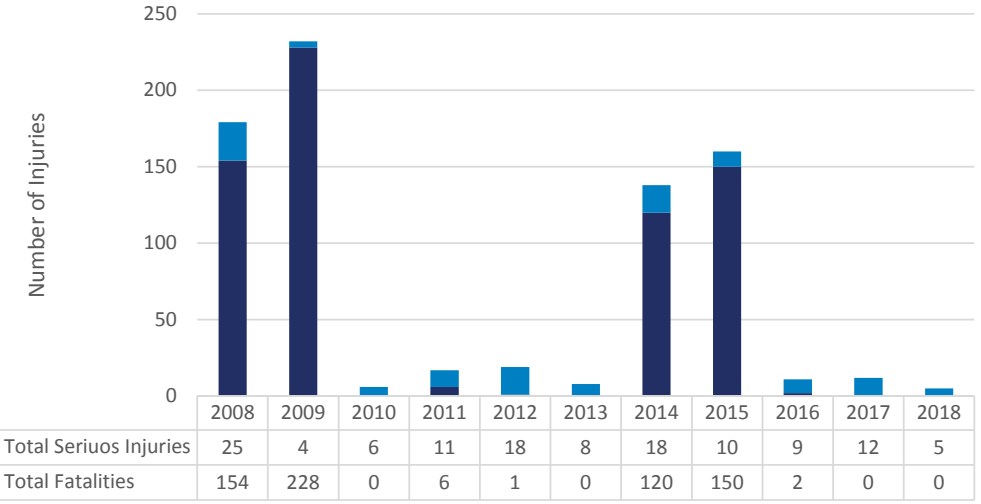


	2014	2015	2016	2017	2018
Lower Risk (ERCS)	19	27	57	30	25
Higher Risk (ERCS)	79	61	70	84	96

Figure 7. Number Of ERCS Higher And Lower Risk Occurrences Per Year 2014- 2018

2008 - 2017 total	mean	median	TIMESPAN	2018
661	66.1	4	FATALITIES	0 ↓
121	12.1	10.5	SERIOUS INJURIES	5 ↓

ABOVE
Table 4. Number of Fatalities and Serious Injuries, 2008-2018



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total Seriuos Injuries	25	4	6	11	18	8	18	10	9	12	5
Total Fatalities	154	228	0	6	1	0	120	150	2	0	0

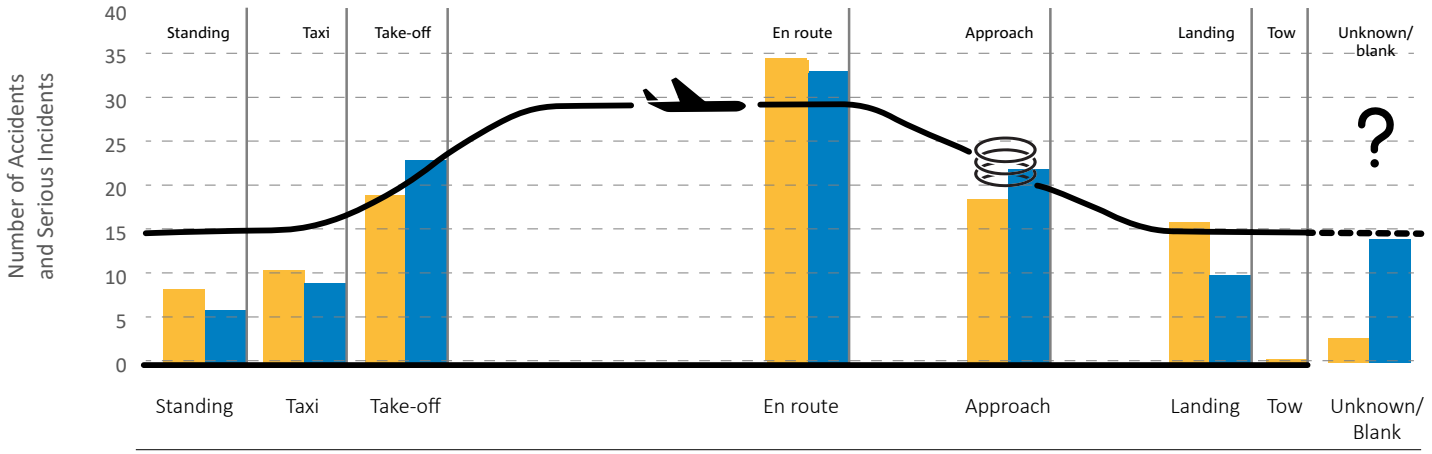
RIGHT
Figure 8. Number Of Fatalities And Serious Injuries, 2008-2018

is the reason why the Regulation (EU) 376/2014 mandates the development and eventual use of a European common risk classification scheme (ERCS) to risk classify all occurrences reported to the European Authorities. The main purpose of this risk score is to be able to discriminate between occurrences of higher and lower associated risk. EASA, together with an expert group composed by relevant European Risk Experts, has developed the ERCS methodology that will be published by the European Commission (see details here). Figure 7 shows the evolution of the key statistics from accidents and serious incidents to classification of higher risk and lower risk occurrences based on the individual ERCS score. As illustrated in Figure 7, the data show a different pattern than the representation of accidents and serious incidents. This is because certain occurrences classified as serious incidents have inherent risk profiles that may equal or even exceed the risk of certain accidents. As the figure below shows, there is a slight increase in the number of higher risk occurrences since 2016. The number of serious injuries in 2018 remains between the mean and the median of the previous 10-year period.

As it can be seen in the Figure 8, the number of fatalities per year follows a random distribution, being only dependent on the size and occupancy of the aeroplane involved in the accident. The most recurrent source of injuries in this period was the encounter with turbulences in flight.

2.1.1.1 Phase of flight

The numbers for 2018 show a very similar distribution pattern of accidents and serious incidents to the 10 year average with greater number in “En-route” due the higher exposure (length of this phase of flight) and during approach, take-off and landing due to the critical nature of those flight phases. “Unknown/blank” flight phase corresponds to those occurrences where no data was available and it normally relates to the second aircraft in some of the occurrences (e.g. in a general aviation leisure flight leading to a loss of separation with an Airliner, the missing information on the specific flight phase may be for the general aviation flight).



	Standing	Taxi	Take-off	En route	Approach	Landing	Tow	Unknown/ Blank
Average 2008-2017	8.3	10.5	19.1	34.4	18.6	16	0.4	2.8
2018	6	9	23	33	22	10	0	14

Figure 9. Number Of Accidents And Serious Incidents By Flight Phase, 2008- 2018

2.1.1.2 Operation type

The numbers for 2018 show a similar distribution between operation types (passenger or cargo) in comparison to the 10 year average (2008-2017), with a slight increase for the figures in 2018. “Unknown/blank” corresponds to those occurrences where no data on the operation type was available and it normally relates to the second aircraft in some of the occurrences (e.g. loss of separation between an Airliner and another aircraft).

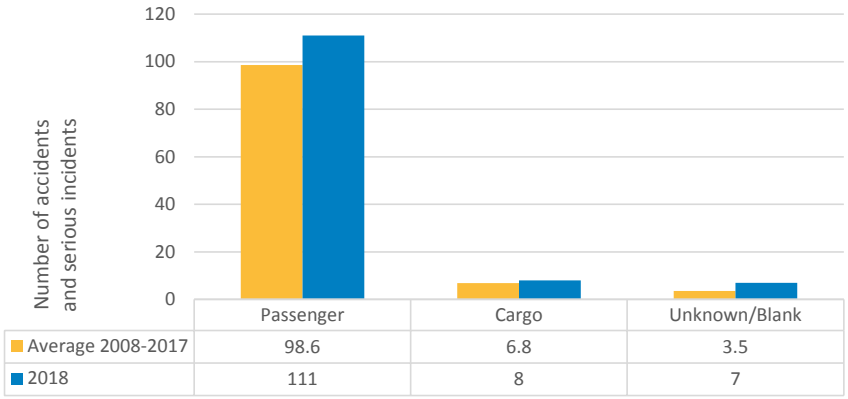


Figure 10. Number Of Accidents And Serious Incidents By Operation Type, 2008-2018

2.1.1.3 Propulsion type

The split by propulsion type shows a similar pattern between the figures in 2018 and the 10 year average (2008-2017). The comparison between turbofan and turboprop is consistent with the split of aircraft fleet sizes and its different exposure figures.

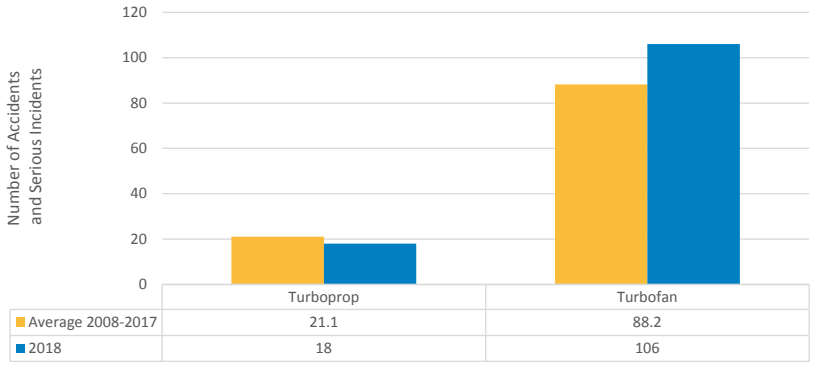


Figure 11. Number Of Accidents And Serious Incidents By Propulsion Type Of The Aeroplanes Involved, 2008- 2018

2.2 NON-COMMERCIAL COMPLEX – BUSINESS[3]

This section covers the safety performance of EASA MS registered complex aeroplanes operating non-commercial operations (NCC).

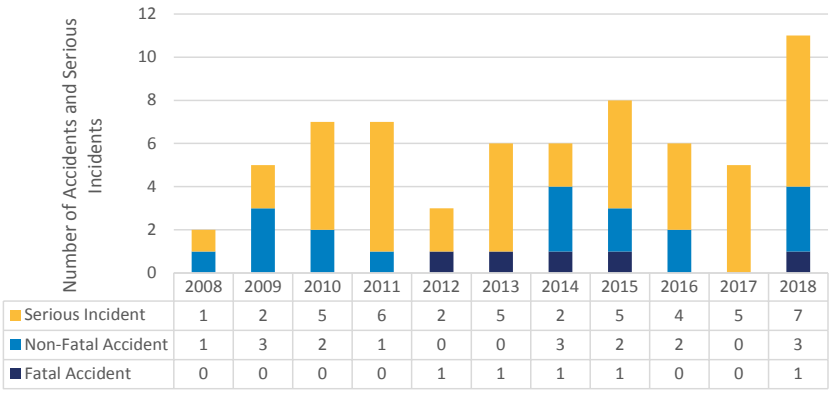
2.2.1 Key Statistics

The key statistics for this domain are in Table 5 and include comparison of the number of accidents (fatal and non-fatal) and serious incidents for the 10-year period (2008-2017) and the last year (2018).

During 2018, there was one fatal accident involving a European registered NCC aeroplane. This accident corresponds to the fatal explosive door opening during ground operation of a business jet aircraft. The number of non-fatal accidents and serious incidents have increased in comparison with the average of the previous 10-year period (2008-2017). This is the result of the more successful data

2008 - 2017 total	TIMESPAN	2018
4	FATAL ACCIDENTS	1 ↓
14	NON-FATAL ACCIDENTS	3 ↑
37	SERIOUS INCIDENTS	7 ↑

Table 5. Key statistics for Non Commercial Complex Aeroplanes



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Serious Incident	1	2	5	6	2	5	2	5	4	5	7
Non-Fatal Accident	1	3	2	1	0	0	3	2	2	0	3
Fatal Accident	0	0	0	0	1	1	1	1	0	0	1

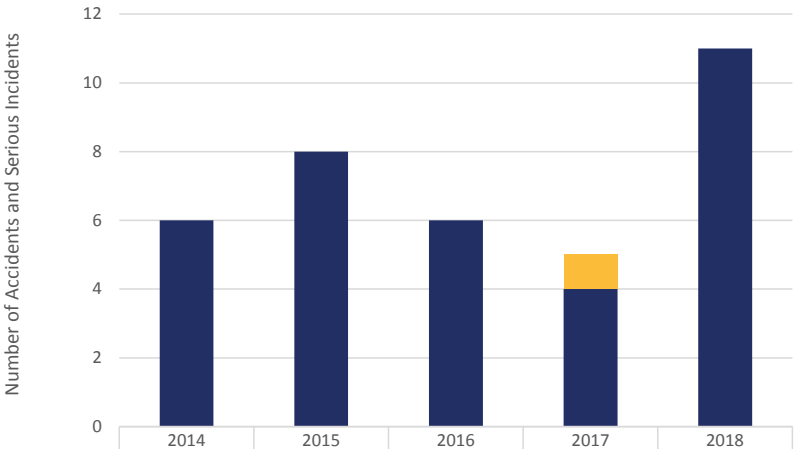
Figure 12. Number Of Accidents And Serious Incidents Per Year 2008-2018

3 The scope of this sub-chapter has changed from previous year, covering now the whole NCC Business spectrum. Statistics in previous years' publications are likely to defer.

collection process carried out during 2018 in the NCC Business domain.

Similar to the previous section, the figure below shows the split of the accidents and serious incidents grouped by higher and lower risk based on the ERCS methodology. This classification provides an additional view using a proxy to the risk of those occurrences. As it can be seen in the figure below, there is a negligible amount of lower risk occurrences. This is likely due to the low reporting in this domain, where only high risk, normally very visible and with severe outcome, are being reported and investigated.

Due to the size of the aeroplanes used for the bulk of this type of operations, the number of fatalities is significantly low, though still with a consolidated average of around 1 fatality per year. As can be seen in Figure 14, there has been approximately 1 fatal accident every 2 years.

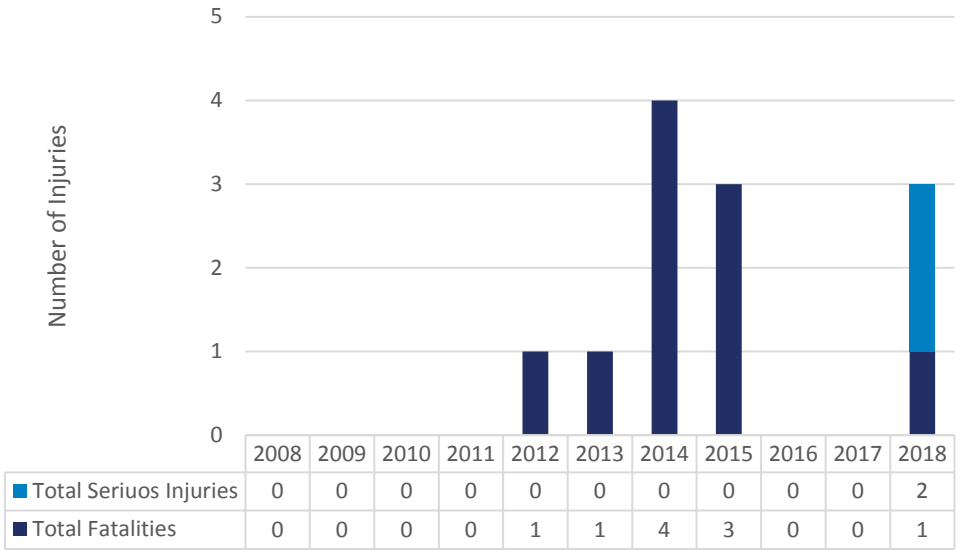


	2014	2015	2016	2017	2018
Not ERCS scored	0	0	0	0	0
Lower Risk (ERCS)	0	0	0	1	0
Higher Risk (ERCS)	6	8	6	4	11

Figure 13. Number Of Higher And Lower Risk Occurrences, 2014- 2018

2008 - 2017 total	mean	median	TIMESPAN	2018
9	0.9	0	FATALITIES	1 ↓
0	0	0	SERIOUS INJURIES	2 ↑

Table 6. Number Of Fatalities And Serious Injuries, 2008- 2018



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total Seriuos Injuries	0	0	0	0	0	0	0	0	0	0	2
Total Fatalities	0	0	0	0	1	1	4	3	0	0	1

Figure 14. Number Of Fatal And Serious Injuries, 2008-2018

2.2.1.1 Phase of flight

The low numbers in this section do not allow any comparison in terms of flight phase. However, the data is still presented for information.

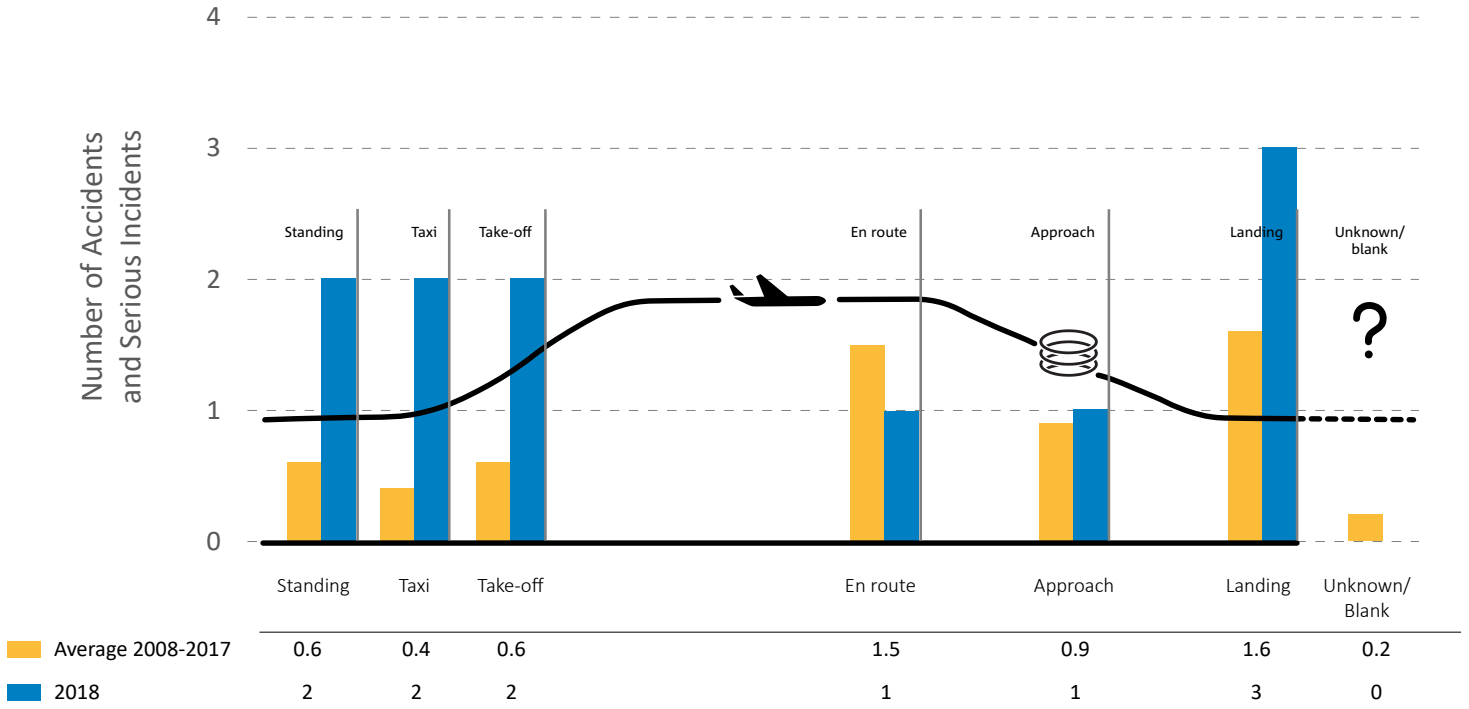


Figure 15. Number Of Accidents And Serious Incidents By Flight Phase, 2008-2018

2.2.1.2 Propulsion type

The low figures in these domain do not allow any comparison between the two main propulsion types. However, the data are still presented for information.

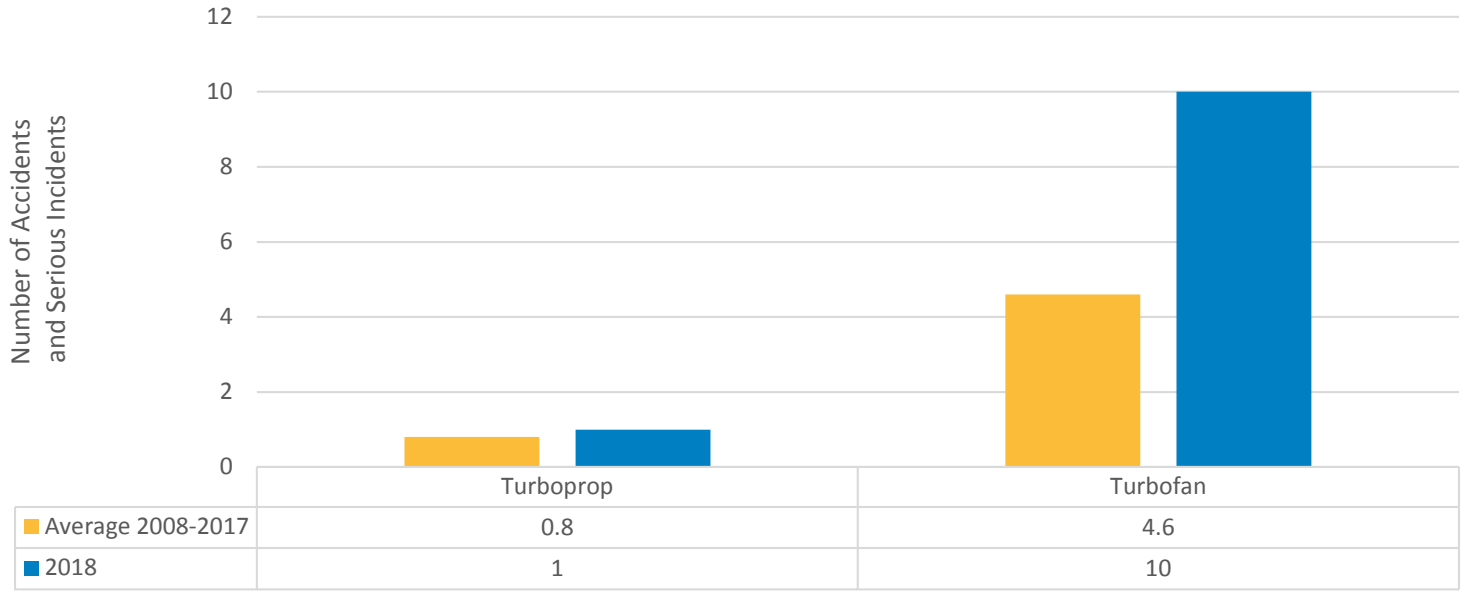
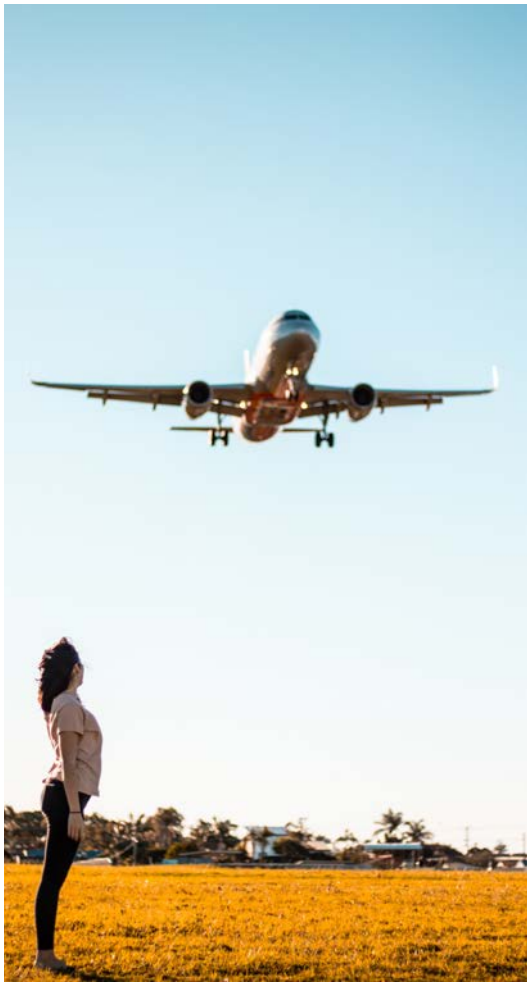


Figure 16. Number Of Accidents And Serious Incidents By Propulsion Type, 2008-2018

2.3 SAFETY RISK PORTFOLIO FOR LARGE AEROPLANE (CAT-AIRLINES, AIR-TAXI AND NCC BUSINESS)

CAT Airline, Air-Taxi and NCC Business operations are covered by a single Safety Risk Portfolio due to the similarity of the main risk areas and safety issues for these operation types, and the small dataset available for NCC- Business.

The safety risk portfolio provides a summary of the key risk areas and safety issues for this domain of aviation. The portfolio is used to prioritise the assessment of safety issues, target analysis activities over key risk areas and prioritise safety actions. It is one of the main contributors to the EPAS process.



In order to arrive at this safety risk portfolio, the European Safety Risk Management process provides a structured approach that combines the available safety data and expertise from both the Industry and the Member States. For the Safety Risk Portfolio for Large Aeroplanes, the first step is the update of the existing safety risk portfolio, which is kept current by the relevant Collaborative Analysis Groups (CAGs), with the available occurrence data. This update results in a preliminary portfolio. This portfolio is the visualisation of the identified safety issues (i.e. the issues listed in the risk portfolio) through the occurrence data. In other words, whether the identified safety issues were present the occurrences in the last 5 years and with what risk (i.e. individual ERCS score). The preliminary portfolio is then enriched with expert knowledge on each individual safety issue. This is provided by the industry and the Member States who participate in the CAG. This exercise provides a correction of the static picture that the occurrence data provides, and delivers a picture which is much closer to the actual risk picture. It considers the exposure to the hazard and its evolution in the coming years, the expected safety benefit of the mitigations recently implemented or recently committed, and the possible risk transfers to other safety issues or from other changes in the system (e.g. implementation of new mitigations, changes in the system).

Finally, the safety issues are clustered in three groups and ranked in terms of perceived risk (higher to lower):

- **Mitigate:** The information available on the safety issue suggests that the implementation of the proposed mitigations (i.e. not yet committed) would render the safety issue under control.

- **Assess:** The information available on the safety issue is not sufficient to determine if the safety issue is under control or not, or there is not enough information to define relevant mitigations. In this case, a detailed analysis will be carried out to gain better understanding on the issue.

- **Monitor:** The enrichment and subsequent analysis of the information pertaining to the safety issue leads to the conclusion that either the safety issue is considered of lower risk or that the ongoing or committed mitigations would render the safety issue under control. The safety issue is placed under monitoring to confirm this assumption.

It is necessary to highlight that these considerations are made in the context of the European Safety Risk Management process and only valid in this context. The European Safety Risk Management process is complementary to, but should not be taken as a substitute of, the safety risk management processes run by the States and aviation organisations. Therefore, safety issues assessed as "under control" at the European level could have different consideration at State or organisation level.

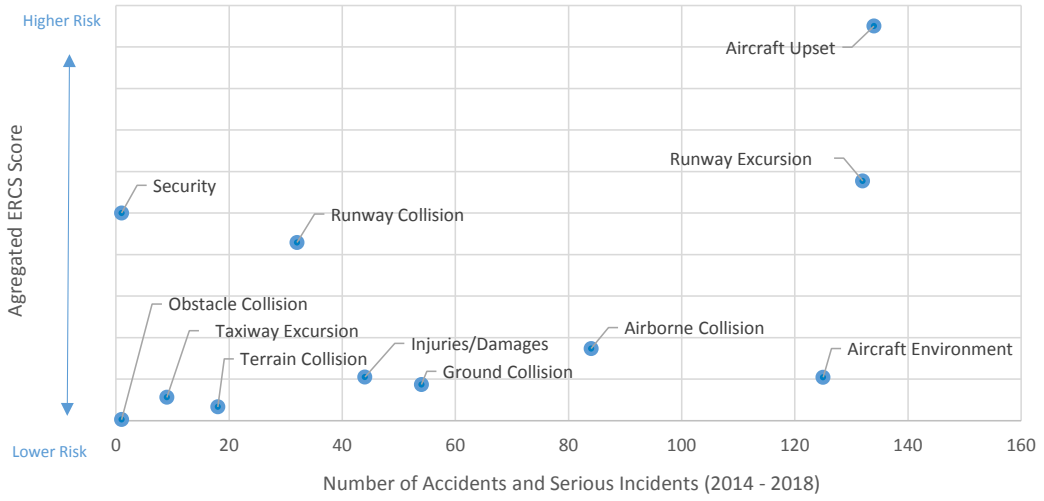
The preliminary portfolio uses the aggregated ERCS score to provide and initial ranking of the key risk areas and safety issue. Figure 17 plots the accidents and serious incidents related to CAT Airlines, Air-Taxi and NCC Business, by the key risk area which the occurrence would potentially lead to. The number of occurrences is represented by the x-axis and in the y-axis their aggregated ERCS risk score. The key risk areas with a higher cumulative ERCS score would be considered as higher risk.

Based on this definition, the key risk areas with a higher cumulative ERCS score are Aircraft Upset (also Loss of Control in Flight) and Runway Excursion followed by Security and Runway Collision. It is worth mentioning that the attribution of occurrences to key risk areas is not based solely on the actual outcome of the occurrence but also by the existence of direct precursors to those potential outcomes. That is, for example, an occurrence related to unstabilised approach would be linked to the key risk area of Runway Excursion, and depending on the case, also linked to Aircraft Upset.

The main key risk areas highlighted above are defined by their potential accident outcome and by the immendiate precursors of that accident outcome.

1. **Aircraft upset:** Includes uncontrolled collisions with terrain and occurrences where the aircraft deviated from the intended flight path or intended flight parameters, regardless of whether the flight crew was cognisant of the deviation and whether it was possible to recover or not. It also includes the triggering of stall warning and envelope protections.

2. **Runway excursion:** Covers actual runway excursions, both at high and low speed, and occurrences where the flight crew had difficulties maintaining the directional control of the aircraft or of the braking action during landing, where the landing occurred long, fast, off-centred or hard, or where the aircraft had technical problems with the landing gear (not locked, not extended or collapsed) during landing.



Similar to the approach adopted for key risk areas, Figure 18 lists the safety issues in the Large Aeroplanes 2019 portfolio and shows both the number of occurrences and the risk score. However, in this case, the aggregated ERCS score is considered a less reliable risk indicator. This is because the finer granularity of the safety issue renders this indicator more vulnerable to the reactiveness of the data type used (only accidents and serious incidents). This is also the reason why the portfolio needs to be refined through the previously mentioned enrichment process.

The safety risk portfolio is shown in Table 7, where the safety issues, sorted by the aggregated risk score, are linked to the key risk areas, also sorted by their aggregated risk score.

Figure 17. Distribution Of Higher Risk Occurrences By Number Of Events And Aggregated Risk Score (ERCS)

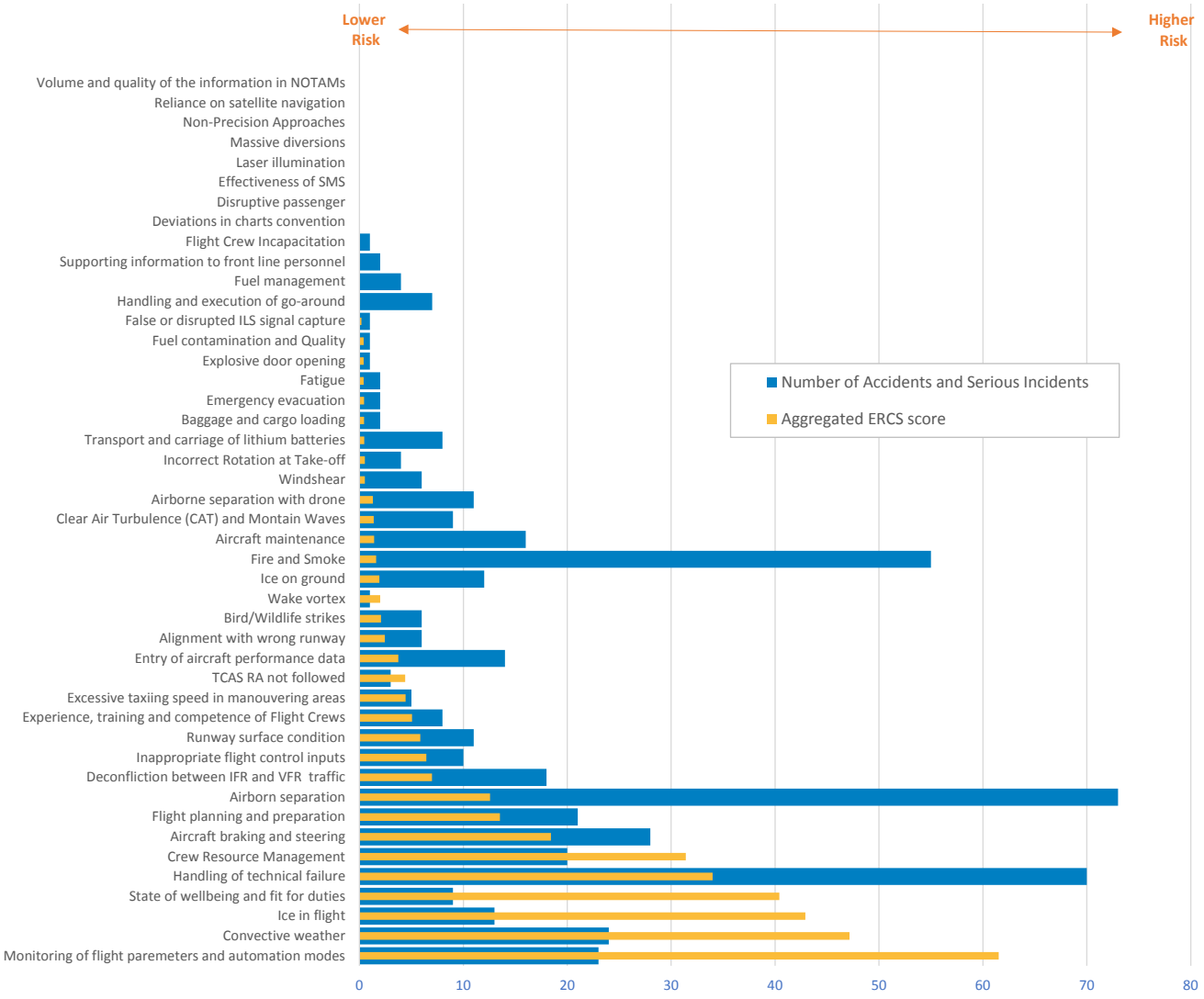


Figure 18. Comparison Of Number Of Occurrences And Aggregated ERCS Score Per Safety Issue

CAT AEROPLANES

Bands of Aggregated ERCS Risk Score (2014-2018)

SAFETY ISSUES	Key Risk Areas										
	Aircraft Upset	Runway Excursion	Security	Runway Collision	Airborne Collision	Injuries/Damages	Aircraft Environment	Ground Collision	Taxiway Excursion	Terrain Collision	Obstacle Collision
Monitoring of flight paremeters and automation modes	x	x			o	o	o			o	
Convective weather	x	o				x				o	
Ice in flight	x	o					o			o	
State of wellbeing and fit for duties	x	o	x							o	
Handling of technical failure	x	x		o	o		o		o	o	
Crew Resource Management	x	x		o	x		o				
Aircraft braking and steering		x					o		x		
Flight planning and preparation	x	x			o	o	o				
Deconfliction between IFR and VFR traffic					x						
Inappropriate flight control inputs	x	x			o	o					
Runway surface condition		o									
Experience, training and competence of Flight Crews	o	x		o				o			
Excessive taxiing speed in manouvering areas		o						o	x		
TCAS RA not followed					o					o	
Entry of aircraft performance data	x	x								o	
Alignment with wrong runway		x		o				o	o	o	o
Bird/Wildlife strikes	o	o		o							
Wake vortex	o				o						

X = Higher risk occurrences
O = Lower risk occurrences

Priority 1 Priority 2 Priority 3 Priority 4

PP. 48-49
Table 7. Large aeroplane safety risk portfolio

Bands of Aggregated ERCS Risk Score (2014-2018)

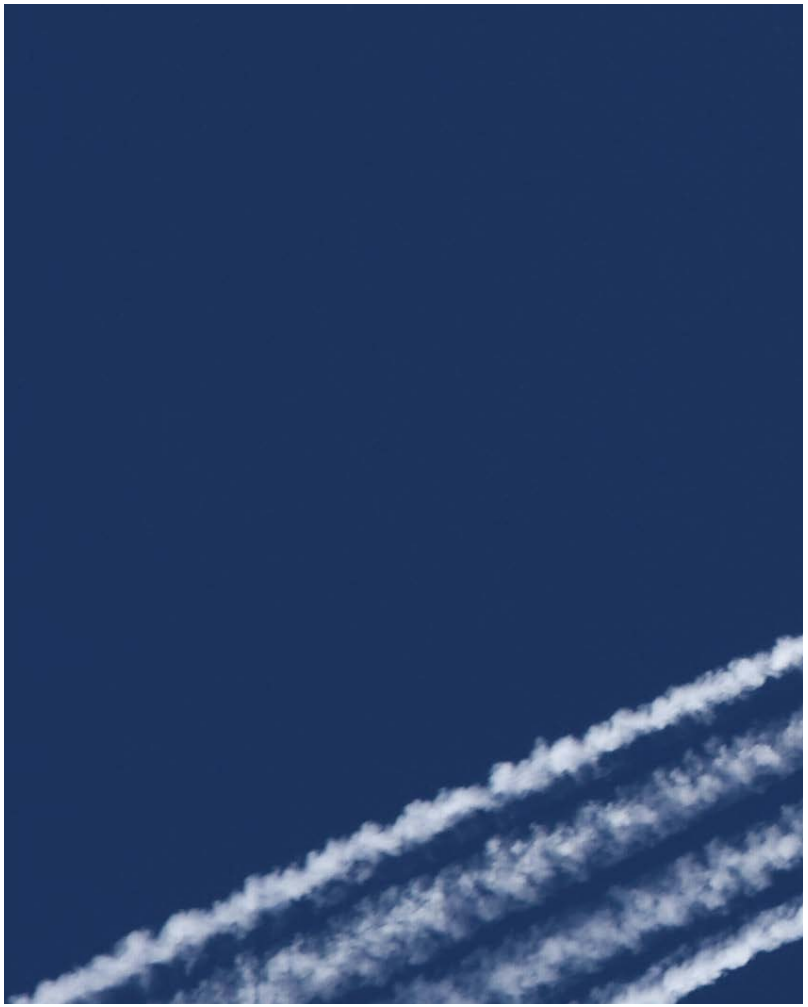
SAFETY ISSUES	Key Risk Areas										
	Aircraft Upset	Runway Excursion	Security	Runway Collision	Airborne Collision	Injuries/Damages	Aircraft Environment	Ground Collision	Taxiway Excursion	Terrain Collision	Obstacle Collision
Ice on ground	x	o					o				
Fire and Smoke						o	x				
Aircraft maintenance	o	o				o	o	o		o	
Clear Air Turbulence (CAT) and Montain Waves	o					o					
Airborne separation with drone					x						
Windshear	o	o			o						
Incorrect Rotation at Take-off	o	o									
Transport and carriage of lithium batteries		o					x				
Baggage and cargo loading	o	o									
Emergency evacuation						o	o				
Fatigue	o	o						o			
Explosive door opening						o					
Fuel contamination and Quality	o									o	
False or disrupted ILS signal capture	o	o		o						o	o
Handling and execution of go-around	o	o			o		o			o	
Fuel management	o										
Supporting information to front line personnel	o				o	o					
Flight Crew Incapacitation	o										
Deviations in charts convention	No Data										
Disruptive passenger											
Effectiveness of SMS											
Laser illumination											
Mass diversions											
Non-Precision Approaches											
Reliance on satellite navigation											
Volume and quality of the information in NOTAMs											

The safety risk portfolio presented in Table 7 links the safety issues to key risk areas. The highest contribution to Aircraft Upset and Runway Excursion are from “Monitoring of Flight Parameters and Automation Modes”, “Handling of Technical Failures” and “Aircraft Braking and Steering”.

The refinement of the portfolio is among the main tasks of the CAT Aeroplanes CAG. The process has three main steps:

1. **Update** of the information available for each safety issue. All the information available to the CAT Aeroplane CAG is logged in the individual Safety Issue Fact Sheet and is kept up to date by the EASA portfolio manager with the support of the CAG members. The information collected usually relates to:

- The safety performance of the issue (e.g. occurrence data, performance indicators),
- The exposure to the related hazard and the evolution of this exposure in the coming years (e.g. traffic, number of operations in certain conditions, fleet)
- The strength/weakness of the existing safety barriers (e.g. recent safety analyses, findings from audits)
- The expected improvements due to the recently implemented, ongoing or proposed mitigations (e.g. actions in the EPAS, mitigations proposed after safety assessments, initiatives from other safety partners)

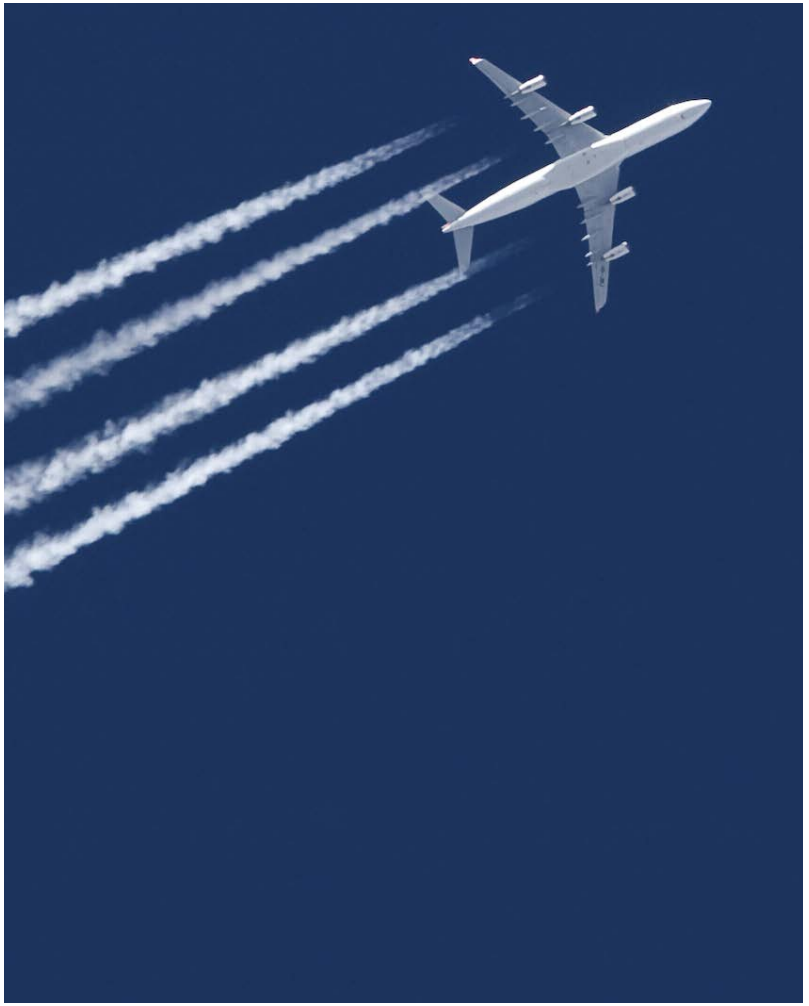


2. **Cluster** of the safety issues. As defined above, the CAT Aeroplane CAG proposes the split of the safety issues in three clusters: Monitor, Mitigate and Assess.

3. **Prioritisation** of the safety issues within the clusters. Once the clustering of the safety issues is consolidated, the CAT Aeroplane CAG prioritises the safety issues by pair-wise comparison of all the safety issues in the same cluster. The Safety Issue Fact Sheets provide the objective reference to support this step.

The result of this refinement exercise, when validated by the EASA Executive Safety Committee, constitutes the finalised safety risk portfolio. It provides immediate information for the planning of the of safety actions (e.g. under the EPAS process) and for the definition of safety assessment tasks under the Collaborative Analysis Groups (CAGs).

The final safety risk portfolio is being reviewed internally, and will be published in due course. Its contents are also being considered for the EPAS activities that will be launched in the coming year.



2.4 SPECIALISED OPERATIONS - AEROPLANES

The scope of this chapter covers Specialised Operations (SPO) involving aeroplanes of all mass categories having an EASA Member State as State of Registry or State of Operator.

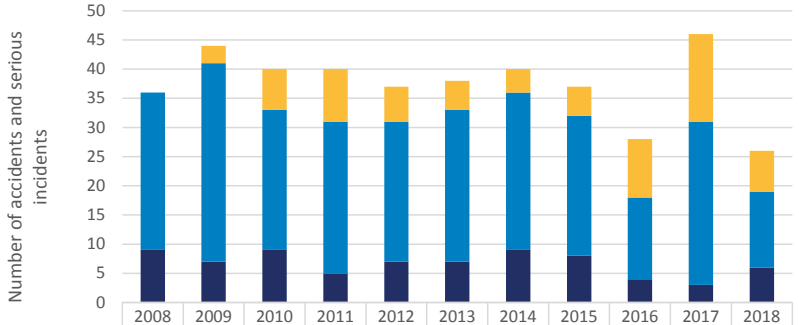
2.4.1 Key Statistics

The key statistics for this domain are in Table 8 and include a comparison of the number of accidents (fatal and non-fatal) and serious incidents for the 10-year period (2008-2017) and the last year (2018). Table also includes the comparison of fatalities and serious injuries sustained in those accidents during the same time frame.

2008 - 2017 total	TIMESPAN	2018
68	FATAL ACCIDENTS	6 ↓
254	NON-FATAL ACCIDENTS	13 ↓
64	SERIOUS INCIDENTS	7 ↑

2008 - 2017 total	TIMESPAN	2018
138	FATALITIES	7 ↓
88	SERIOUS INJURIES	4 ↓

Table 8. Key statistics for Specialised Operations-Aeroplanes



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Serious Incident	0	3	7	9	6	5	4	5	10	15	7
Non-Fatal Accident	27	34	24	26	24	26	27	24	14	28	13
Fatal Accident	9	7	9	5	7	7	9	8	4	3	6

Figure 19. Number Of Accidents And Serious Incidents Per Year 2008-2018

In comparison with other years in the preceding decade, 2018 had similar numbers of accidents and serious incidents as 2016, when in particular the number of non-fatal accidents was considerably lower than in the other years. The number of serious injuries in 2018 was the same as 2011 and 2013, no other year in the preceding decade had a lower number of serious injuries recorded.

The number of accidents and serious incidents in the standing and towing flight phases were higher in 2018 than the average of the preceding decade. In the taxiing phase, the number was in line with the average of the 10 years prior and in the other flight phases, the 2018 numbers were lower than in the preceding ten years.

In terms of the operation type, the number of accidents and serious incidents in agricultural operations was higher in 2018 than the average of the preceding decade. There was only one accident or serious incident recorded in each of the aerial advertising, aerial observation and photography categories. However, this was enough to increase the numbers for these categories compared with the respective averages of the preceding decade. Contrary to this, the single accident/serious incident recorded in the airshow/race category is considerably lower than the average of 2008-2017. The 2018 numbers for the parachute drop and (aerial) towing were lower than the 10 year period before. There were no aerial patrol or aerial survey accidents or serious incidents in 2018.

In terms of propulsion type, the number of accidents and serious incidents with reciprocating engine aircraft was lower in 2018 compared to the preceding decade.

For turboprop aircraft the number was higher in 2018 compared with the preceding ten years

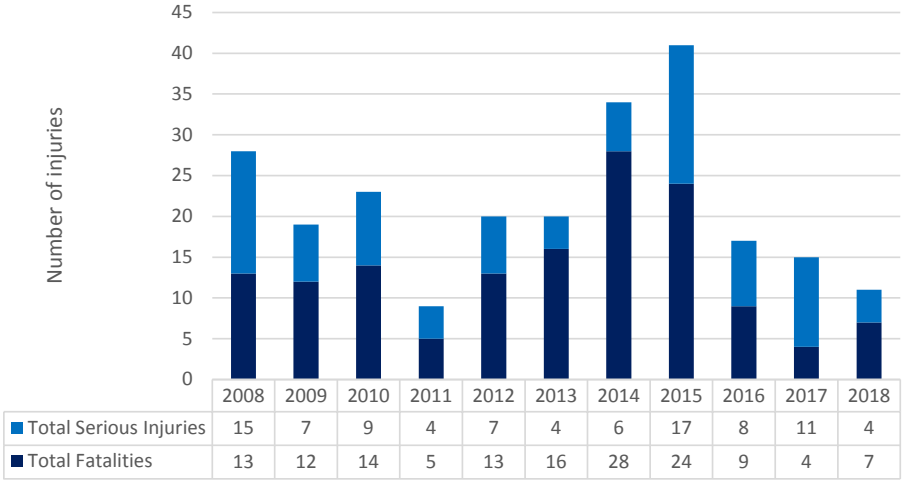


Figure 20. Number Of Fatalities And Serious Injuries, 2008-2018

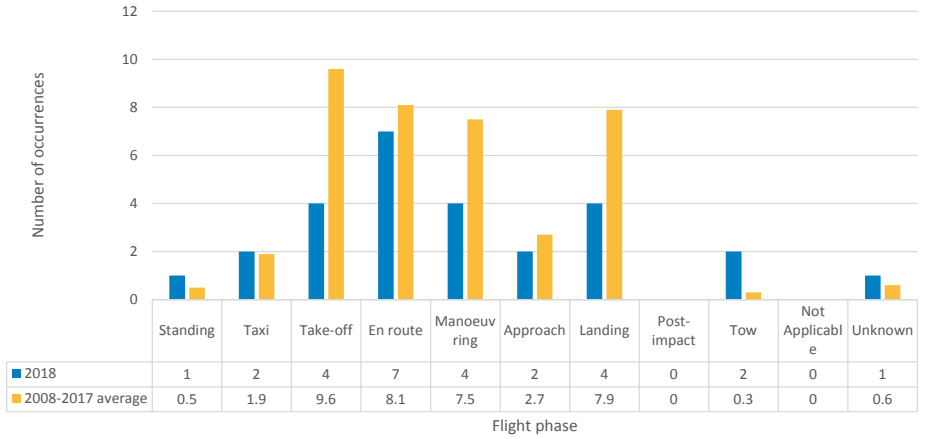


Figure 21. Number Of Accidents And Serious Incidents By Flight Phase, 2008-2018

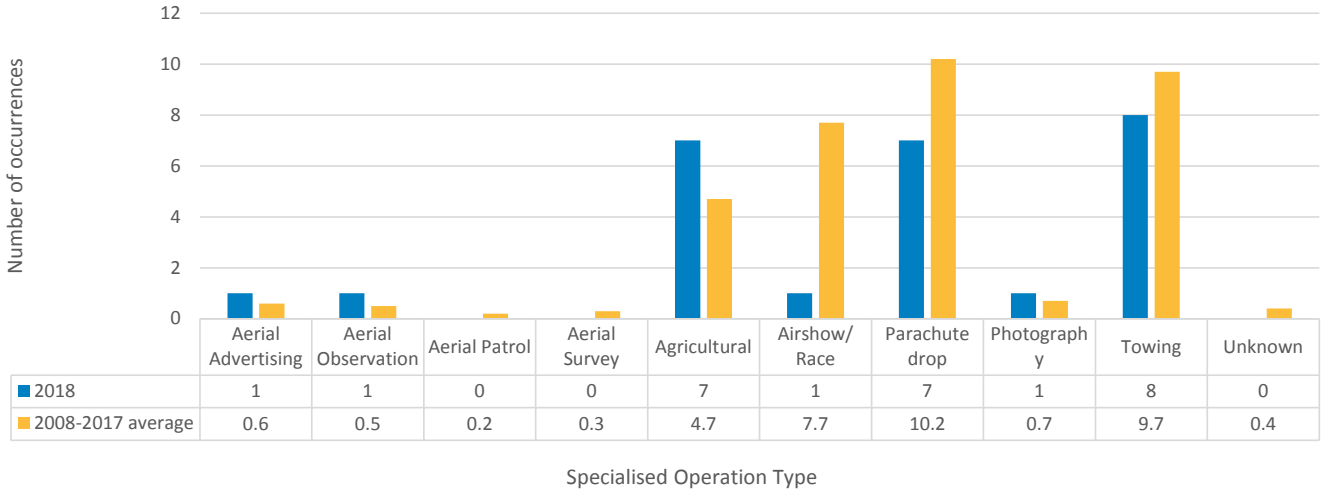


Figure 22. Number Of Accidents And Serious Incidents By Operation Type, 2008-2018

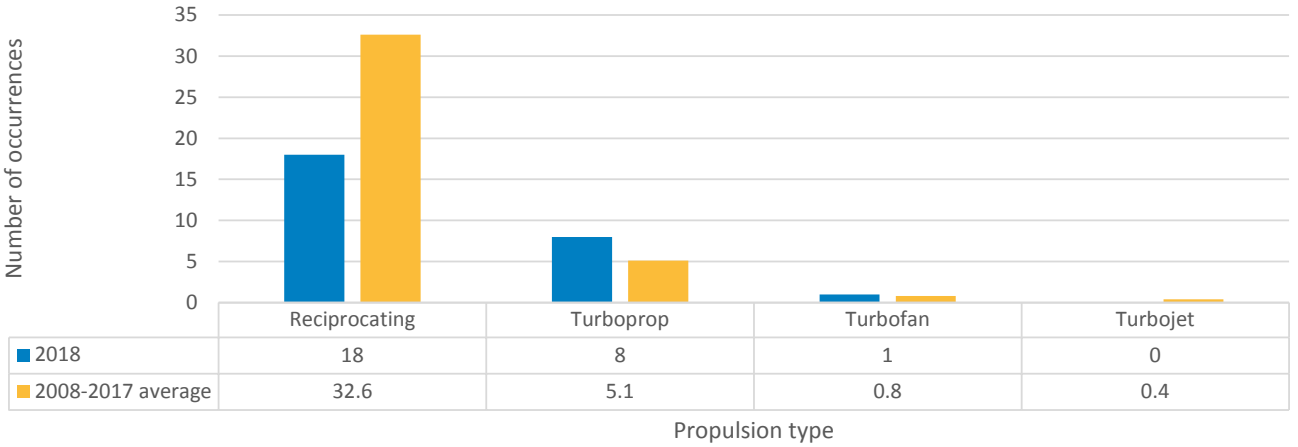


Figure 23. Number Of Accidents And Serious Incidents By Propulsion Type, 2008-2018

2.4.2 Safety Risk Portfolios

The key risk areas for Specialised Operations involving aeroplanes are shown below. It can be observed that aircraft upset is the highest risk and most common type of accident or serious incident in this domain.

There have been over 50 occurrences where runway excursion is the key risk area, however the aggregated ERCS risk score of those are lower than for example the risk scores of potential airborne collisions and terrain collisions.

The Safety Risk Portfolio for SPO Aeroplanes is based solely on occurrence data, since an SPO Aeroplanes CAG has not yet been established. The Safety Issues and Key Risk Areas are prioritised based on the cumulative ERCS risk score for accidents and serious incidents in the EASA occurrence repository for the 2014-2018 period.

The absence of an SPO aeroplane CAG means that these issues are not yet fully defined.

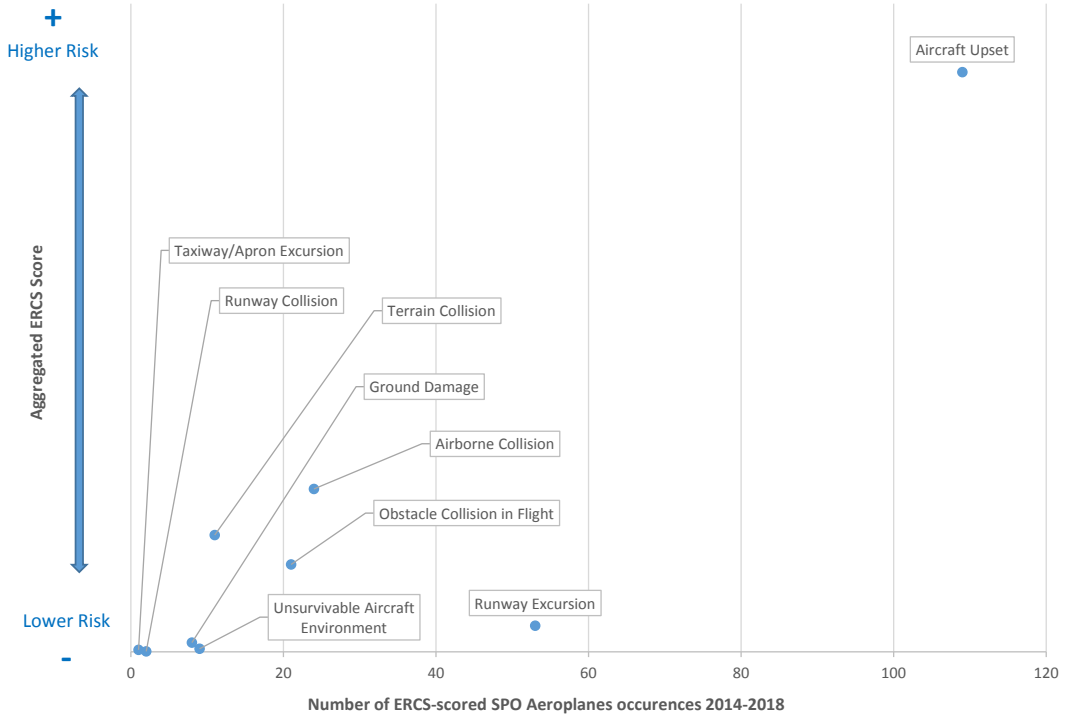


Figure 24. Comparison Of Number Of Occurrences And Aggregated ERCS Score Per Key Risk Area

SPECIALISED OPERATIONS - AEROPLANES

Bands of Aggregated ERCS Risk Score (2014-2018)

SAFETY ISSUES	Key Risk Areas: Aircraft Upset	Airborne Collision	Terrain Collision	Obstacle Collision in Flight	Runway Excursion	Ground Collision	Aircraft Environment	Taxiway Excursion	Runway Collision
System reliability	x	x	o	o	x	o	x	o	
Intentional low flying	x		o	o		o			
Perception and situational awareness	x	o	o	o	o	o			o
Experience, training and competence of Flight Crews	x	x		o	o		o		o
Airborne Separation	o	x							
Flight Planning and Preparation	x	o		o	x	o			
Aircraft Maintenance	x				o		o		
Control of Manual Flight Path	o	o							
Bird and Wildlife Strikes	o								
Decision Making and Planning	o	o	o	o	o				
Handling of Technical Failures	x		o	o	o		o		
Crosswind					o				
CRM and Operational Communications	o				o				
Knowledge of Aircraft Systems and Procedures	o				o				
Personal Pressure and Arousal				o					
Approach Path Management	No Data								
Damage Tolerance to UAS Collisions									
Development and Application of Regulations and Procedures									
Icing in Flight									
Icing on Ground									

X = Higher risk occurrences
O = Lower risk occurrences

Priority 1 Priority 2 Priority 3 Priority 4

Table 9. Specialised Operations Aeroplane Safety Risk Portfolio

2.5 NON-COMMERCIAL OPERATIONS

The scope of this chapter covers Non-Commercial Operations involving aeroplanes of mass groups below 5700 kg with an EASA Member State as the State of Registry.

2.5.1 Key Statistics

The key statistics for this domain are Table 10 and include a comparison of the number of accidents (fatal and non-fatal) and serious incidents for the 10-year period (2008-2017) and the last year (2018). The Table also includes the comparison of fatalities and serious injuries sustained in those accidents during the same time frame.
At 49, there were more fatal accidents in 2018 compared to the 10-year average but there were fewer non-fatal accidents. Both the number of fatalities and serious injuries is similar to the average for the preceding decade.

2008 - 2017 total	TIMESPAN	2018	
471	FATAL ACCIDENTS	49	↑
3611	NON-FATAL ACCIDENTS	303	↓
438	SERIOUS INCIDENTS	87	↑

2008 - 2017 total	TIMESPAN	2018	
860	FATALITIES	95	↑
488	SERIOUS INJURIES	34	↓

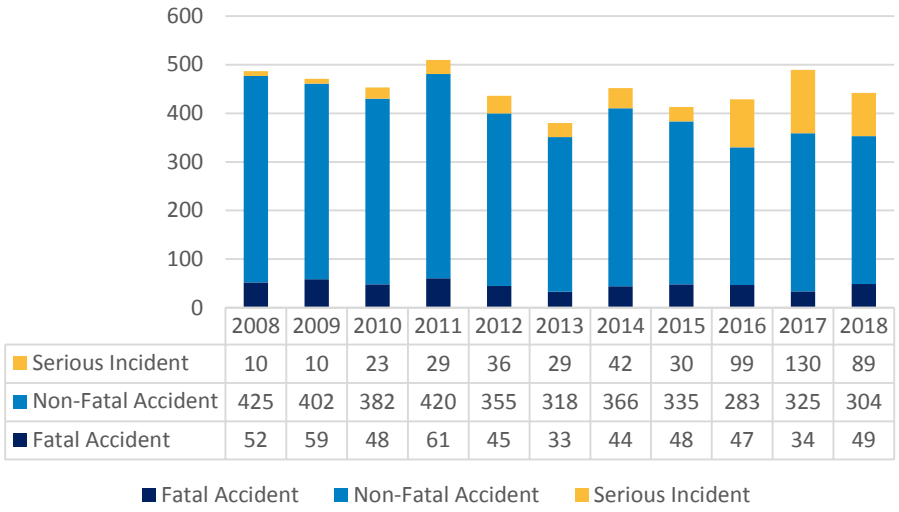
Table 10. Key Statistics For Non-Commercial Small Aeroplane Operations

The highest number of fatalities in a single accident in 2018 occurred in three accidents where four persons died in each of them. One occurred in Germany and the other two in Switzerland. It is worth noting that the number of serious incidents both in 2017 and 2018 are twice the decade average.

When considering the trend across the full time span, it can be seen that there has been very little change in the overall number of occurrences. While the number of accidents has declined slightly, this has been met with an increase in serious incidents

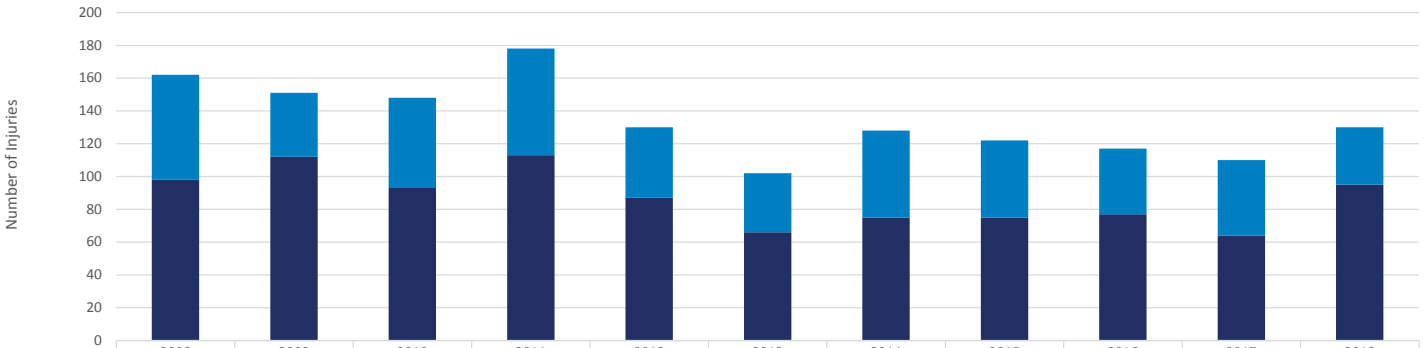
The number of fatalities in 2018 increased compared with 2017. There were 95

fatalities last year which is a 33% increase from 2017. Compared to the 10-year average the number of fatal accidents have increased by 9%. Serious injuries decreased to 34 in 2018, compared to 46 in 2017. When looking at the period from 2008-2018 (Figure 2) we can see a gradual reduction in the combined number of fatalities and serious injuries.



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Serious Incident	10	10	23	29	36	29	42	30	99	130	89
Non-Fatal Accident	425	402	382	420	355	318	366	335	283	325	304
Fatal Accident	52	59	48	61	45	33	44	48	47	34	49

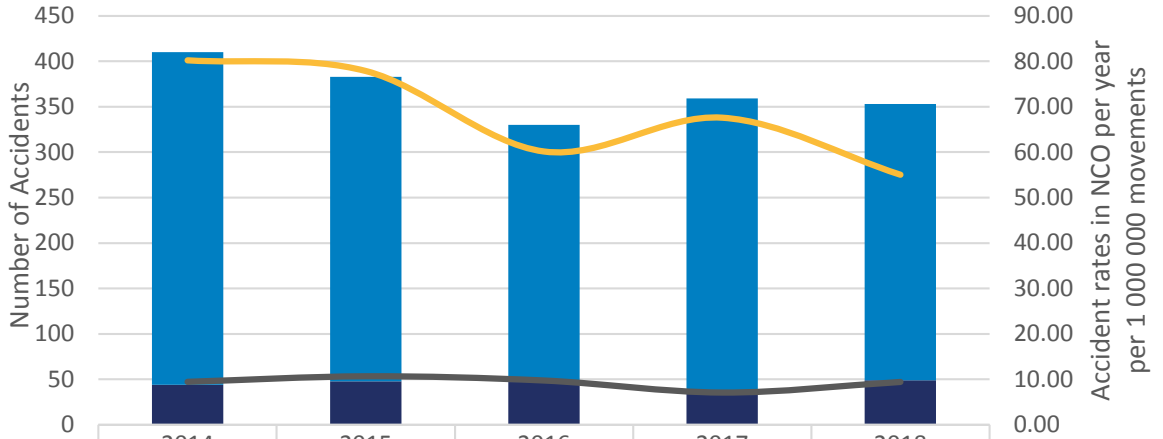
Figure 25. Number Of Accidents And Serious Incidents, 2008-2018



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total Serious Injuries	64	39	55	65	43	36	53	47	40	46	35
Total Fatalities	98	112	93	113	87	66	75	75	77	64	95

Figure 26. Number Of Fatalities And Serious Injuries, 2008-2018

2.5.1.1 Rates of accidents and serious incidents



	2014	2015	2016	2017	2018
Non-Fatal Accidents	366	335	283	325	304
Fatal Accidents	44	48	47	34	49
Non-fatal accident rate	80.20	77.85	60.14	67.58	55.03
Fatal accident rate	9.46	10.68	9.75	7.10	9.43

Figure 27. Number And Rate Of Accidents Per Year 2014-2018

Two years ago EASA published for the first time accident rates for non-commercial small aeroplanes. These rates were based on responses from 12 EASA MS to a joint EASA/AOPA survey in 2014 and estimates made for the remaining EASA MS.

This year the Agency used figures derived from a survey performed by AOPA and GAMA in early 2019. This is reflected in Figure 27. The data received from GAMA and AOPA contains an estimated number of flight hours on single engine piston aircraft. The composition of the data is significantly different from the data in the 2014 survey. In the new survey the data contains significantly more inputs from flight clubs and flight schools. That means that the utilisation of each aircraft is significantly higher than for a privately owned aircraft. New estimates have been created by combining the new data from the AOPA/GAMA survey with the percentage changes between previous years from 2014-2018.

When calculating the number of movements, one movement is considered to be one flight from engine start-up to engine shutdown, regardless of how many touch and go landings are performed.

The survey results showed that the average length of a flight on a single engine piston aircraft was 1.2 hours. That translates to 1 hour and 10 minutes per flight. Using this average of 1.2 hours per flight an estimate was made of the number of movements. The data does not specifically address inactive aircraft or those that have few hours and therefore does not fully reflect on the whole domain.

What is worth noting about Figure 27 is the fatal accident rate. It can be seen that the fatal accident rate is relatively stable over time. It dropped from 9.46 in 2014 to 7.10 fatal accidents per 1 million movements in 2017. However last year the fatal accident rate rose to 9.43 per 1 million movements – or 0.94 per 100 000 movements. The non-fatal accident rate has also decreased over the five year period by 22%. When looking at flight hours the fatal accident rate for last year drops even lower or 7.55 per 1 million flight hours. That equates to 0.75 fatal accidents per 100 000 flight hours.

The improvement of exposure data gives a much better picture of the current situation. However, it has to be kept in mind that the exposure data used is based upon a survey and then extrapolated to the fleet size. This decreases the accuracy of the calculated rates but does give a fair indication of non-commercial small aeroplane safety in Europe.

2.5.1.2 Phase of flight

In terms of flight phase for accidents in this domain, it can be seen that most accidents take place during the landing phase of the flight. These usually result in runway excursions. The take-off and en route phases show that there were fewer accidents last year compared to the 10 year average. The same is true regarding the landing phase accidents decreased by 5% compared to the 10 year average.

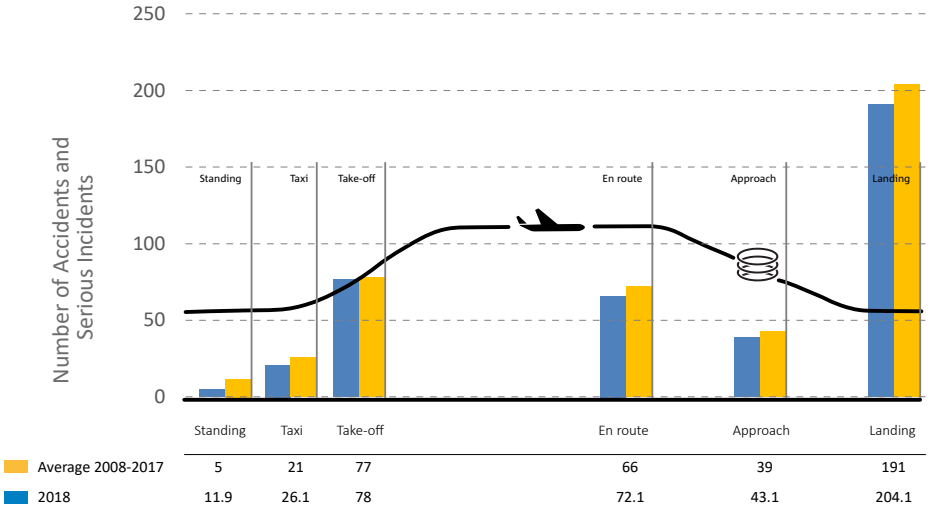


Figure 28. Number Of Accidents And Serious Incidents By Phase Of Flight, 2008-2018

2.5.1.3 Operation Type

Most of the accidents in this domain occurred during pleasure flights, followed by flight training/instructional flights. This can be considered to be normal as those operation types are the most common within the domain. There has been an approximate 30% decrease in pleasure flight accidents compared to the 10 year average. Flight training/Instructional flights remain level to the 10 year average.

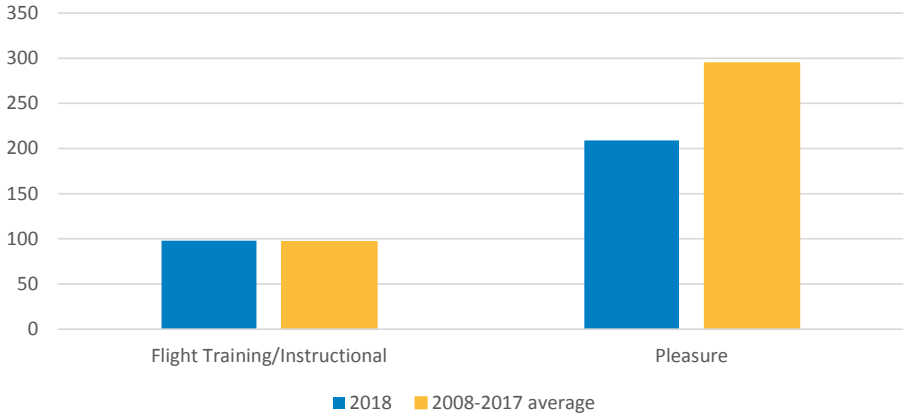


Figure 29. Number Of Accidents And Serious Incidents By Operation Type, 2008-2018

2.5.2 Safety Risk Portfolios

2.5.2.1 Categories and ERCS scores 2017-2018

EASA has now risk assessed all accidents in this domain using the European Risk Classification Scheme (ERCS). Figure 30 shows the key risk areas in relation to the number of accidents vs. the aggregated ERCS score. The figure shows clearly that the KRA showing the highest risk is aircraft upset. However, although runway excursions are common they have a low risk of fatal or serious injuries. Figure 30 therefore indicates where the efforts should lie in terms of action areas in the EPAS.

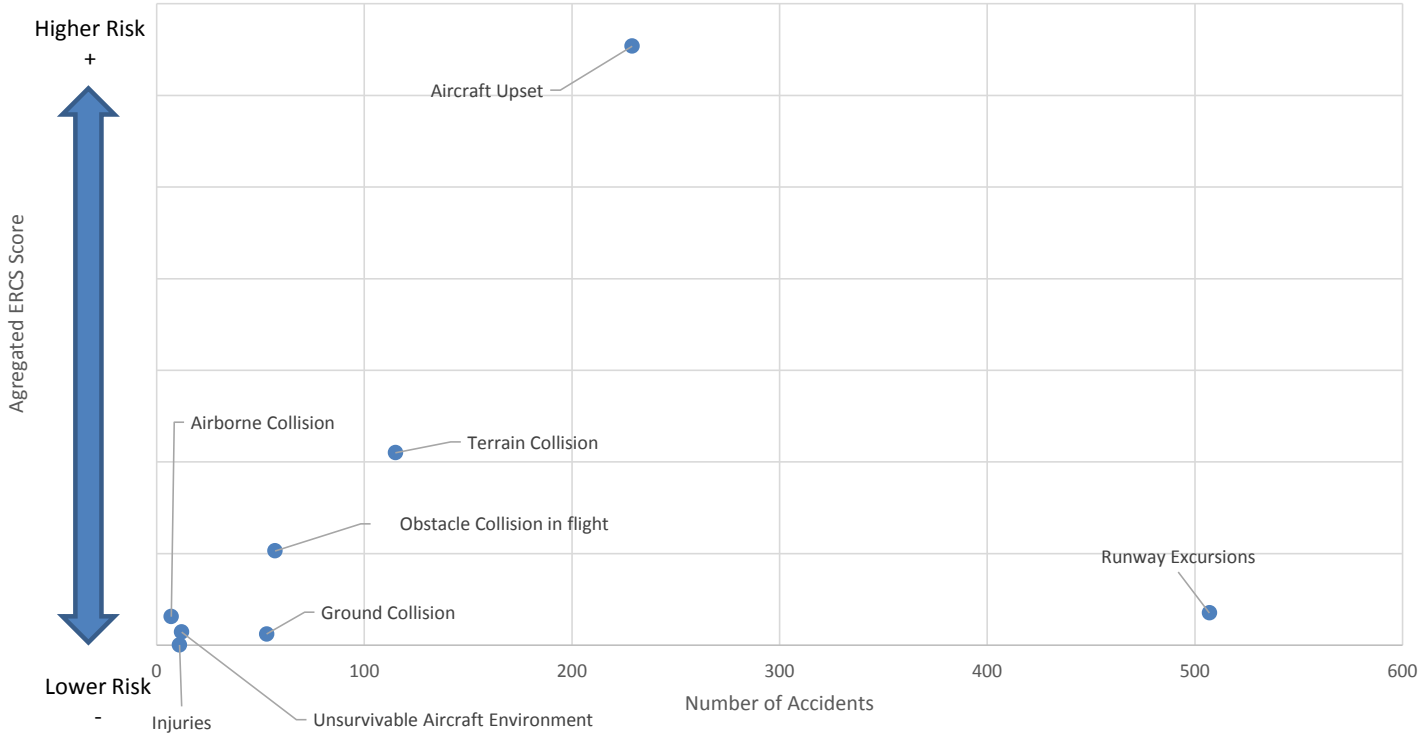


Figure 30. Comparison Of Number Of Occurrences And Aggregated ERCS Score Per Key Risk Area

2.5.2.2 Identified Safety Issues and ERCS scores

The identified safety issues for the non-commercially operated small aeroplane Safety Risk Portfolio are shown in Figure 31.

This is the second year that this portfolio has been shown in this format. Figure 31 shows that the safety issue 'stall/spin' is the most common one followed by 'loss of control – other'. That safety issue includes directional control, heading, pitch and roll are all part of this safety issue and excludes stalls and spins. This supports Figure 30 where we see aircraft upset bearing the highest risk. Strongly associated with that safety issue are the 'flight planning and preparation' and 'handling of technical failures' which highlights pilot's actions that are either precursors or resulting actions to recover the situation. The fifth issue is 'airborne conflict'. This issue shows both actual collisions as well as near-misses. Due to the nature of the issue it often bares high risk and is therefore high on the list.

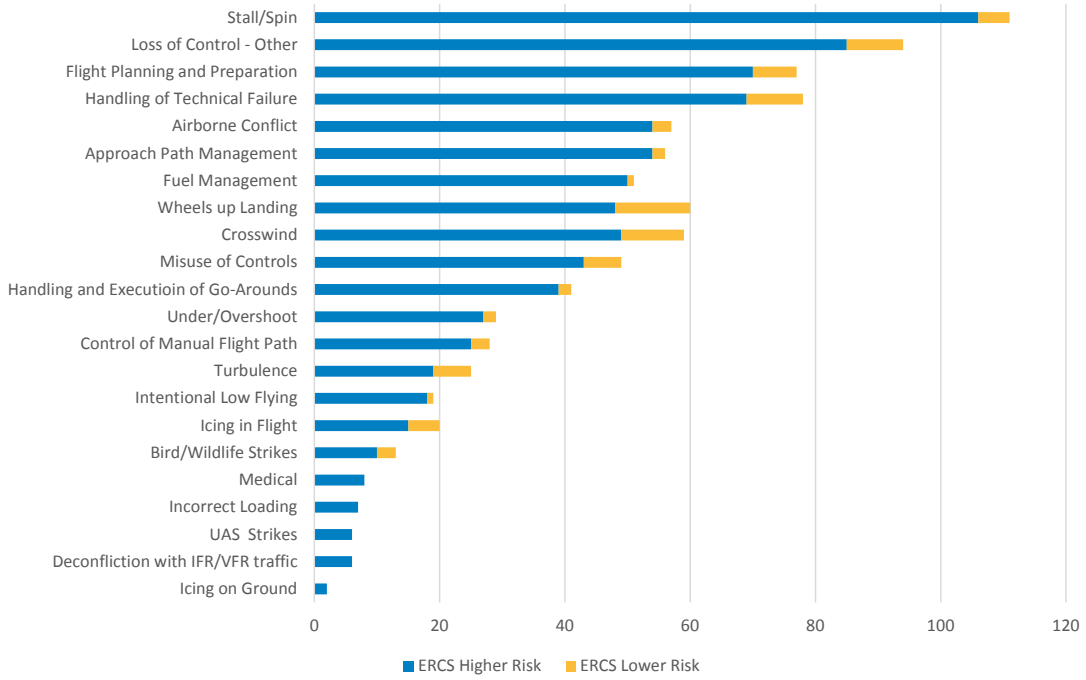


Figure 31. Number Of Ercs Higher And Lower Risk Occurrences By Safety Issue, 2015-2018

2.5.2.3 Safety Risk Portfolios

Based on the data above, the portfolio can be seen in Table 12. The portfolio combines occurrence data with some inputs from the domain Collaborative Analysis Group. However, as many of the occurrences in 2018 are still being investigated, the conclusions and safety priorities may change as the data is further analysed. The two top safety issues, stall/spin and loss of control – other divide the aircraft upset accidents into two main safety issue categories. Both Stall/Spin and Loss of control (other) focus on take-off, manoeuvring, approach and landing phases of the flight. In the stall/spin row a mark can be seen under the key risk area Airborne Collision. This is due to mid-air collision occurrences that often result in a loss of control.

The list below provides information on all fatal accidents occurring within non-commercial small aeroplane operations for the past 3 years.

NON-COMMERCIALLY OPERATED SMALL AEROPLANES

Bands of Aggregated ERCS Risk Score (2014-2018)

SAFETY ISSUES	Key Risk Areas: Aircraft Upset	Terrain Collision	Obstacle Collision in Flight	Runway Excursion	Airborne Collision	Aircraft Environment	Ground Collision	Taxiway Excursion	Runway Collision
Stall/Spin	x		x		x				
Perception and situational awareness	x	x	x	x	x	o	x	o	o
Decision making and planning	x	o	o	o	o	o			o
System reliability	x	o	x	x	o	x	o	o	o
Flight planning and preparation	x	x	x	x	x	o	o	o	o
Loss of control (other)	x		x		x		o	o	
Experience, training and competence of individuals	x	o	x	x	o	o	o	o	

X = Higher risk occurrences
O = Lower risk occurrences

PP.65-66
Table 11. Non-Commercial Small Aeroplane Safety Risk Portfolio.

Bands of Aggregated ERCS Risk Score (2014-2018)

SAFETY ISSUES	Key Risk Areas								
	Aircraft Upset	Terrain Collision	Obstacle Collision in Flight	Runway Excursion	Airborne Collision	Aircraft Environment	Ground Collision	Taxiway Excursion	Runway Collision
Handling of Technical Failures	x	o	o	x	o	o	o		
Intentional Low Flying	x	o	o		o				
Airborne Separation					x				
Approach Path Management	x	x	x	x					
CRM and Operational Communications	x	o	o	o	x				o
Bird and Wildlife Strikes	x		o	o					
Control of Manual Flight Path	x		o	x					
Fuel Management	x		o	o	o				o
Baggage and Cargo Loading	x		o	o					o
Icing in Flight	x	o	o	o		o			o
Crosswind	x		o	x					
Turbulence	x		o	x	o		o		
Knowledge of Aircraft Systems and Procedures	x		o	x		o	o		
Aircraft Maintenance	x	o	o	x	o	x	o	o	
Damage Tolerance to UAS Collisions					o				
Deconfliction with IFR/VFR traffic					x				
Icing on Ground	o		o						

CHAPTER 3
HELICOPTERS

This chapter covers all helicopter operations. The chapter is divided in four main sections:

1 **Passenger and cargo flights to and from offshore oil and gas installations,** conducted by EASA Air Operators Certificate (EASA AOC) holders and using certificated helicopters.

2 P**assenger and cargo flights**, conducted by EASA Air Operators Certificate (EASA AOC) Holders, using certified helicopters and excluding offshore oil and gas operations.

3 **Specialised operations** involving certified helicopters, such as air ambulance, advertisement, photography with an EASA MS as state of operator or state of registry.

4 **Non-commercial operations** involving certified helicopters, with an EASA MS as state of operator or state of registry..

For each section, the key statistics are presented. Each section contains an individual safety risk portfolio, providing an overview of the main risks for these types of operations at the European level.

3.1 HELICOPTER OFFSHORE COMMERCIAL AIR TRANSPORT

The scope of this section covers the key safety statistics for certified helicopters performing offshore commercial air transport operated by an EASA MS AOC holder.

The data are based on the accidents and serious incidents collected by the Agency as per Annex 13 investigations or by the active search of those events from other official sources.

3.1.1 Key Statistics

The key statistics for this domain are Table 12 and include a comparison of the number of accidents (fatal and non-fatal) and serious incidents for the 10-year period (2008-2017) and the last year (2018). The Table also includes the comparison of fatalities and serious injuries sustained in those accidents during the same time frame.

In 2018, there were 4 serious incidents and no fatal or non-fatal accidents in helicopter

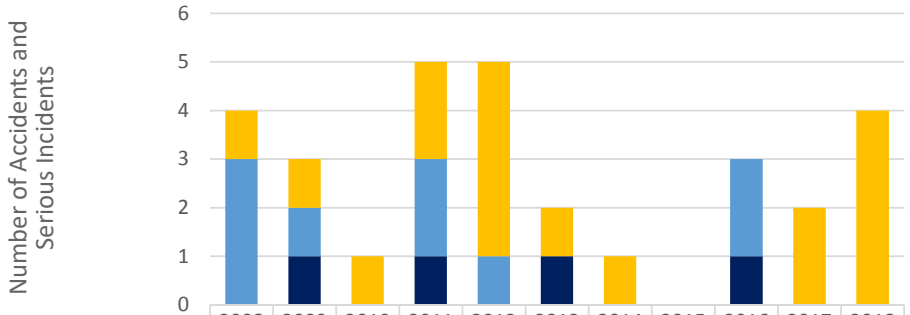
2008 - 2017 total	TIMESPAN	2018	
4	FATAL ACCIDENTS	0	↓
9	NON-FATAL ACCIDENTS	0	↓
13	SERIOUS INCIDENTS	4	↑

2008 - 2017 total	TIMESPAN	2018	
36	FATALITIES	0	↓
8	SERIOUS INJURIES	0	↓

Table 12. Key Statistics for Helicopter Offshore Commercial Air Transport

1 The term "Annex 13 investigations" refers to both the investigations carried out under the Regulation (EC) 996/2010 by the European Safety Investigation Authorities and by non-European authorities under ICAO Annex 13.

Figure 32. Number Of Accidents And Serious Incidents Per Year 2008-2018



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Serious incident	1	1	1	2	4	1	1	0	0	2	4
Non Fatal Accident	3	1	0	2	1	0	0	0	2	0	0
Fatal Accident	0	1	0	1	0	1	0	0	1	0	0

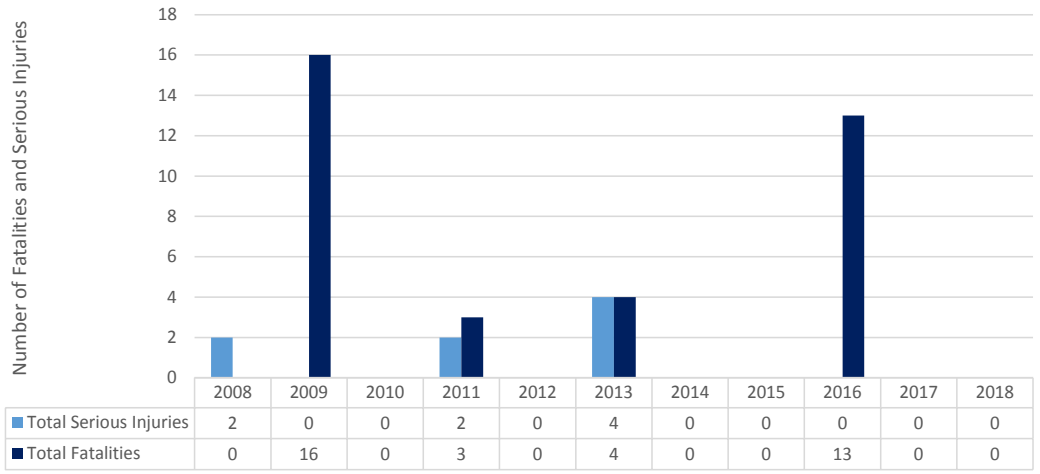
offshore commercial air transport. The number of serious incidents in 2018 was higher than the average for the 10 year period prior to 2018. The latest fatal accident in this domain of operation was the loss of an Airbus Helicopters EC225 Super Puma in Norway on 29 April 2016.

Over the period analysed, the number of occurrences has remained relatively stable.

There were no fatalities or serious injuries in helicopter offshore commercial air transport in 2018.

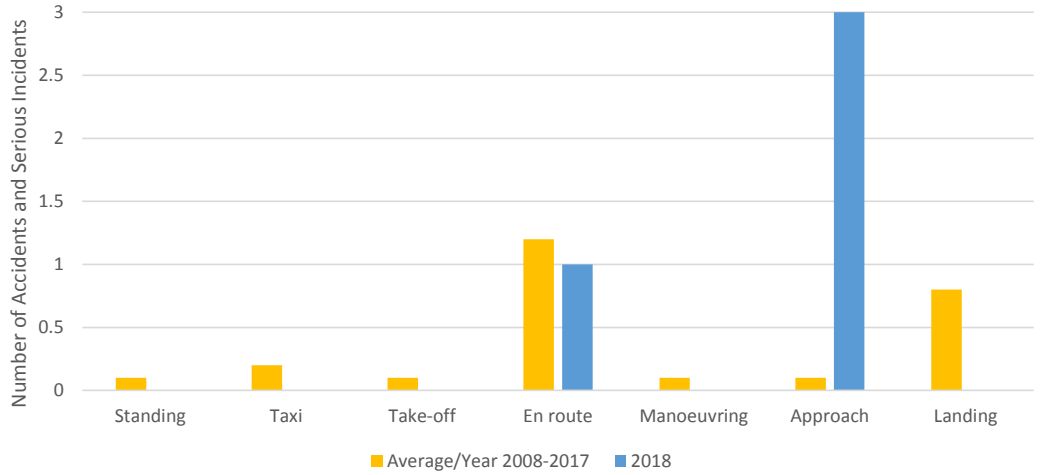
Most of the occurrences of 2018 happened during the approach flight phase. However, the low number of accidents and serious incidents in this domain prevents any conclusions from being drawn regarding the phase of flight.

Figure 33. Number Of Fatalities And Serious Injuries Per Year 2008-2018



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total Serious Injuries	2	0	0	2	0	4	0	0	0	0	0
Total Fatalities	0	16	0	3	0	4	0	0	13	0	0

Figure 34. Number Of Accidents And Serious Incidents By Phase Of Flight, 2008-2018



3.1.2 Safety Risk Portfolio

The following safety risk portfolio provides a risk picture based on key risk areas and associated safety issues identified from the data of accidents and serious incidents which happened from 2014 to 2018 (10 occurrences) in helicopter offshore commercial air transport.

It is important to note that this safety risk portfolio is only built from occurrence data. No further assessment or refinement from safety experts have been done for this aviation domain.

The main key risk areas are identified and prioritised using the European Risk Classification Scheme (ERCS) risk score methodology are Aircraft Upset, Landing Surface Excursions and Obstacle Collision in Flight. One single occurrence can be associated to more than one key risk area.

Aircraft Upset was identified as a key risk area in 1 fatal accident with 13 fatalities, 1 non-fatal accident and 2 serious incidents.

Landing Surface Excursions was identified in 1 non-fatal accident related to a hard

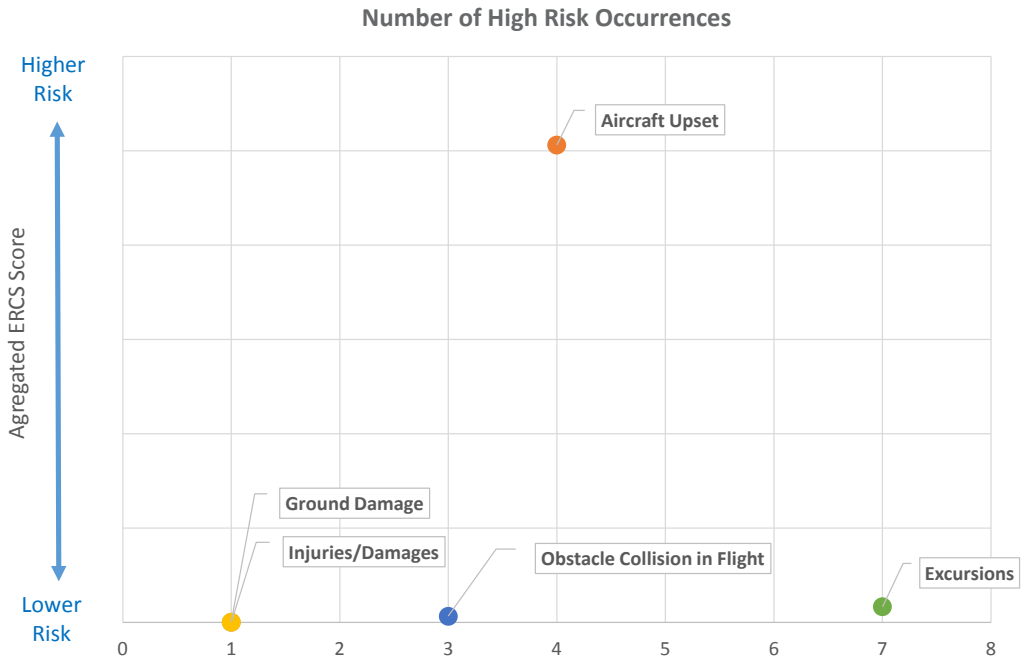


Figure 35. Comparison Of Number Of Occurrences And Aggregated ERCS Score Per Key Risk Area, 2014-2018

landing due to a lack of tail rotor in 2016 and 2 serious incidents in 2018, both related to nose landing gear extensions issues.

Obstacle Collision in Flight was identified in 3 serious incidents, all associated with landing on a wrong deck.

The safety risk portfolio links the safety issues to the key risk areas to which they contribute.

These key risk areas are listed at the top of the table and are prioritised from the left to the right based on the aggregated ERCS risk score.

The safety issues are listed on the left of the table and are also sorted from the top by decreasing aggregated ERCS risk score.

From the data supporting the portfolio, the safety issues shown in Figure 36 can be highlighted as the most frequent contributors to the 3 key risk areas having the highest ERCS aggregated score.

Only the safety issues identified in at least 3 occurrences are listed, and sorted by decreasing number of occurrences.

Aircraft Upset

- System Reliability

Landing Surface Excursions

- System Reliability

Obstacle Collision in Flight

- Crew Resource Management (CRM) and Operational Communication
- Flight Planning and Preparation
- Navigation and Airspace Knowledge
- Wrong Deck Landing

Figure 36. Number Of Accidents And Serious Incidents By Safety Issue, 2014-2018

HELICOPTERS - OFFSHORE COMMERCIAL AIR TRANSPORT

Bands of Aggregated ERCS Risk Score (2014-2018)

SAFETY ISSUES	Key Risk Areas								
	Aircraft Upset	Excursions	Obstacle Collision in Flight	Injuries/ Damage	Ground Collision	Terrain Collision	Airborne Collision	Runway Collision	Aircraft Environment
System reliability	x	x		o					
Software and configuration	o	o	o						
CRM and operational communication	o		x						
Flight planning and preparation			x						
Navigation and airspace knowledge			x						
Wrong deck landing			x						
Development and application of regulations and procedures			o	o	o				
Flight path management	o	o							
Handling of technical failures	o	o							
Aircraft maintenance	o	o							

X = Higher risk occurrences
O = Lower risk occurrences

Priority 1 Priority 2 Priority 3 Priority 4

PP. 74-75
Table 13. Offshore- CAT Helicopter Safety Risk Portfolio

Bands of Aggregated ERCS Risk Score (2014-2018)

SAFETY ISSUES	Key Risk Areas								
	Aircraft Upset	Excursions	Obstacle Collision in Flight	Injuries/ Damage	Ground Collision	Terrain Collision	Airborne Collision	Runway Collision	Aircraft Environment
Helideck operations			o						
Perception and situational awareness	o		o	o					
Decision making and planning			o						
Human Performance	o		o	o					
Personal pressure and arousal			o						
Experience, training and competence of individuals	o								
Airworthiness management	o								
Helicopter obstacle see and avoid	No Data								
Degraded visual environment									
Adverse weather									
Knowledge of aircraft systems and procedures									
Intentional low flying									
Icing in flight									
Effectiveness of safety management									
Bird/Wildlife strikes									
Use of operationally ready safety systems for helicopters									
Emergency/Crash locator devices									
Safety culture									
Airborne separation									
Damage tolerance to UAS collisions									
Downwash									

3.2 HELICOPTER COMMERCIAL OPERATIONS – OTHER THAN OFFSHORE

This section covers the main safety statistics for certified helicopters performing commercial air transport other than offshore such as Helicopter Emergency Medical Services (HEMS), Air Taxi or Sightseeing, operated by an EASA MS AOC holder.
The data are based on the accidents and serious incidents collected by the Agency as per Annex 13 investigations or by the active search of those events from other official sources.

3.2.1 Key Statistics

The key statistics for this domain are in Table 14 and include comparison of the number of accidents (fatal and non-fatal) and serious incidents for the 10-year period (2008-2017) and the last year (2018). It also includes the comparison of fatalities and serious injuries that happened in those accidents during the same timeframe.

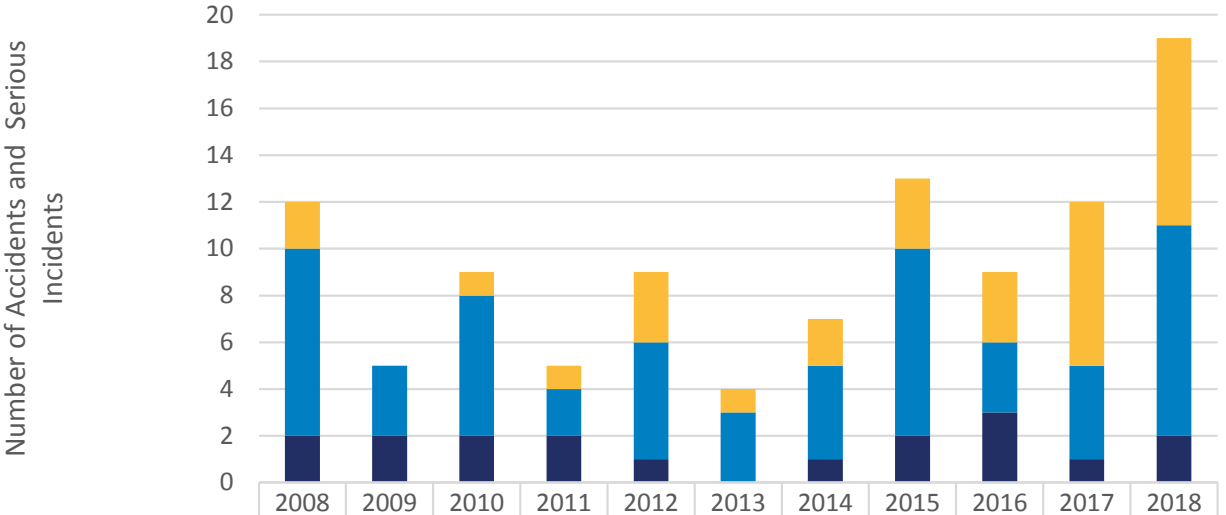
The number of reported occurrences in 2018 has increased compared to 2017, and

2008 - 2017 total	TIMESPAN	2018	
16	FATAL ACCIDENTS	2	↑
46	NON-FATAL ACCIDENTS	9	↑
23	SERIOUS INCIDENTS	8	↑

2008 - 2017 total	TIMESPAN	2018	
52	FATALITIES	8	↑
43	SERIOUS INJURIES	0	↓

Table 14. Key Statistics for Helicopter Commercial Operations – Other than Offshore

is the highest since 2008.
There were two fatal accidents in 2018, which is slightly higher than the average of the previous decade. The first fatal accident was an airborne collision in Germany between an Airbus Helicopter EC135 operating HEMS and a Piper PAW139 performing a training flight, with 4 fatalities. The second fatal accident occurred in Portugal when an Agusta A109 conducting HEMS operations collided with a radio antenna before crashing on the ground resulting in 4 fatalities.
The number of non-fatal accidents in 2018 was almost twice the average of the previous decade. For serious incidents, the numbers in 2018 were also considerably higher than the 10-year average.

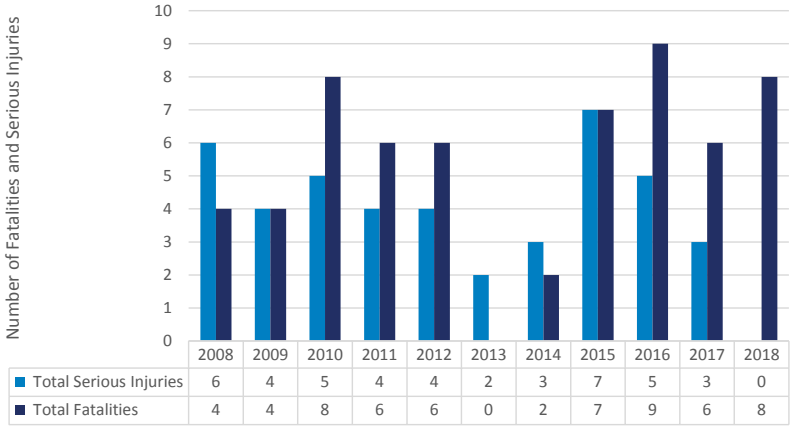


	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Serious Incident	2	0	1	1	3	1	2	3	3	7	8
Non Fatal Accident	8	3	6	2	5	3	4	8	3	4	9
Fatal Accident	2	2	2	2	1	0	1	2	3	1	2

Figure 37. Number Of Accidents And Serious Incidents Per Year 2008-2018

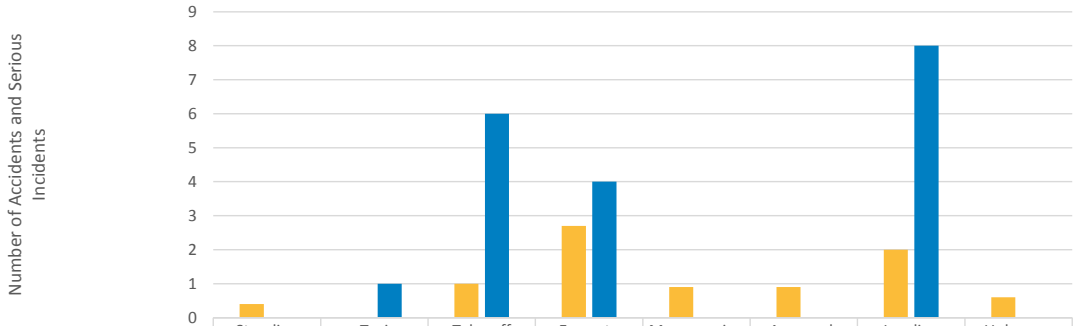
With a total of 8 fatalities, 2018 is part of the 3 most fatal years since 2008, with the other two years being 2010 and 2016. The number of serious injuries is however the lowest recorded over the same time period. Most of the accidents and serious incidents in 2018 happened during take-off and landing phases of flight, and in comparison with the 10 year (2008-2017) average, the numbers are considerably higher.

Similar to the 10 year (2008-2017) average, the highest number of accidents and serious incidents in 2018 have been in HEMS operations, followed by air taxi and sightseeing operations. However, the numbers are significantly higher than the 10 year average in 2018 for HEMS operations. The 19 occurrences reported in 2018 all involved helicopters powered with turboshaft engines, which is a significant increase compared to the 10 year average for this propulsion type.



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total Serious Injuries	6	4	5	4	4	2	3	7	5	3	0
Total Fatalities	4	4	8	6	6	0	2	7	9	6	8

ABOVE
Figure 38. Number Of Fatalities And Serious Injuries Per Year 2008-2018



	Standing	Taxi	Take-off	En route	Manoeuvring	Approach	Landing	Unknown
Average/Year 2008-2017	0.4	0	1	2.7	0.9	0.9	2	0.6
2018	0	1	6	4	0	0	8	0

BELOW
Figure 39. Number Of Accidents And Serious Incidents By Flight Phase, 2008-2018

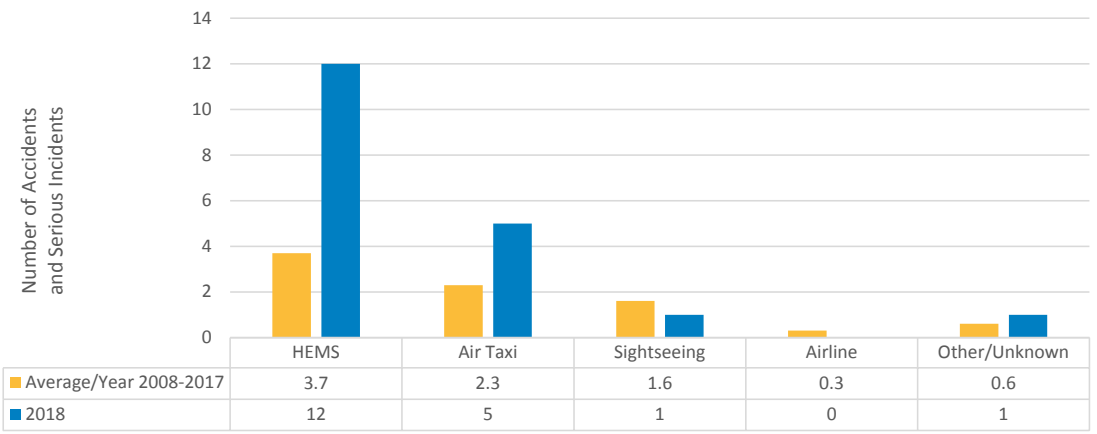


Figure 40. Number Of Accidents And Serious Incidents By Operation Type, 2008-2018

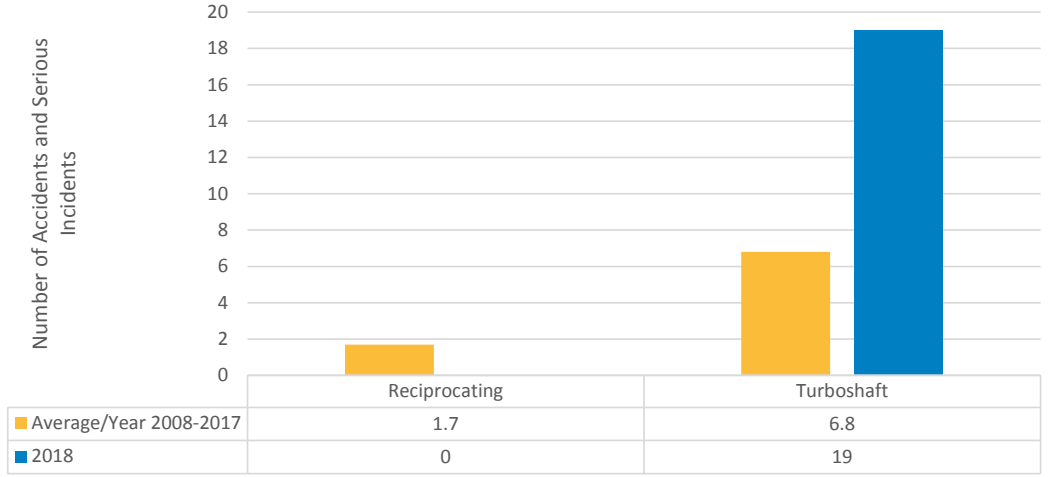


Figure 41. Number Of Accidents And Serious Incidents By Propulsion Type, 2008-2018

3.2.2 Safety Risk Portfolio

The following safety risk portfolio provides a risk picture based on key risk areas and associated safety issues identified from the data of accidents and serious incidents which happened from 2014 to 2018 (60 occurrences) in helicopter commercial air transport other than offshore.

It is important to note that this safety risk portfolio is only built from occurrence data. No further assessment or refinement from safety experts have been done for this aviation domain.

The main key risk areas identified and prioritised using the ERCS risk score methodology are Terrain Collision, Aircraft Upset, and Obstacle Collision in Flight. One single occurrence can be associated to more than one key risk area.

Terrain Collision was identified as a key risk area in 6 fatal accidents with 22 fatalities.

Aircraft Upset was identified in 3 fatal accidents with 13 fatalities.

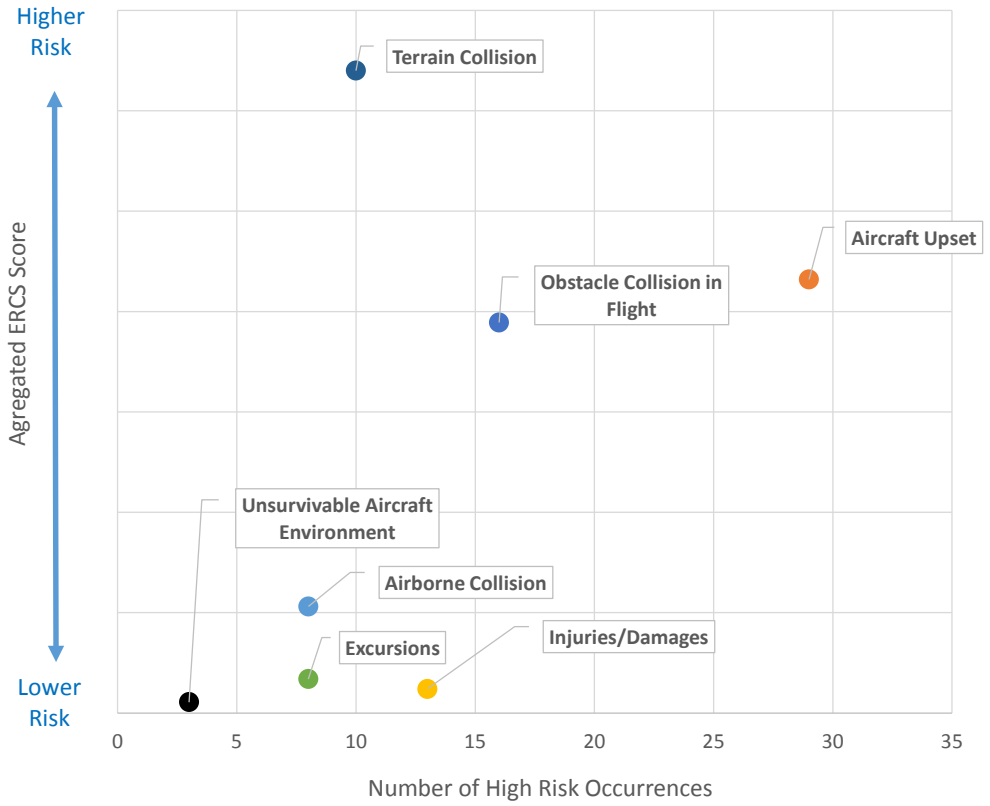


Figure 42. Comparison Of Number Of Occurrences And Aggregated ERCS Score Per Key Risk Area, 2014-2018

Obstacle Collision in Flight was identified in 3 fatal accidents with 10 fatalities.

The safety risk portfolio links the safety issues to the key risk areas to which they contribute.

The key risk areas are listed at the top of the table and are prioritised from the left to the right based on the aggregated ERCS risk score.

The safety issues are listed on the left of the table and are also sorted from the top by decreasing aggregated ERCS risk score.

The link between a safety issue and a key risk area is represented by a cross if both were identified in at least 5 occurrences, or by a dot if this combination was identified in less than 5 occurrences.

From the data supporting the portfolio, the following safety issues can be highlighted as the most frequent contributors to the 3 key risk areas having the highest ERCS aggregated score.

Figure 43. Number Of Accidents And Serious Incidents By Safety Issue, 2014-2018

HELICOPTERS - COMMERCIAL OPERATIONS - OTHER THAN OFFSHORE

Bands of Aggregated ERCS Risk Score (2014-2018)

SAFETY ISSUES	Key Risk Areas								
	Terrain Collision	Aircraft Upset	Obstacle Collision in Flight	Airborne Collision	Excursions	Injuries/ Damage	Aircraft Environment	Ground Collision	Runway Collision
Perception and situational awareness	x	x	x		o	x			
Helicopter obstacle see and avoid	x	x	x			o			
Degraded visual environment	x	o	o						
Decision making and planning	o	o	o						
Software and configuration	o	o	o						
Flight path management	o	x	x		o	o	o		
Intentional low flying	o	o	o			o			
Experience, training and competence of individuals	o	x	o	o	o	o	o		
CRM and operational communication	o	o		o	o				
Personal pressure and arousal	o	o							

X = Higher risk occurrences
O = Lower risk occurrences

Priority 1 Priority 2 Priority 3 Priority 4

PP. 82-83
Table 15. CAT Helicopter Other Than Offshore Safety Risk Portfolio

Bands of Aggregated ERCS Risk Score (2014-2018)

SAFETY ISSUES	Key Risk Areas								
	Terrain Collision	Aircraft Upset	Obstacle Collision in Flight	Airborne Collision	Excursions	Injuries/ Damage	Aircraft Environment	Ground Collision	Runway Collision
Landing site operations		x	x		o	o			
Navigation and airspace knowledge	o	o							
Development and application of regulations and procedures		o	o		o		o		
Flight planning and preparation	o	o	o				o		
Airborne separation				x					
Adverse weather	o		o						
System reliability		x	o	o	x	o			
Handling of technical failures					o	o			
Use of operationally ready safety systems for helicopters		o							
Airworthiness management		o				o			
Aircraft maintenance		o	o				o		
Knowledge of aircraft systems and procedures		o				o			
Bird/Wildlife strikes		o				o			
Emergency/Crash locator devices		o				o			
Downwash						o			
Icing in Flight	No Data								
Effectiveness of Safety Management									
Safety Culture									
Damage Tolerance to UAS Collisions									

Only the safety issues identified in at least 5 occurrences are listed, and sorted by decreasing number of occurrences. If more than 5 safety issues match this criteria, only the top 5 safety issues are listed.

Terrain Collision

- Perception and Situational Awareness
- Helicopter Obstacle See and Avoid
- Degraded Visual Environment

Aircraft Upset

- Perception and Situational Awareness
- Flight Path Management
- System Reliability
- Helicopter Obstacle See and Avoid
- Experience, Training and Competence of Individuals

Obstacle Collision in Flight

- Helicopter Obstacle see and Avoid
- Perception and Situational Awareness
- Flight Path Management
- Landing Site Operations

3.3 HELICOPTER SPECIALISED OPERATIONS

This section covers the main safety statistics for certified helicopters performing specialised operations with an EASA MS as state of operator or state of registry.
The data are based on the accidents and serious incidents collected by the Agency as per Annex 13 investigations or by the active search of those events from other official sources.

2008 - 2017 total	TIMESPAN	2018
38	FATAL ACCIDENTS	2 ↓
143	NON-FATAL ACCIDENTS	10 ↓
18	SERIOUS INCIDENTS	6 ↑

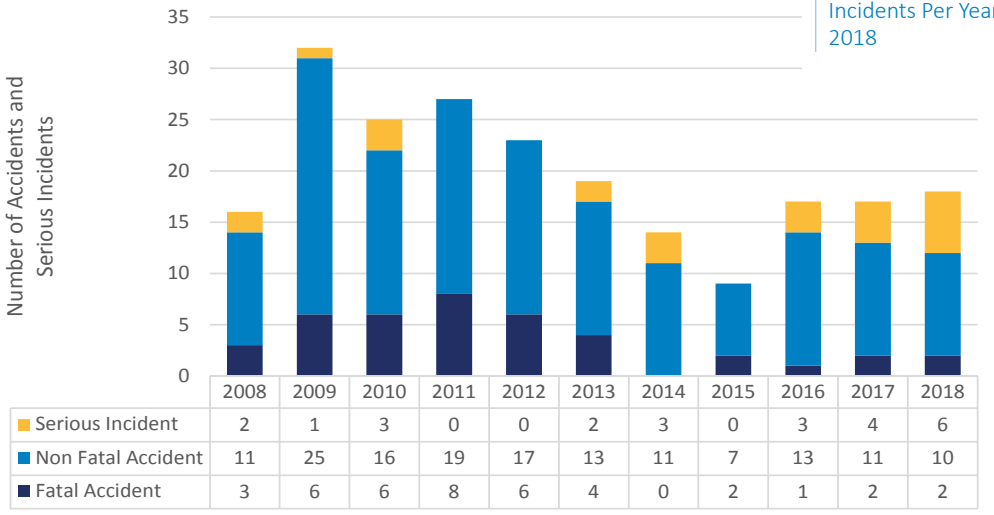
2008 - 2017 total	TIMESPAN	2018
71	FATALITIES	2 ↓
65	SERIOUS INJURIES	1 ↓

Table 16. Key Statistics for Helicopter Specialised Operations

3.3.1 Key Statistics

The key statistics for this domain are in Table 16 and include a comparison of the number of accidents (fatal and non-fatal) and serious incidents for the 10-year period (2008-2017) and the last year (2018). It also includes the comparison of fatalities and serious injuries sustained in those accidents during the same timeframe

The total number of reported occurrences has been stable for the 3 last years. While the number of fatal accidents and non-fatal accidents in 2018 was slightly lower than

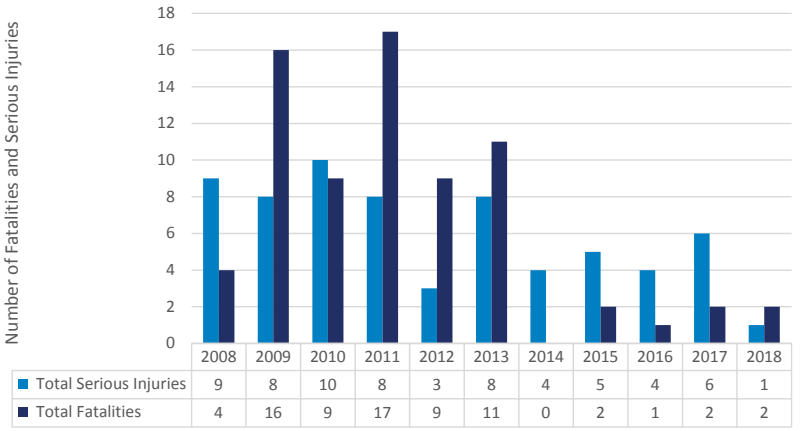


	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Serious Incident	2	1	3	0	0	2	3	0	3	4	6
Non Fatal Accident	11	25	16	19	17	13	11	7	13	11	10
Fatal Accident	3	6	6	8	6	4	0	2	1	2	2

Figure 44. Number Of Accidents And Serious Incidents Per Year 2008-2018

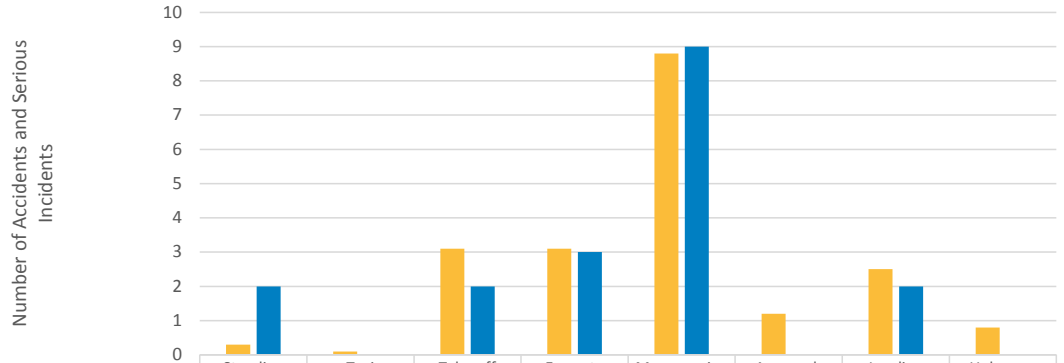
the average of the preceding decade, the number of serious incidents was higher than this average. There were two fatal accidents in 2018, both involving an Airbus Helicopter AS350 performing sling load operations. The number of fatalities has been stable since 2015 after a significant decrease from 2011 to 2014. Overall, the number of fatal or serious injuries has decreased across the period analysed.
Half of the accidents and serious incidents in 2018 happened during manoeuvring flight phases. The overall split of occurrences by phase of flight in 2018 was similar to the average of the ten previous years.
The highest number of accidents and serious incidents in 2018 occurred during construction/sling load operations, followed by agricultural work. The overall picture by type of specialised operations in 2018 is very close to the one of the previous decade.

More than two thirds of the total number of accidents and serious incidents involved a helicopter powered by a turboshaft engine in 2018, which is very similar to the figures of the previous decade.



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total Serious Injuries	9	8	10	8	3	8	4	5	4	6	1
Total Fatalities	4	16	9	17	9	11	0	2	1	2	2

TOP
Figure 45. Number Of Fatalities And Serious Injuries Per Year 2008-2018



	Standing	Taxi	Take-off	En route	Manoeuvring	Approach	Landing	Unknown
Average/Year 2008-2017	0.3	0.1	3.1	3.1	8.8	1.2	2.5	0.8
2018	2	0	2	3	9	0	2	0

BELOW
Figure 46. Number Of Accidents And Serious Incidents By Flight Phase, 2008-2018

Figure 47. Number Of Accidents And Serious Incidents By Operation Type, 2008-2018

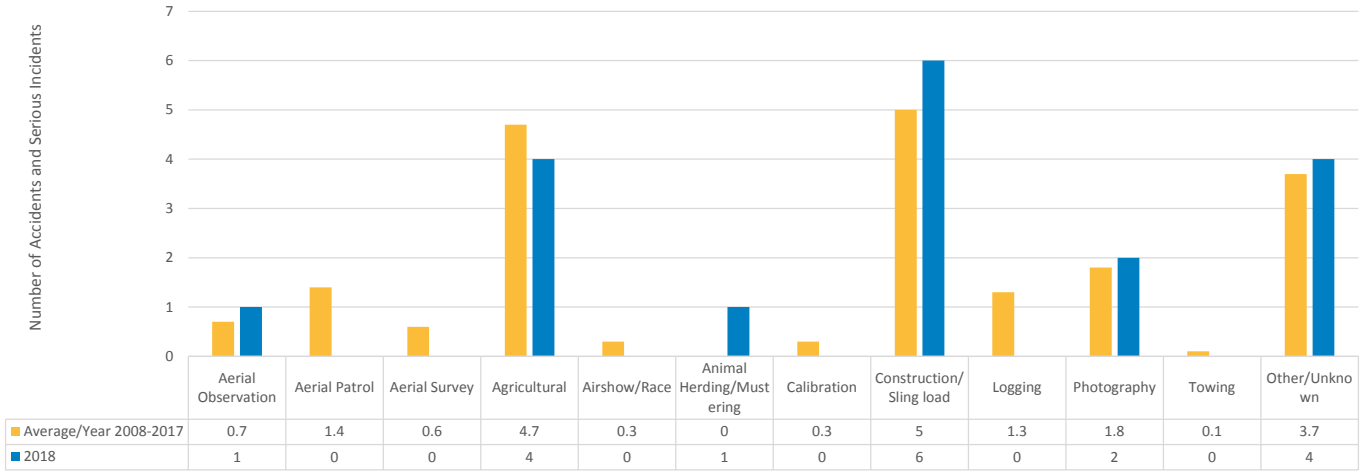
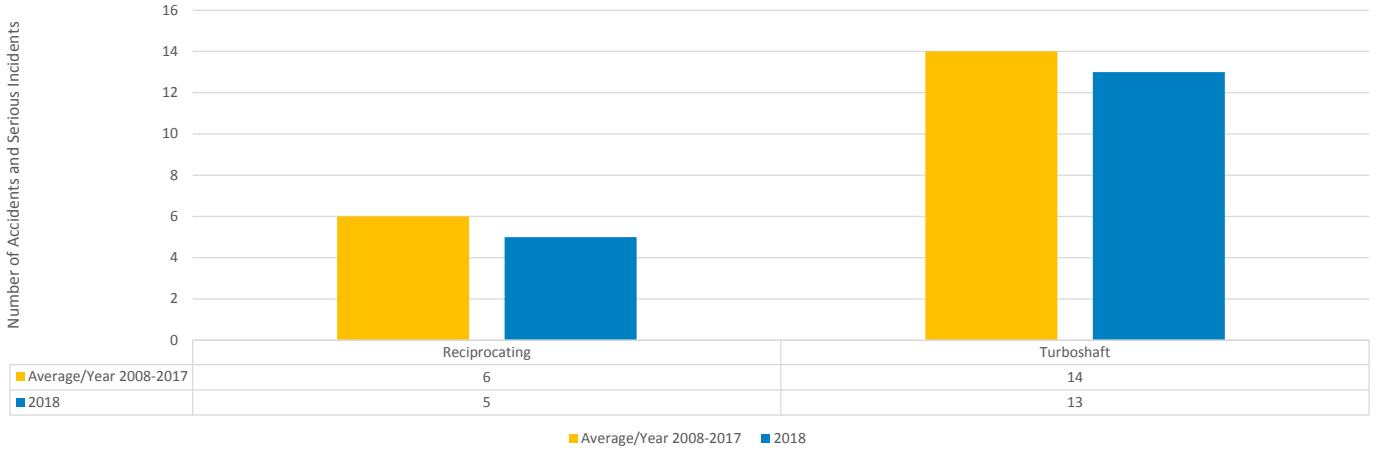


Figure 48. Number Of Accidents And Serious Incidents By Propulsion Type, 2008-2018



3.3.2 Safety Risk Portfolio

The safety risk portfolio provides a risk picture based on key risk areas and associated safety issues identified from the data of accidents and serious incidents which happened from 2014 to 2018 (75 occurrences) in helicopter specialised operations.

It is important to note that this safety risk portfolio is only built from occurrence data. No further assessment or refinement from safety experts have been done for this aviation domain.

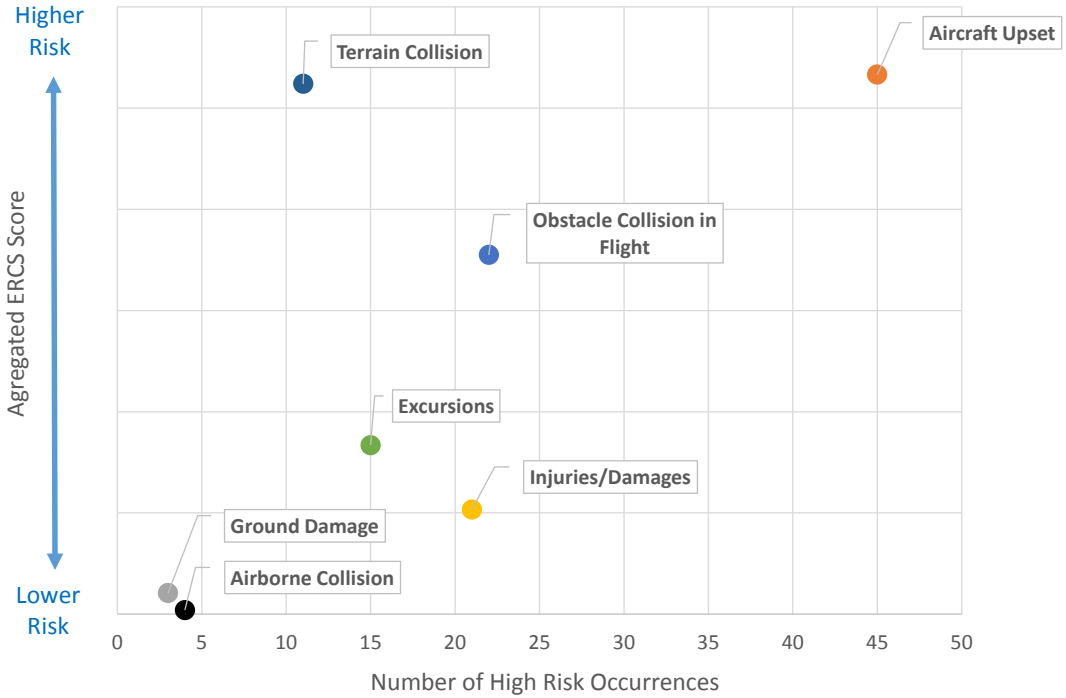


Figure 49. Comparison Of Number Of Occurrences And Aggregated ERCS Score Per Key Risk Area, 2014-2018

The main key risk areas identified and prioritised using the ERCS risk score methodology are Aircraft Upset, Terrain Collision and Obstacle Collision in Flight. One single occurrence can be connected to more than one key risk area.

The safety risk portfolio links the safety issues to the key risk areas to which they contribute.

The key risk areas are listed at the top of the table and are prioritised from the left to the right based on the aggregated ERCS risk score.

The safety issues are listed on the left of the table and are also sorted from the top by decreasing aggregated ERCS risk score.

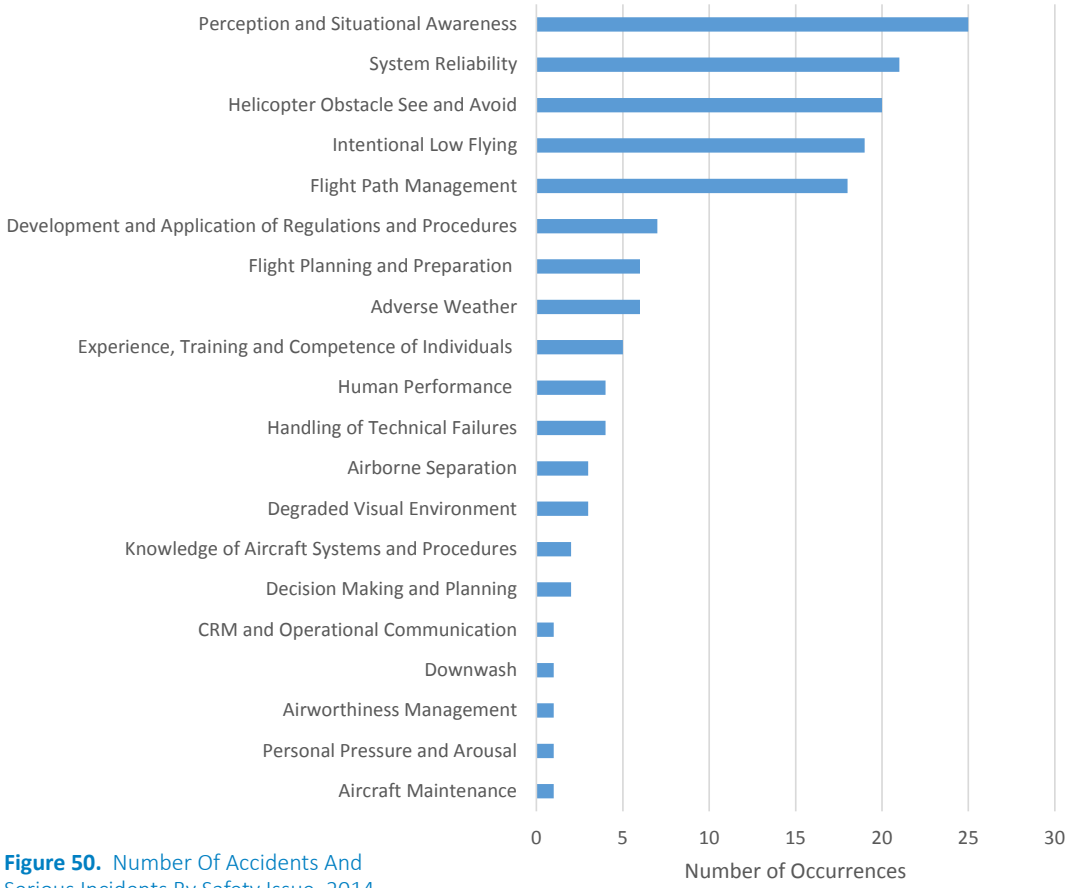


Figure 50. Number Of Accidents And Serious Incidents By Safety Issue, 2014-2018

From the data supporting the portfolio, the following safety issues can be highlighted as the most frequent contributors to the 3 key risk areas having the highest ERCS aggregated score. Only the safety issues identified in at least 5 occurrences are listed, and sorted by decreasing number of occurrences. If more than 5 safety issues match this criteria, only the top 5 safety issues are listed.

Aircraft Upset

- System Reliability
- Intentional Low Flying
- Perception and Situational Awareness
- Flight Path Management
- Helicopter Obstacle See and Avoid

Terrain Collision

- Perception and Situational Awareness
- Intentional Low Flying

Obstacle Collision in Flight

- Perception and Situational Awareness
- Helicopter Obstacle See and Avoid
- Flight Path Management
- Intentional Low Flying

HELICOPTERS - SPECIALISED OPERATIONS

Bands of Aggregated ERCS Risk Score (2014-2018)

SAFETY ISSUES	Key Risk Areas: Aircraft Upset	Terrain Collision	Obstacle Collision in Flight	Excursions	Injuries/ Damage	Ground Collision	Airborne Collision	Runway Collision	Aircraft Environment
Perception and Situational Awareness	x	x	x	o	x		o		
Helicopter Obstacle See and Avoid	x	o	x	o	o				
Flight Path Management	x	o	x	o	x		o		
Intentional Low Flying	x	x	x	o	x		o		
System Reliability	x	o	o	x	x				
Development and Application of Regulations and Procedures	x	o	o	o	o	o	o		
Adverse Weather	o	o			o		o		
Experience, Training and Competence of Individuals	x	o		o	o		o		
Handling of Technical Failures	x			o	o				
Degraded Visual Environment		o			o				
Decision Making and Planning	o	o			o				

X = Higher risk occurrences
O = Lower risk occurrences

Priority 1 Priority 2 Priority 3 Priority 4

PP. 91-92
Table 17. Helicopter Specialised Operations Safety Risk Portfolio

Bands of Aggregated ERCS Risk Score (2014-2018)

SAFETY ISSUES	Key Risk Areas								
	Aircraft Upset	Terrain Collision	Obstacle Collision in Flight	Excursions	Injuries/ Damage	Ground Collision	Airborne Collision	Runway Collision	Aircraft Environment
Aircraft Maintenance	o								
Flight Planning and Preparation	o	o	o	o	o	o	o		
Knowledge of Aircraft Systems and Procedures	o	o		o					
Personal Pressure and Arousal			o		o				
Airworthiness Management	o			o					
Downwash					o				
Airborne Separation					o		o		
CRM and Operational Communication	o		o	o					
Navigation and Airspace Knowledge	No Data								
Landing Site Operations									
Icing in Flight									
Effectiveness of Safety Management									
Software and Configuration									
Bird/Wildlife Strikes									
Use of Operationally Ready Safety Systems for Helicopters									
Emergency/Crash Locator Devices									
Safety Culture									
Damage Tolerance to UAS Collisions									

3.4 HELICOPTER NON COMMERCIAL OPERATIONS

This section covers the main safety statistics for certified helicopters performing non-commercial operations with an EASA MS as state of operator or state of registry.
Data is based on the accidents and serious incidents collected by the Agency as per Annex 13 investigations or by the active search of those events from other official sources.

2008 - 2017 total	TIMESPAN	2018
55	FATAL ACCIDENTS	6 ↑
377	NON-FATAL ACCIDENTS	24 ↓
38	SERIOUS INCIDENTS	3 ↓

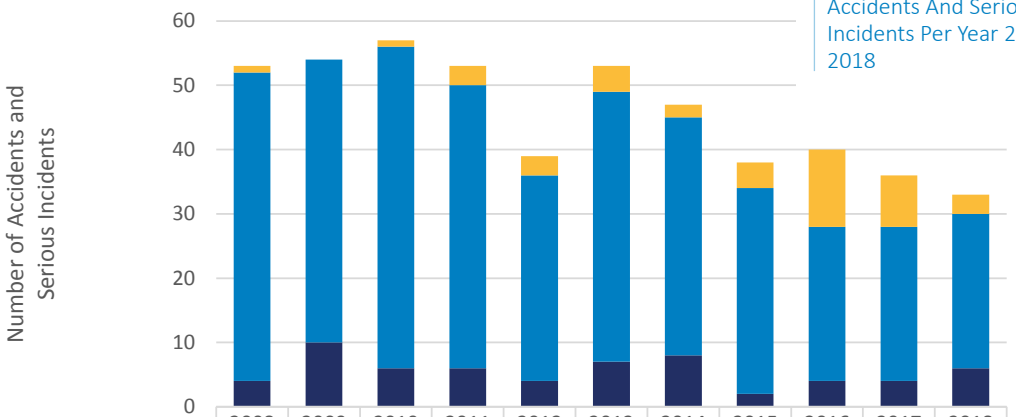
2008 - 2017 total	TIMESPAN	2018
118	FATALITIES	15 ↓
59	SERIOUS INJURIES	5 ↓

Table 18. Key Statistics for Helicopter Non-Commercial Operations

3.4.1 Key Statistics

The key statistics for this domain are in Table 18 and include a comparison of the number of accidents (fatal and non-fatal) and serious incidents for the 10-year period (2008-2017) and the last year (2018). It also includes a comparison of fatalities and serious injuries sustained in those accidents during the same timeframe.

The total number of accidents and serious incidents in 2018 was the lowest since 2008, in line with the decreasing trend



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Serious Incident	1	0	1	3	3	4	2	4	12	8	3
Non Fatal Accident	48	44	50	44	32	42	37	32	24	24	24
Fatal Accident	4	10	6	6	4	7	8	2	4	4	6

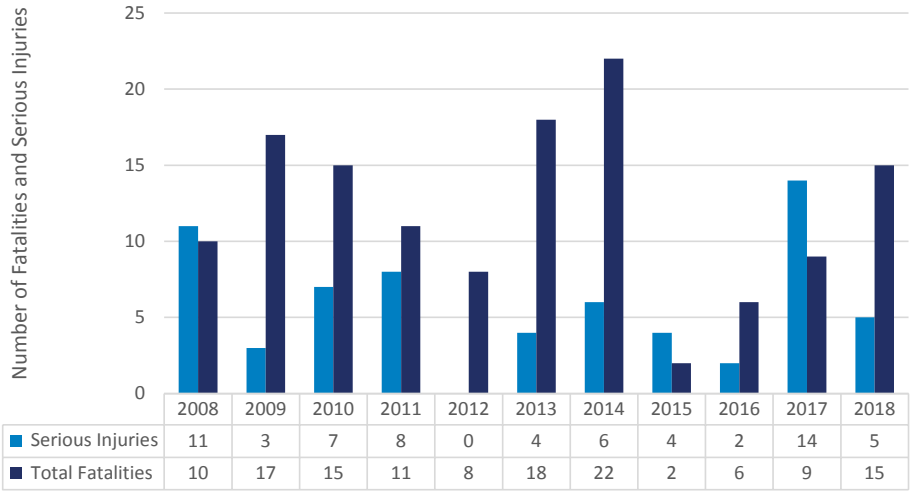
Figure 51. Number Of Accidents And Serious Incidents Per Year 2008-2018

since 2013. However, the number of fatal accidents in 2018 increased as compared to 2017 and is slightly higher than the 10 year average.

The low number of reported serious incidents in comparison with the accidents suggests a weak reporting culture in helicopter non-commercial operations.

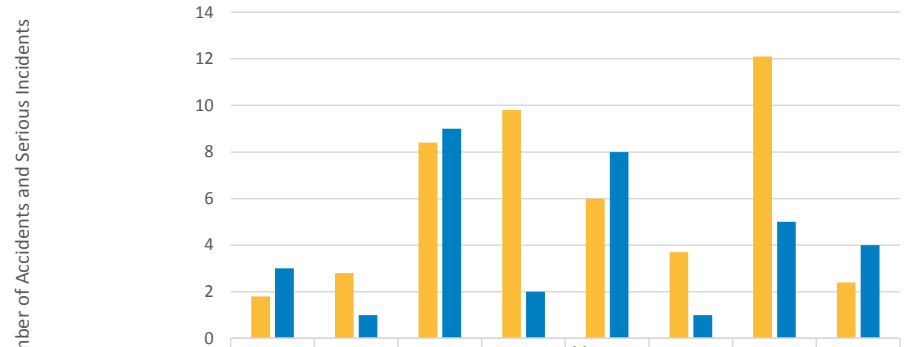
The number of fatalities in 2018 was slightly higher than the average of the previous decade. The trend for the number of fatalities has been increasing since 2015, which was the safest year of the period analysed. For serious injuries, no particular trend can be detected and the numbers in 2018 are close to the 10 year average.

The highest number of accidents and serious incidents in 2018 occurred during the take-off and manoeuvring phases. It can be also noticed that the number of occurrences that happen during en route, approach and landing were lower in 2018 than the 10-year average.



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Serious Injuries	11	3	7	8	0	4	6	4	2	14	5
Total Fatalities	10	17	15	11	8	18	22	2	6	9	15

Figure 52. Number Of Fatalities And Serious Injuries Per Year 2008-2018



	Standing	Taxi	Take-off	En route	Manoeuvring	Approach	Landing	Unknown
Average/Year 2008-2017	1.8	2.8	8.4	9.8	6	3.7	12.1	2.4
2018	3	1	9	2	8	1	5	4

Figure 53. Number Of Accidents And Serious Incidents By Flight Phase, 2008-2018

In 2018, training/instructional flights remained the type of non-commercial operations where the highest number of accidents and serious incidents occurred, followed by pleasure flights.

Almost two thirds of the total number of accidents and serious incidents involved a helicopter powered by a reciprocating engine in 2018, which keeps the same proportion as the figures for the 10 previous years.

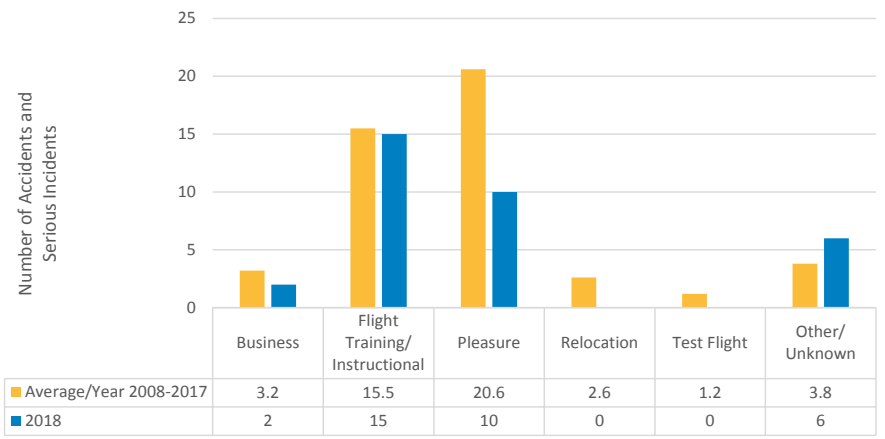


Figure 54. Number Of Accidents And Serious Incidents By Operation Type, 2008-2018

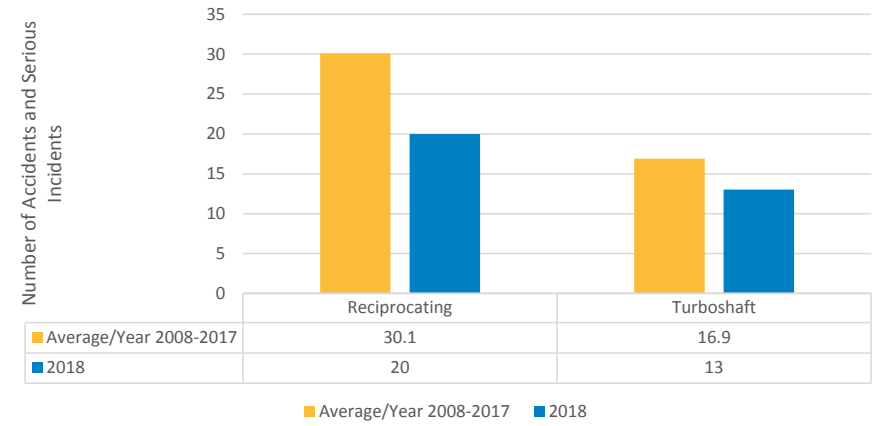


Figure 55. Number Of Accidents And Serious Incidents By Propulsion Type, 2008-2018

3.4.2 Safety Risk Portfolio

The following safety risk portfolio provides a risk picture based on key risk areas and associated safety issues identified from the data of accidents and serious incidents which happened from 2014 to 2018 (194 occurrences) in helicopter non-commercial operations.

It is important to note that this safety risk portfolio is only built from occurrence data. No further assessment or refinement from safety experts have been done for this aviation domain.
The main key risk areas identified and prioritised using the ERCS risk score methodology are Aircraft Upset and Terrain Collision. One single occurrence can be connected to more than one key risk area.
The safety risk portfolio links the safety issues to the key risk areas to which they contribute.

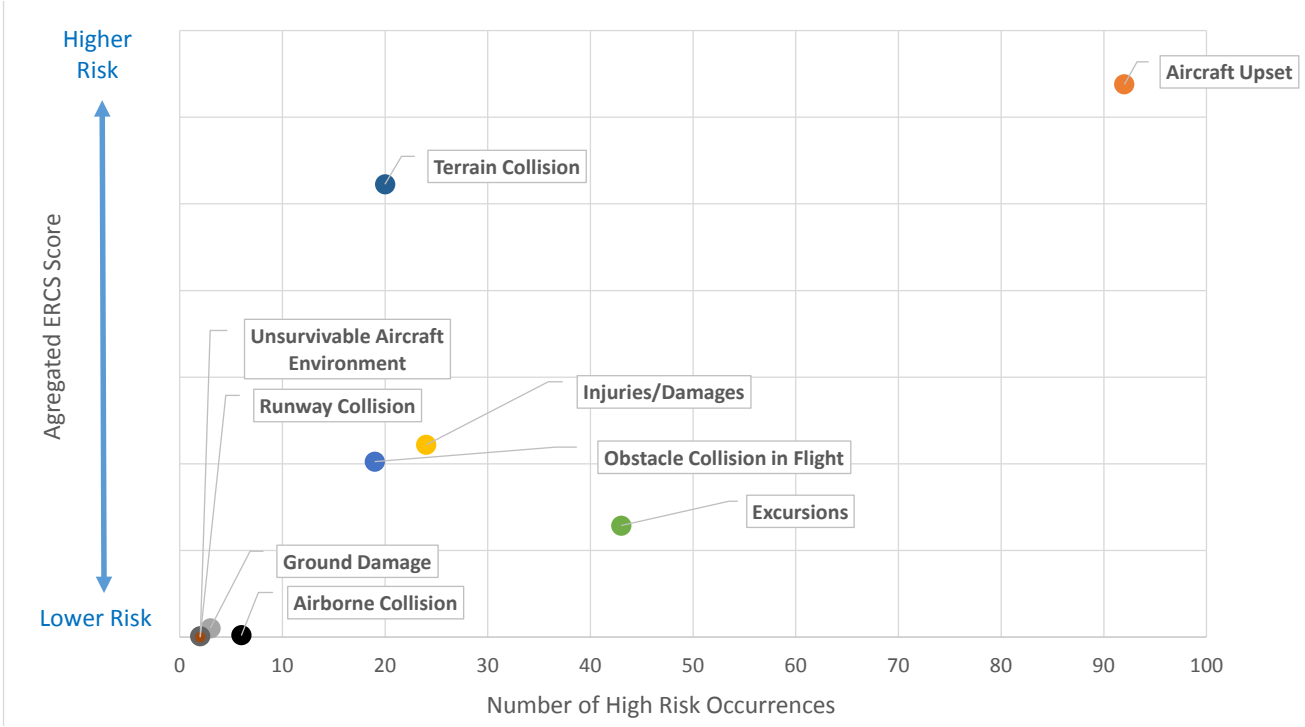


Figure 56. Comparison Of Number Of Occurrences And Aggregated ERCS Score Per Key Risk Area, 2014-2018

The key risk areas are listed at the top of the table and are prioritised from the left to the right based on the aggregated ERCS risk score.

The safety issues are listed on the left of the table and are also sorted from the top by decreasing aggregated ERCS risk score.

From the data supporting the portfolio, the following safety issues can be highlighted as the most frequent contributors to the 3 key risk areas having the highest ERCS aggregated score.

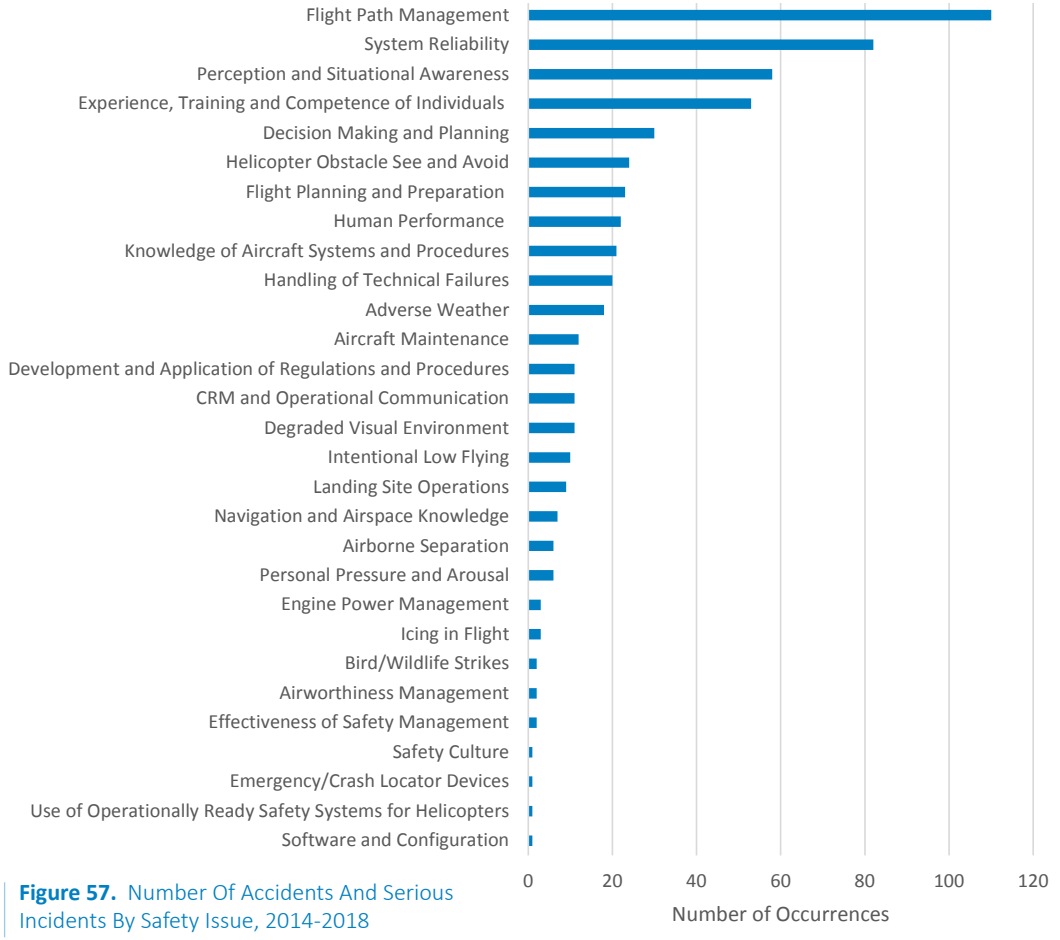


Figure 57. Number Of Accidents And Serious Incidents By Safety Issue, 2014-2018

Only the safety issues identified in at least 5 occurrences are listed, and sorted by decreasing number of occurrences. If more than 5 safety issues match this criteria, only the top 5 safety issues are listed.

Aircraft Upset

- System Reliability
- Flight Path Management
- Experience, Training and Competences of Individuals
- Perception and Situational Awareness
- Handling of Technical Failures

Terrain Collision

- Perception and Situational Awareness
- Helicopter Obstacle See and Avoid
- Experience, Training and Competences of Individuals
- Decision Making and Planning

Injuries/Damages

- Flight Path Management
- System Reliability
- Perception and Situational Awareness
- Experience, Training and Competences of Individuals
- Decision Making and Planning

HELICOPTERS - NON COMMERCIAL OPERATIONS

Bands of Aggregated ERCS Risk Score (2014-2018)

SAFETY ISSUES	Key Risk Areas: Aircraft Upset	Terrain Collision	Injuries/ Damage	Obstacle Collision in Flight	Excursions	Ground Collision	Airborne Collision	Runway Collision	Aircraft Environment
Perception and situational awareness	x	x	x	x	x	o		o	
Flight path management	x	o	x	x	x				
System reliability	x	o	x	o	x	o			o
Experience, training and competence of individuals	x	x	x	o	x				
Decision making and planning	x	x	x	x	o				
Flight planning and preparation	x	o	x		o				
Helicopter obstacle see and avoid	x	x		x		o			
Degraded visual environment	x	o	o	o	o				

X = Higher risk occurrences
O = Lower risk occurrences

Priority 1 Priority 2 Priority 3 Priority 4

PP. 99-100
Table 19. Helicopter Non-Commercial Operations Safety Risk Portfolio

Bands of Aggregated ERCS Risk Score (2014-2018)

SAFETY ISSUES	Key Risk Areas								
	Aircraft Upset	Terrain Collision	Injuries/ Damage	Obstacle Collision in Flight	Excursions	Ground Collision	Airborne Collision	Runway Collision	Aircraft Environment
Adverse Weather	x	o	x		o				
CRM and Operational Communication	x	o	o	o	o		o	o	
Navigation and Airspace Knowledge		o	o		o			o	
Knowledge of Aircraft Systems and Procedures	x	o	o		x				
Intentional Low Flying	o	o	o	x					
Development and Application of Regulations and Procedures	x	o	o		o				
Personal Pressure and Arousal		o	o		o				
Aircraft Maintenance	x		o	o	o				
Handling of Technical Failures	x	o	o	o	x				
Landing Site Operations	o	o		o	o				
Icing in Flight	o								
Engine Power Management	o				o				
Effectiveness of Safety Management	o				o				
Software and Configuration		o							
Airworthiness Management					o				
Bird/Wildlife Strikes	o								
Use of Operationally Ready Safety Systems for Helicopters	o		o						
Emergency/Crash Locator Devices	o		o						
Safety Culture					o				
Airborne Separation	o		o	o			x		
Damage Tolerance to UAS Collisions	No Data								
Downwash									

CHAPTER 4
BALLOONS

The scope of this chapter covers hot air balloon operations where the state of registry is an EASA Member State. The Balloon Collaborative Analysis Group (CAG) was the first CAG to be established in 2013 and the excellent work produced by the Balloon CAG has proven the effectiveness of a CAG, giving rise to the establishment of CAGs in other aviation domains.

4.1.1 Key Statistics

2008 - 2017 total	TIMESPAN	2018
13	FATAL ACCIDENTS	0 ↓
190	NON-FATAL ACCIDENTS	13 ↓
18	SERIOUS INCIDENTS	1 ↓

2008 - 2017 total	TIMESPAN	2018
22	FATALITIES	0 ↓
199	SERIOUS INJURIES	15 ↓

Table 20. Key Statistics for Balloons

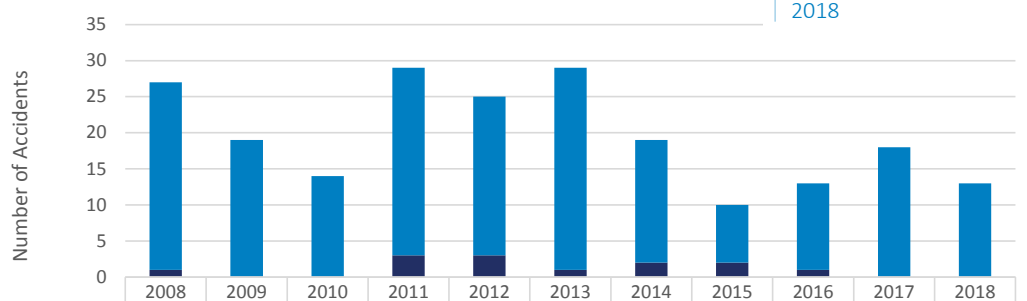
The key statistics for this domain are in Table 21 and include a comparison of the number of accidents (fatal and non-fatal) and serious incidents for the 10-year period (2008-2017) and the last year (2018). The table also includes a comparison of fatalities and serious injuries sustained in those accidents during the same time frame.

There were no fatal accidents in 2018 compared with 13 over the preceding 10 years. There was 1 serious incident in 2018, a decrease in relation to the decade average.

4.1.1.1 Number of fatal accidents, accidents and serious incidents

2018 is the second year in a row with no fatal accidents. The data shows that from 2011 to 2016 there were fatal accidents every year. However, before 2011 there was only one fatal accident in 2008.

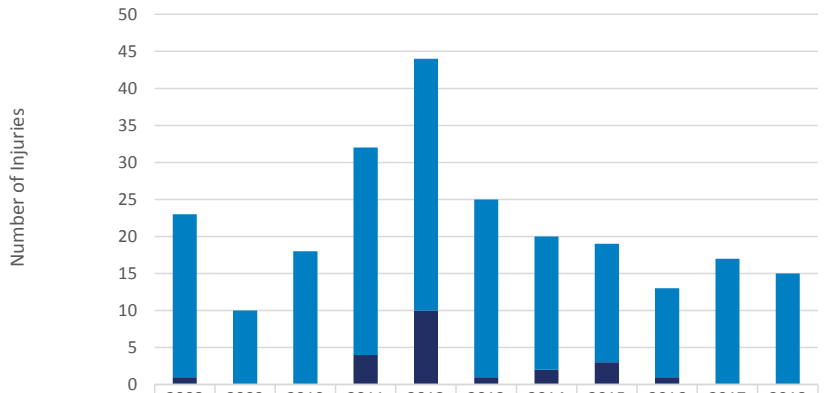
Figure 58. Number Of Fatal And Non-Fatal Accidents Per Year 2008-2018



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Non-Fatal Accident	26	19	14	26	22	28	17	8	12	18	13
Fatal Accident	1	0	0	3	3	1	2	2	1	0	0

4.1.1.2 Number of fatal and serious injuries

There were no fatal injuries in 2018. The number of serious injuries also decreased, from 19.9 on average for the time period 2008-2017 to 15 in 2018.

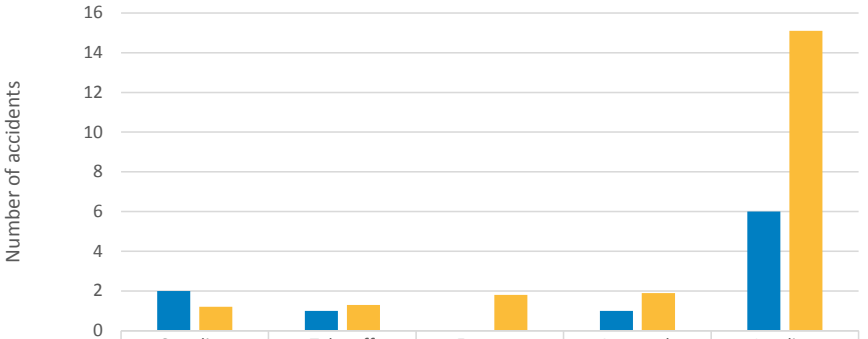


	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total Seriuos Injuries	22	10	18	28	34	24	18	16	12	17	15
Total Fatalities	1	0	0	4	10	1	2	3	1	0	0

Figure 59. Number Of Fatalities And Serious Injuries Per Year 2008-2018

4.1.1.3 Phase of flight

Most balloon accidents occur during the landing phase of the flight. The average from 2008-2017 shows that 15.1 of the accidents happen during landing but last year that percentage dropped to 6 accidents.



	Standing	Take-off	En route	Approach	Landing
2018	2	1	0	1	6
2008-2017	1.2	1.3	1.8	1.9	15.1

Figure 60. Number Of Balloon Accidents By Flight Phase, 2008-2018

4.1.2 Safety Risk Portfolios

4.1.2.1 Categories and ERCS scores 2014-2018

With the application of the European Risk Classification Scheme (ERCS), EASA now assesses the risk of all hot air balloon accidents and serious incidents from 2014-2018. This risk classification is used to build a risk picture of a particular domain in aviation, enabling the design of targeted safety actions to mitigate those risks.

Figure 4 shows that the Key Risk Areas bearing the highest risk are Balloon Landings and Obstacle Collision in Flight. The analysis of data confirms that collisions with powerlines and hard landings are events with a higher propensity to cause injuries in ballooning operations. The causes of powerline collisions are mainly lack of information, the position of the sun making it difficult to see the lines, fog or wind gusts. The main causes for hard balloon landings resulting in injuries are predominantly wind gusts or downdrafts, control of the balloon inertia and passengers not being prepared for touchdown.

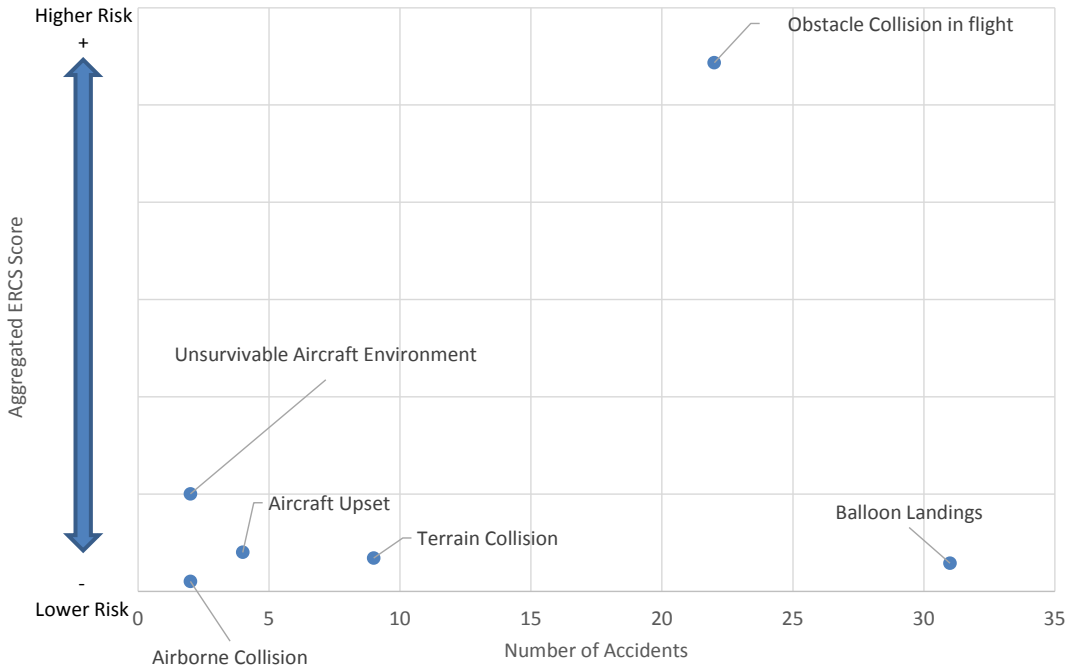


Figure 61. Comparison Of Number Of Occurrences And Aggregated ERCS Score Per Key Risk Area

4.1.2.2 Safety Risk Portfolio table

Table 22 provides the Safety Risk Portfolio (SRP) for balloon operations, which has been developed through a data-driven approach. The safety issues have been ranked by their aggregated ERCS scores and then assigned an appropriate priority accordingly. The same process was applied for the key risk areas.

The high-priority safety issues under Balloon Landings, based on the coding of the occurrences, are:

- **High Wind Encounter**
- **Presence and Use of Pilot Restraints**
- **Decision Making and Planning**

The main safety issues to address under Obstacle Collision in Flight are:

- **Perception and Situational Awareness**
- **Powerline Collisions**

It should also be mentioned that powerline collision events often overlap with the balloon landings as these collisions tend to happen in the final stages of the balloon flight. In some cases, the powerline is hit after the landing has taken place.

Experience, Training and Competence of Individuals was another safety issue identified by the CAG. However, it was not included in the portfolio due to the lack of data on this safety issue.

BALLOONS

Bands of Aggregated ERCS Risk Score (2014-2018)

SAFETY ISSUES	Key Risk Areas: Balloon Landings	Obstacle Collision in Flight	Balloon Upset	Terrain Collision	Balloon Environment	Airborne Collision
Perception and situational awareness	o	x	o	o	o	o
Powerline collisions	x	x	o	o	o	o
High wind encounters	x	o	o		o	
Presence and use of pilot restraints	x	o	o	o		
Decision making and planning	x	o	o		o	
Collision with Buildings and Trees	o	x	o	o		
Control of Flight Path and Inertia	x	o	o	o		
Flight Planning and Preparation	x	o	o	o		
Turbulence	o	o				o
Airborne Separation						o
Approach Path Management	o	o	o			
System Reliability						
Fuel Systems					o	

X = Higher risk occurrences
O = Lower risk occurrences

Priority 1 Priority 2 Priority 3 Priority 4

Table 21. Balloon Safety Risk Portfolio

4.1.2.3 Actions

The last Balloon CAG meeting held in February 2018 concluded that the following actions should be assessed and then published in the EPAS:

1. **Power line proximity and decision making** – Safety promotion task directed towards operators and balloon pilots for mitigation of collision risk with power lines and support the pilots in decision making and situational awareness.

2. **Passenger Safety Briefings** – EASA to consolidate and publish a model Safety Card to be used during passenger safety briefings before and during the flight. EASA is currently working on a generic safety card that operators can use during their briefings with passengers.

3. **Weather Encounters** – Safety promotion task aimed at balloon pilots focusing on correct actions before and during the flight.

4. **Commercial pressure on balloon pilots** – Safety promotion task focused on Commercial Ballooning operators aiming at reducing pressure on balloon pilots helping them to take the correct decision when weather is marginal.

CHAPTER 5
SAILPLANES

The scope of this chapter covers Sailplane operations where the State of Registry is an EASA MS using EASA's accident and serious incident dataset. It should be noted that Austria has notified EASA that their processing of 2018 occurrences is not complete and could therefore affect the statistics.

Sailplanes is a unique domain within aviation, largely due to how gliding is performed. Unlike other domains where aircraft are powered by engines, sailplane operations depend on teamwork and safe towing into the air for the flight to commence. This added operational complexity has fostered a collaborative team spirit and cohesive atmosphere for safety within the gliding community. The gliding community with the leadership of European Gliding Union (EGU) has been active in EASA's work on the newly implemented Sailplane Air Operations (OPS) and Flight Crew Licensing (FCL) rules and in providing EASA with valuable input and insight to sailplane operations. The analysis performed in this chapter by the Agency is supported by the EGU and the British Gliding Association (BGA), to provide an in-depth analysis which provided insight on where the safety risks are and what they should be called to be of the best use for the gliding community.

5.1.1 Key Statistics

The key statistics for this domain are in the tables below and include a comparison of the number of accidents (fatal and non-fatal) and serious incidents for the 10-year period (2008-2017) and the last year (2018). The table also includes the comparison of fatalities and serious injuries sustained in those accidents during the same time frame.

There was a decrease in the number of fatal accidents in 2018 with 16 fatal accidents. The number of nonfatal accidents in 2018 was much lower than the 10-year average at 76.

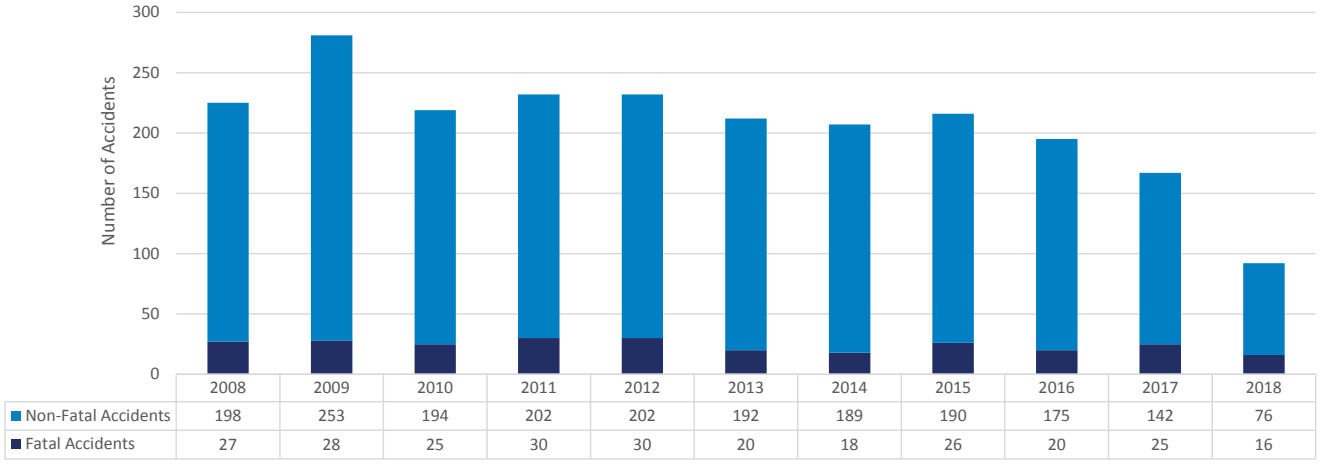
A detailed picture showing the historical fatal and non-fatal accident development can be seen in Figure 62 and a chart of fatal and serious injuries in Figure 63 below. The number of fatal accidents has been very stable throughout the last decade. However, the overall trend in terms of number of accidents is decreasing.

There were 17 fatalities in sailplanes in 2018. The number of fatalities last year is the lowest to date. Serious injuries have also decreased from 2015 resulting in 14 serious injuries in 2018. As seen in Figure 63, a favourable downward trend from 2008 to 2018 is evident.

2008 - 2017 total	TIMESPAN	2018	
249	FATAL ACCIDENTS	16	↓
1937	NON-FATAL ACCIDENTS	76	↓
74	SERIOUS INCIDENTS	17	↓

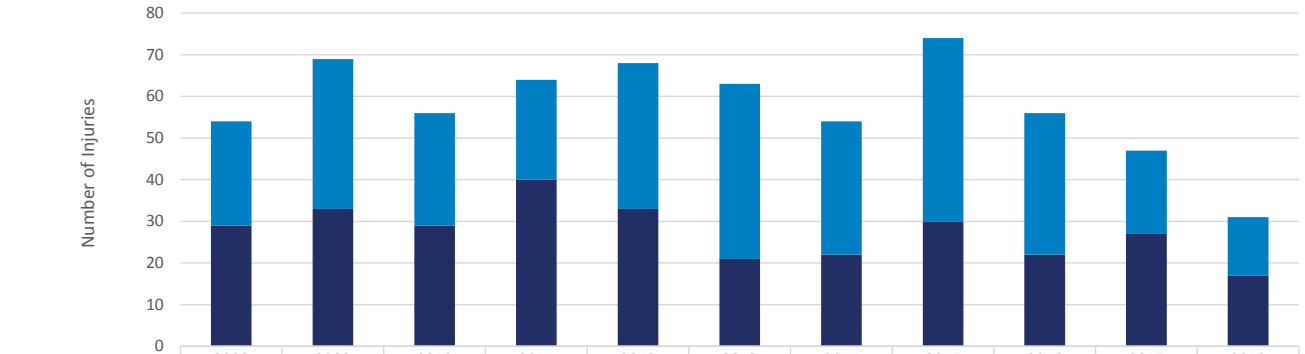
2008 - 2017 total	TIMESPAN	2018	
286	FATALITIES	17	↓
319	SERIOUS INJURIES	14	↓

Table 22. Key Statistics for Sailplanes



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Non-Fatal Accidents	198	253	194	202	202	192	189	190	175	142	76
Fatal Accidents	27	28	25	30	30	20	18	26	20	25	16

Figure 62. Number Of Fatal And Non-Fatal Accidents Per Year 2008-2018



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total Serious Injuries	25	36	27	24	35	42	32	44	34	20	14
Total Fatalities	29	33	29	40	33	21	22	30	22	27	17

Figure 63. Number Of Fatalities And Serious Injuries Per Year 2008-2018

5.1.1.1 Number of movements

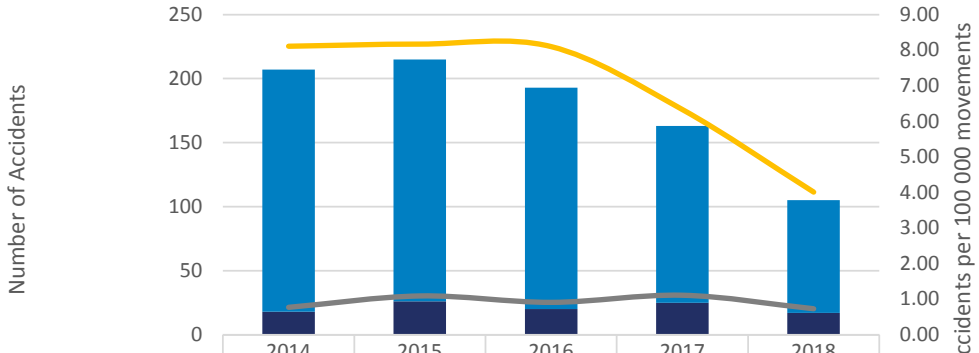
There are no accurate figures available regarding the number of sailplane movements in EASA MS. However, by using the available fleet data reported by EASA MS to the General Aviation Manufacturer Association (GAMA), an estimated number of movements was calculated. By extrapolating that data for the rest of the EASA MS, it is possible to present a broad estimate number of sailplanes in Europe.

To derive an estimated number of flights from 2014-2018, it was decided that the average EU GDP year-on-year increase for the same time period could be used as a suitable proxy to reflect the rate of growth of the glider community over the period. While these numbers are estimates, the margin of error is acceptable until new figures are available. Having consulted the EASA MS, it was evident that sailplane operations seem to have been similar between 2017 and 2018.

It should be noted that accident rates are different between individual EASA MS. This is particularly evident when comparing the geographical locations at which the accidents occurred. The number of fatal accidents are higher in the Alps and other mountainous regions than in areas with lower or more level landscape. The duration of the flights is also longer in mountainous areas than in the lower parts of Europe where the number of movements is higher but the duration of each flight is much shorter.

The fatal accident rate is relatively stable over the five year period, however, the non-fatal accident rate has been decreasing since 2016. As the exposure data is very fragmented, it is impossible at this time to provide an accident rate map of Europe. EASA MS, flight clubs and associations are encouraged to collect and share aggregated exposure data with EASA to construct a more comprehensive overview of the current situation for the benefit of all stakeholders.

Figure 64. Number And Estimated Rate Of Accidents, 2014-2018



	2014	2015	2016	2017	2018
Non-Fatal Accidents	189	189	173	138	88
Fatal Accidents	18	26	20	25	17
Non-fatal Accident Rate	8.11	8.17	8.10	6.33	4.01
Fatal Accident Rate	0.77	1.09	0.91	1.11	0.73

5.1.1.2 Phase of flight

In terms of flight phase, the majority of sailplane accidents occur during the landing phase of the flight, be it a landing on an airfield or an off-field landing due to loss of lift. Hard landings and/or ground loops are usually caused by inaccurate perception of the situation. It should be noted that Figure 65 contains all landings both on airfield and off-field landings. During takeoff, accidents are usually a result of a wing touching the ground during a winch launch. During climb it is due to loss of control during the winch launch. What can also be seen is that accidents in 2018 are generally much fewer than the average of 2008-2017.

When looking at the landing phase specifically, it can be seen that 33% of the landing accidents occurred during level-off/touch down or during landing roll at the airfield. Last year, 67% were attributed to off-field landings where the aircraft landed outside the airfield perimeter. As the event type 'off-field landing' is relatively new, it does not give a perfect picture. It can be assumed that some of the 'level-off/touchdown' event types have occurred during an off-field landing. Landing accidents generally do not result in fatalities. However, these accidents often result in substantial damage to the fuselage.

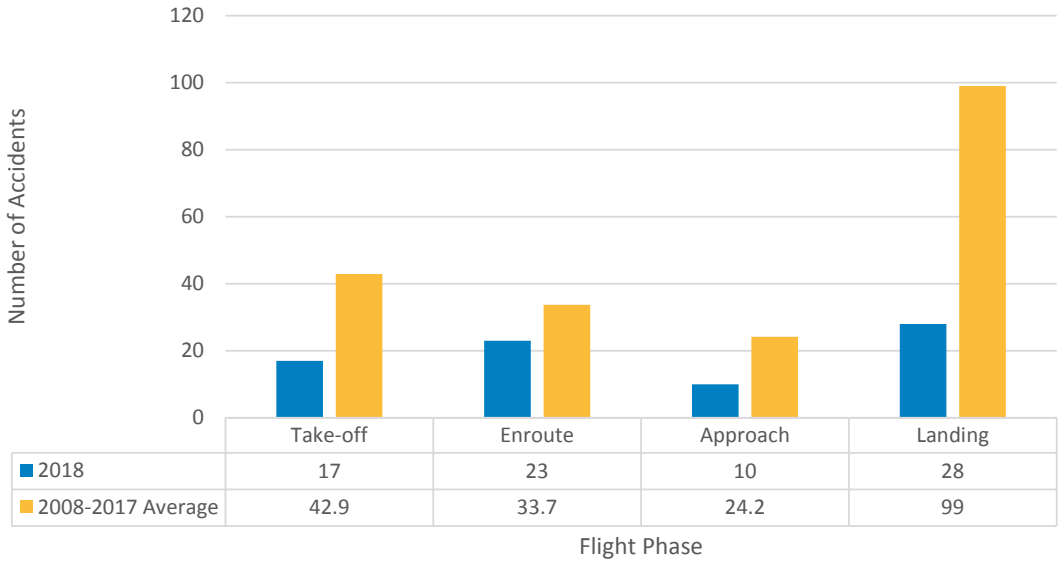


Figure 65. Number Of Accidents By Flight Phase, 2008-2018

5.1.1.3 Operation type

Figure 66 shows that the main operation types on sailplanes are pleasure flying and instructional flights. For this operation type, we can observe a significant difference between the 2008-2017 average on one hand and the actual figure from 2018 on the other.

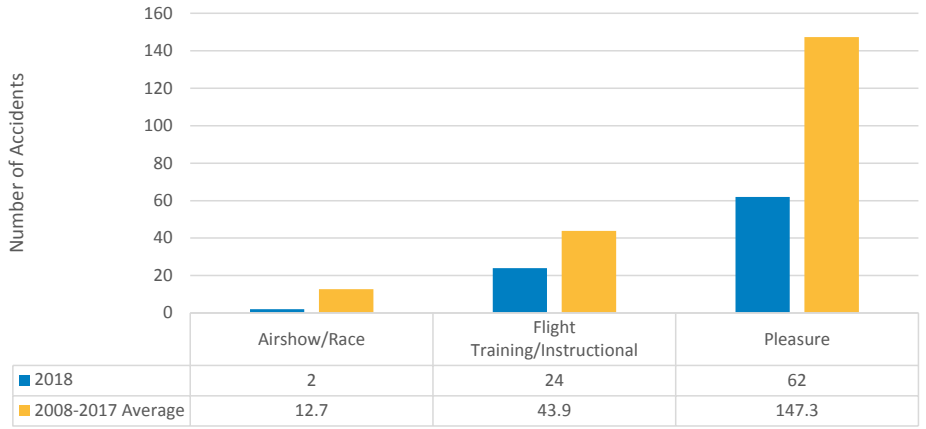


Figure 66. Number Of Accidents By Operation Type, 2008-2018

5.1.2 Safety Risk Portfolio

The following safety risk portfolio analysis provides a risk picture based on key risk areas and associated safety issues identified from sailplane accident data in EASA MS. The analysis has been performed collaboratively with the EGU and BGA. It is worth noting that these safety issues are formed by the apparent immediate cause of the accident. Figure 67 shows the percentage of fatal accidents per safety issue. It should be noted that of 105 fatal accidents from 2014-2018, there were several occurrences where there was no information available to determine the immediate cause of the accident. However, the safety issues most commonly associated with fatal accidents are:

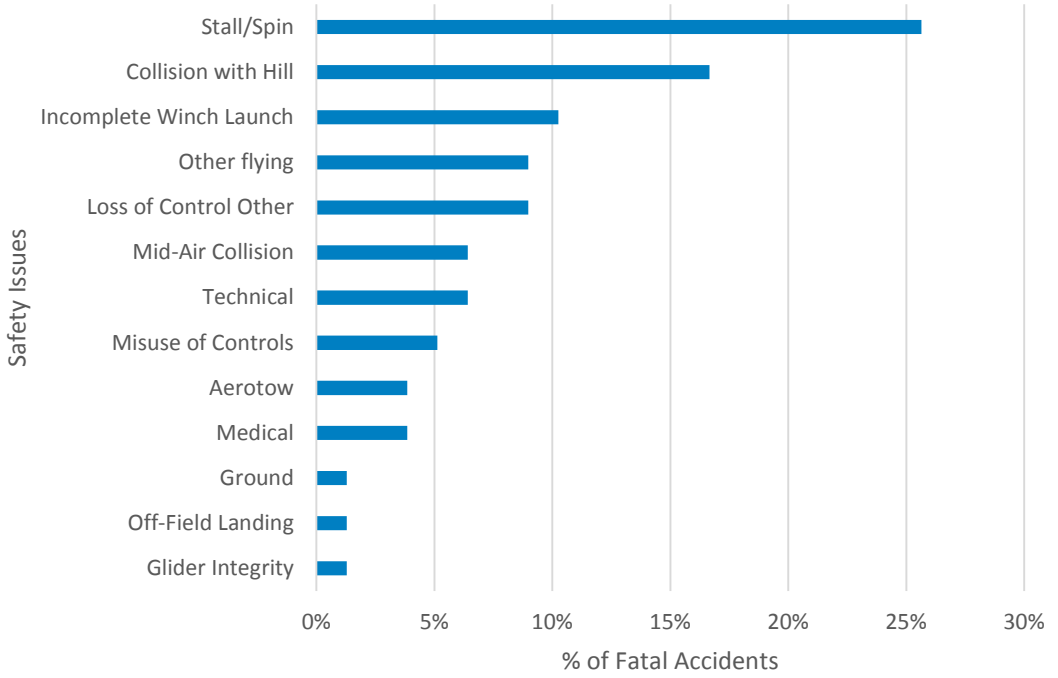


Figure 67. Percentage Of Sailplane Fatal Accidents By Safety Issue, 2014-2018

Stall/spin: Loss of control through a stall and/or spin is a significant safety risk during winch launches but also during the approach and landing phases of the flight.

Collision with hill: Alpine flying is popular but very unforgiving. Pilots need to plan their flights carefully and ensure they know their own limits and understand the dangers involved.

Winch launches: During the take-off run, the aircraft can swerve due to the wing tip hitting the ground. The higher than normal angle of attack results in a stall, or a loss of control due to the incomplete winch launch.

Other: This issue contains accidents caused by structural overload during flight, aerobatic accidents, dives into the ground, and unexplained loss of control.

Loss of control (other): This issue contains other types of loss of control events like bank/roll, pitch, directional control on ground, airspeed control and heading and omits stalls and spins as they are covered separately.

Mid-Air collisions: Searching for thermal lift at the same time with other sailplanes and approaching an airfield where communication is minimal or non-existent increases the risk of mid-air collisions.

The Sailplane Integrity issue relates to the 'Pre-flight planning and preparation' used in the Annual Safety Review 2016 version of the portfolio including assembly of the Sailplane before flight.

Figure 68 shows accidents where sailplanes suffered substantial damage or were considered to be damaged beyond repair. There are no changes in this list from the previous Annual Safety Review.

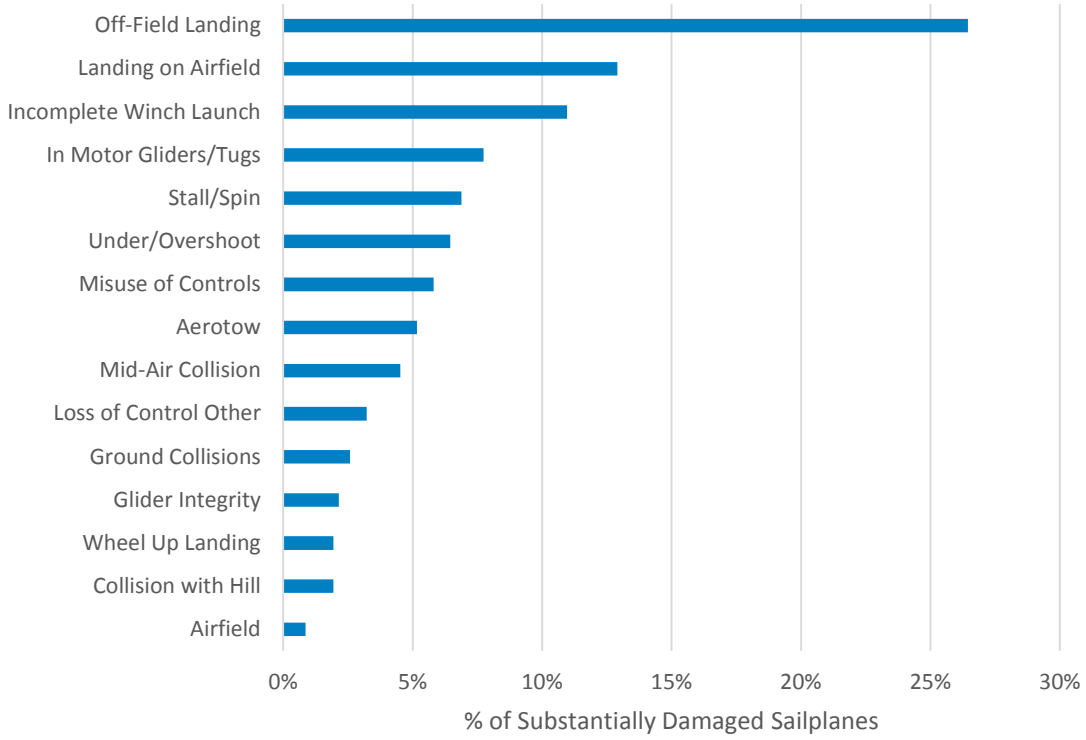


Figure 68. Percentage Of Substantially Damaged Or Destroyed Sailplanes By Safety Issue, 2014-2018

The main Safety Issues are:

Off-field landings: damage caused during landings in an unfamiliar territory, such as crop fields and other agricultural areas, where it can be difficult to determine the quality of the designated landing field from above.

Landing on airfield: The second Safety Issue involves damage during landings at airfields. This includes hard and bounced landings, causing a swerve or a runway excursion.

Incomplete winch launches: During the take-off run, the aircraft can swerve due to the wing tip hitting the ground. The higher than normal angle of attack results in a stall, or a loss of control due to the incomplete winch launch.

Motor gliders/tugs: These are occurrences that can only occur to motorised sailplanes, for example engine failures.

Stall/spin: Loss of control through a stall and/or spin is a significant safety risk during winch launches but also during the approach and landing phases of the flight.

Under/overshoot: This Safety Issue involves unstable approaches, speed and approach control in general.

Misuse of Controls: Refers to accidents in which one control was (mistakenly) being used to achieve the effect of another. The most common example is landing with the left hand on the undercarriage lever instead of the airbrake lever.

5.1.2.1 Identified Safety Issues and safety issue analysis

With the application of the European Risk Classification Scheme (ERCS), EASA has assessed the risk of all sailplane accidents and serious incidents from 2014- 2018. This risk classification is used to build a risk picture of a particular domain in aviation, enabling the design of targeted safety actions to mitigate those risks.

Figure 69 displays the aggregated risk against the number of accidents in Sailplane operation. The figure shows quite clearly that the risk of damage or injury in landing area excursions and aircraft upset are the dominant key risk areas. The occurrences in the landing area excursion category principally relate to damage and injuries during off field landings or during excursions from the expected landing area at a gliding site. The aircraft upset occurrences relate to stall/spin and other loss of control events, often involving fatalities. If the analysis is updated to include only fatal accidents, then the key risk area that is of highest concern is Aircraft Upset, a conclusion that

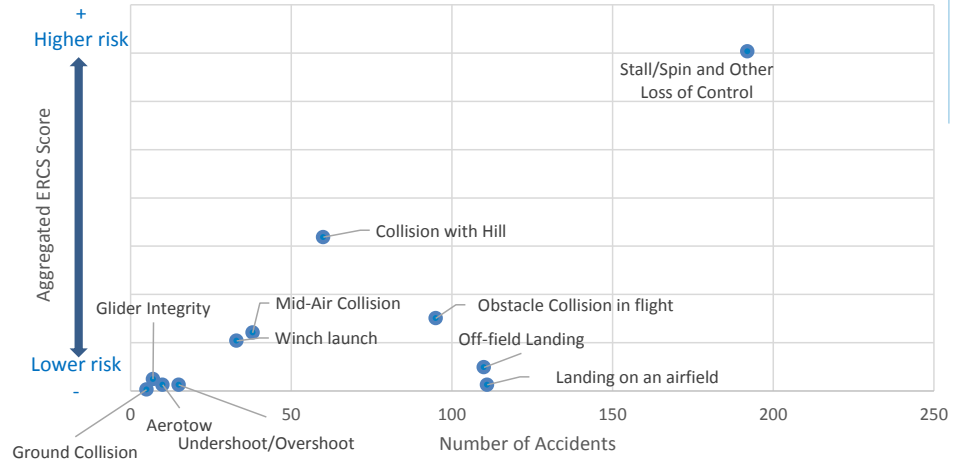


Figure 69. Sailplanes ERCS Scores Plotted Per Key Risk Area

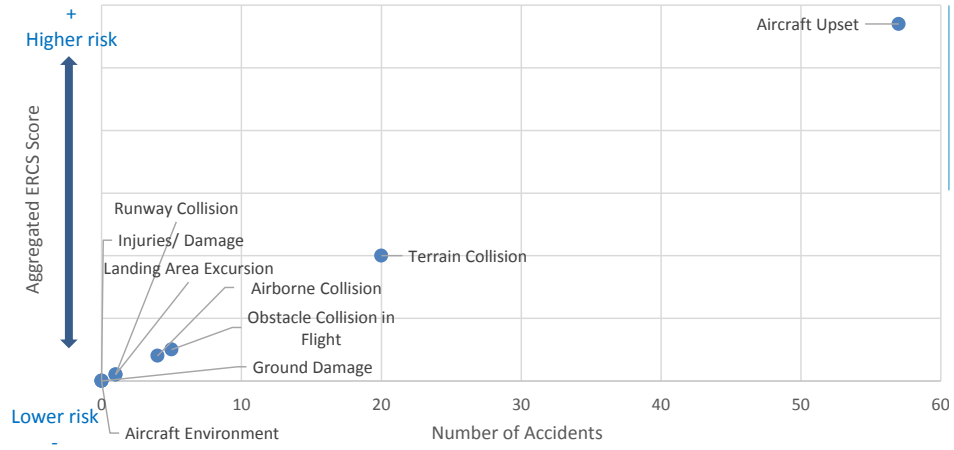


Figure 70. Sailplane Fatal Accident ERCS Scores Plotted Per Key Risk Area

is reinforced by the analysis of safety issues in Figure 71.

Figure 71 shows the number of occurrences with a higher or lower ERCS score, per safety issue. The safety issues 'landing on airfield' and 'off-field landings' contain many occurrences resulting in both higher and lower risk occurrences. The main outcome of the high risk accidents are substantial damage of the sailplane involved. It can also be observed that 'incomplete winch launches' has far fewer lower risk occurrences. This implies that both damage and injuries are more severe in that type of accidents. The safety issue 'Stall/Spin' and Loss of Control (Other) have fewer still lower risk accidents but the number higher risk occurrences and fatalities is much higher, producing a high aggregated risk score. This explains why the joint stall/spin and loss of control (other) is so high in Figure 69, or aircraft upset is so high in Figure 70.

The safety risk portfolio, which cross-references safety issues to key risk areas, is presented in Table 24.

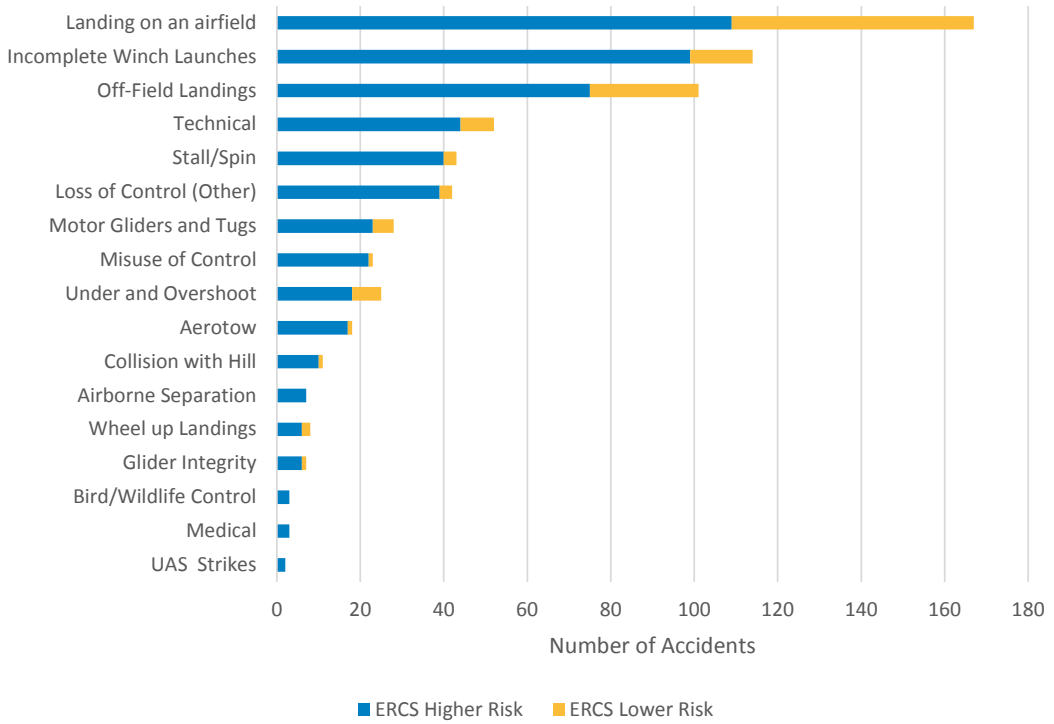


Figure 71. Number Of Accidents By Safety Issue, 2014-2018

SAILPLANES

Bands of Aggregated ERCS Risk Score (2014-2018)

SAFETY ISSUES	Key Risk Areas					
	Aircraft Upset	Landing Area Excursions	Terrain Collision	Obstacle Collision in Flight	Airborne Collision	Aircraft Environment
Stall/Spin	x	x	x	o	o	o
Collision with hill	x	o	x	o	o	o
Loss of control (other)	x	x	o	o	o	
Perception and situational awareness	x	x	x	x	x	
Incomplete winch launch	x	o	o	o	o	
Decision making and planning	x	x	x	x		o
Airborne separation	o				x	
Experience, training and competence of individuals	x	x	o	x		
System reliability	x	x				o
Handling of technical failures	o	o	o			o
Off-field landings	o	x	x	x		
Glider integrity	x					x
High wind encounter	x	x	o	x		
Aerotow	x	o	o	o	o	
Under/Overshoot	x	x	x	x		
Landing on Airfield	No Data					
Turbulence						
Misuse of Controls						

X = Higher risk occurrences
O = Lower risk occurrences

Priority 1 Priority 2 Priority 3 Priority 4

Table 23. Sailplane Safety Risk Portfolio

CHAPTER 6
AERODROME AND GROUND HANDLING

The scope of this chapter covers aerodrome and ground handling operations in EASA Member States. The data are based on the accidents and serious incidents collected by the Agency as per Annex 13 sources or the active search of those events from other official sources. It is worth noting that the accidents and serious incidents in this chapter are those related to aerodrome operations in a general context. This means that the aerodrome itself may or may not have contributed to a given occurrence, but could have a role in preventing similar occurrences in the future.

A Safety Risk Portfolio for aerodrome and ground handling operations is also provided. The portfolio has been developed with the support of the Aerodrome and Ground Handing Collaborative Analysis Group (CAG). The CAG is led by the Agency and comprises members from airports, airlines, national authorities, international organisations and unions.

6.1.1 Key Statistics

The key statistics for this domain are in the tables below. This includes accidents and serious incidents related to aerodromes and ground handling operations at aerodromes located in the EASA Member States.

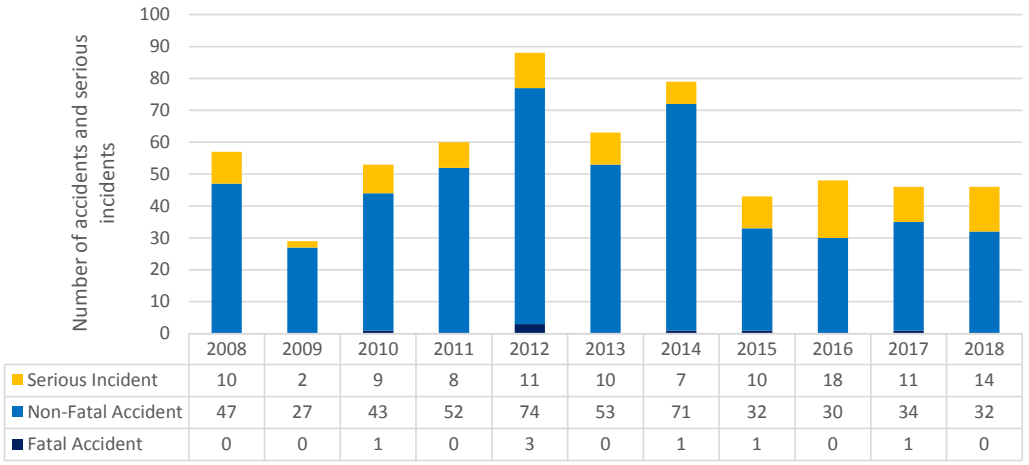
There were no fatal accidents related to aerodrome and ground handling operations in 2018. There were 32 non-fatal accidents in 2018, compared with an average of 46.3 for the preceding decade. There were 14 serious incidents, which is higher than the average of 9.6 in the period 2008-2017.

There were four serious injuries in aerodrome and ground handling related accidents in 2018, which is similar to the average of the preceding 10 year period. The number of accidents and serious incidents have been relatively stable since 2015. Also the number of serious injuries in aerodrome and ground handling related accidents has been quite stable since 2015.

2008 - 2017 total	TIMESPAN	2018	
7	FATAL ACCIDENTS	0	↓
463	NON-FATAL ACCIDENTS	32	↓
96	SERIOUS INCIDENTS	14	↓

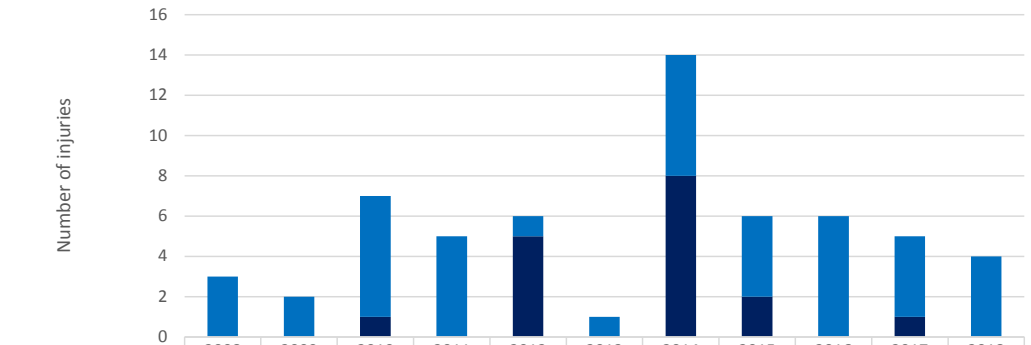
2008 - 2017 total	TIMESPAN	2018	
17	FATALITIES	0	↓
38	SERIOUS INJURIES	4	↑

Table 24. Key statistics for Aerodromes and Ground Handling



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Serious Incident	10	2	9	8	11	10	7	10	18	11	14
Non-Fatal Accident	47	27	43	52	74	53	71	32	30	34	32
Fatal Accident	0	0	1	0	3	0	1	1	0	1	0

Figure 72. Number Of Accidents And Serious Incidents Per Year 2008-2018



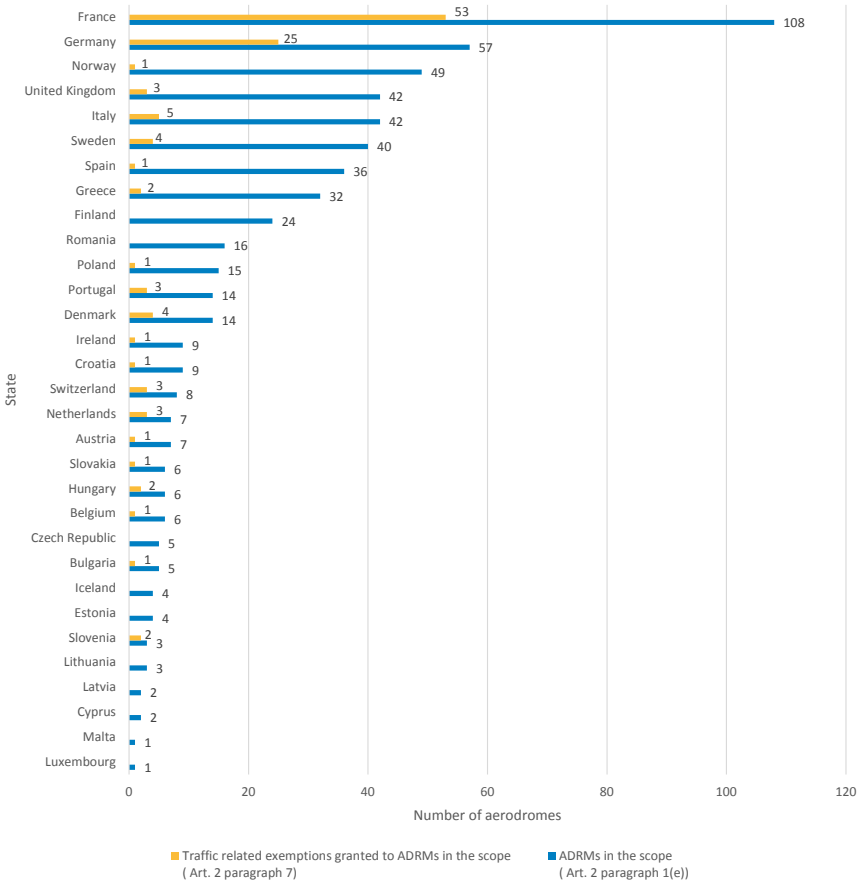
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total Serious Injuries	3	2	6	5	1	1	6	4	6	4	4
Total Fatalities	0	0	1	0	5	0	8	2	0	1	0

Figure 73. Number Of Fatalities And Serious Injuries Per Year 2008-2018

6.1.1 1 Number of EASA MS Certified Aerodromes

Regulation (EU) 139/2014 lays down the requirements for the certification of aerodromes in the EASA Member States. At time of publication, there are 577 aerodromes within the scope of the regulation. 118 of these have been granted an exemption in accordance with Article 5 of Regulation (EU) 139/2014 and Article 2 of Regulation (EU) 2018/1139 (the EASA Basic Regulation).

Figure 74. Number of Aerodromes within the scope of Regulation (EU) 139/2014



6.1.2 Safety Risk Portfolio

The aerodromes and ground handling safety risk portfolio has been developed by EASA and the Aerodromes and Ground Handling Collaborative Analysis Group (CAG). The CAG was launched in March 2017.

In the aerodromes and ground handling domain EASA has reviewed the accidents and serious incidents for 2014-2018 with regard to risk. All accidents and serious incidents within the scope have been risk assessed using the European Risk Classification Scheme (ERCS) methodology, and have been given an ERCS score.

6.1.2.1 Key Risk Areas

The ERCS review of the key risk areas is presented below.

The most frequent key risk area for aerodrome and ground handling related accidents and serious incidents is Ground Damage, followed by Runway Excursions and Aircraft Upset. In terms of aggregated risk, Ground Damage has the highest aggregated risk score, followed by Aircraft Upset and Runway Excursions on a similar level with Obstacle Collision in Flight.

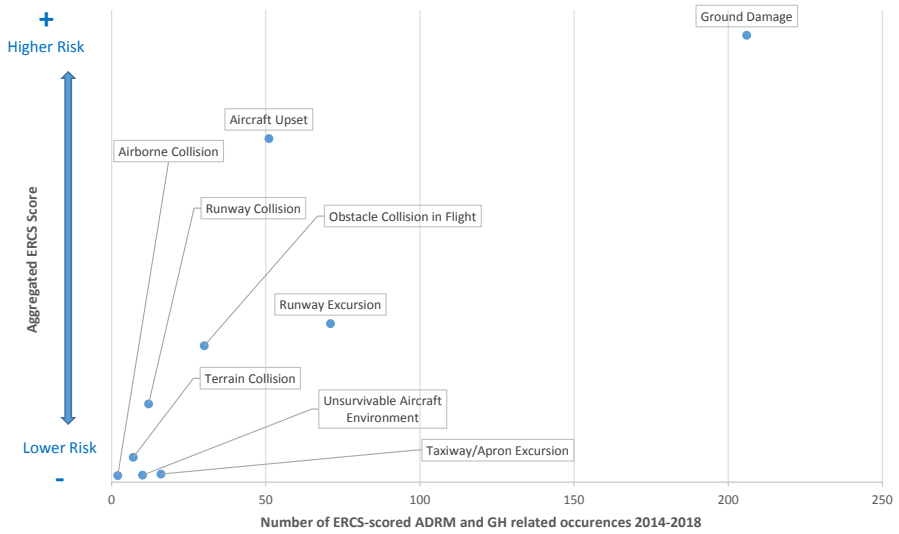


Figure 75. Comparison Of Number Of Occurrences And Aggregated ERCS Score Per Key Risk Area

6.1.2.2 Safety Issues

The safety issues in the aerodrome and ground handling domain have been identified by the Aerodrome and Ground Handling CAG. They are derived from occurrence data from the EASA occurrence repository and the European Central Repository (ECR), as well as the operational expertise provided by the members of the CAG. The wording of the safety issues have been reviewed by the CAG as well as coordinated across other domains. Where possible, ECCAIRS[1] queries have been constructed for each safety issue in order to identify the occurrences associated with each safety issue.

The table below shows the number of occurrences in the ECR for each safety issue. One occurrence can be included in more than one safety issue.

Baggage and Cargo Loading in Passenger Aircraft is the top safety issue based on the number of occurrences in the ECR.

1 ECCAIRS (European Co-ordination Centre for Accident and Incident Reporting Systems) is the IT system which EASA and EASA Member States use to collect, share and analyse safety information.

It was also identified as the top safety issue of concern by the members of the Aerodromes and Ground Handling CAG. Therefore it has been selected as the first issue for assessment in the Safety Risk Management (SRM) process and this assessment is currently ongoing.

The second issue to be assessed in the SRM process will be Ground Staff Movement around Aircraft. The number of ECR occurrences for this safety issue is low, this is however a function of the ECCAIRS taxonomy not having event types to clearly capture such risks, in combination with under-reporting from ground handling organisations.

The review of the accidents and serious incidents for each safety issue is presented below.

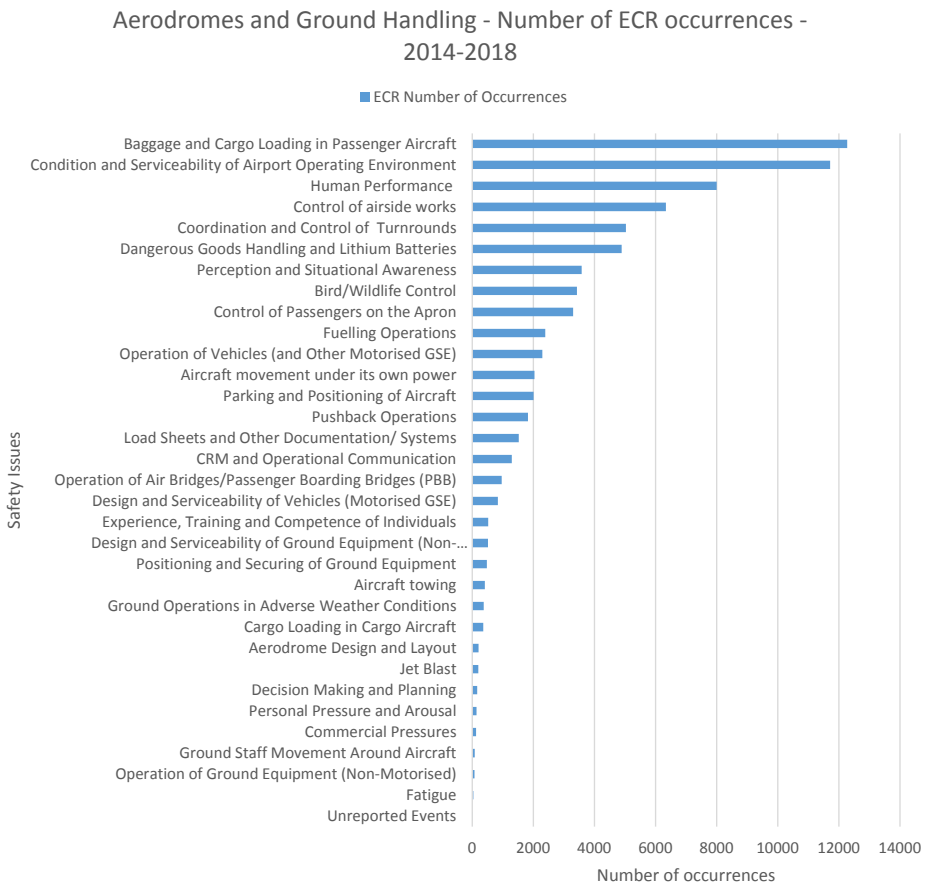


Figure 76. Number of reported occurrences per Safety issue – European Central Repository – 2014-2018

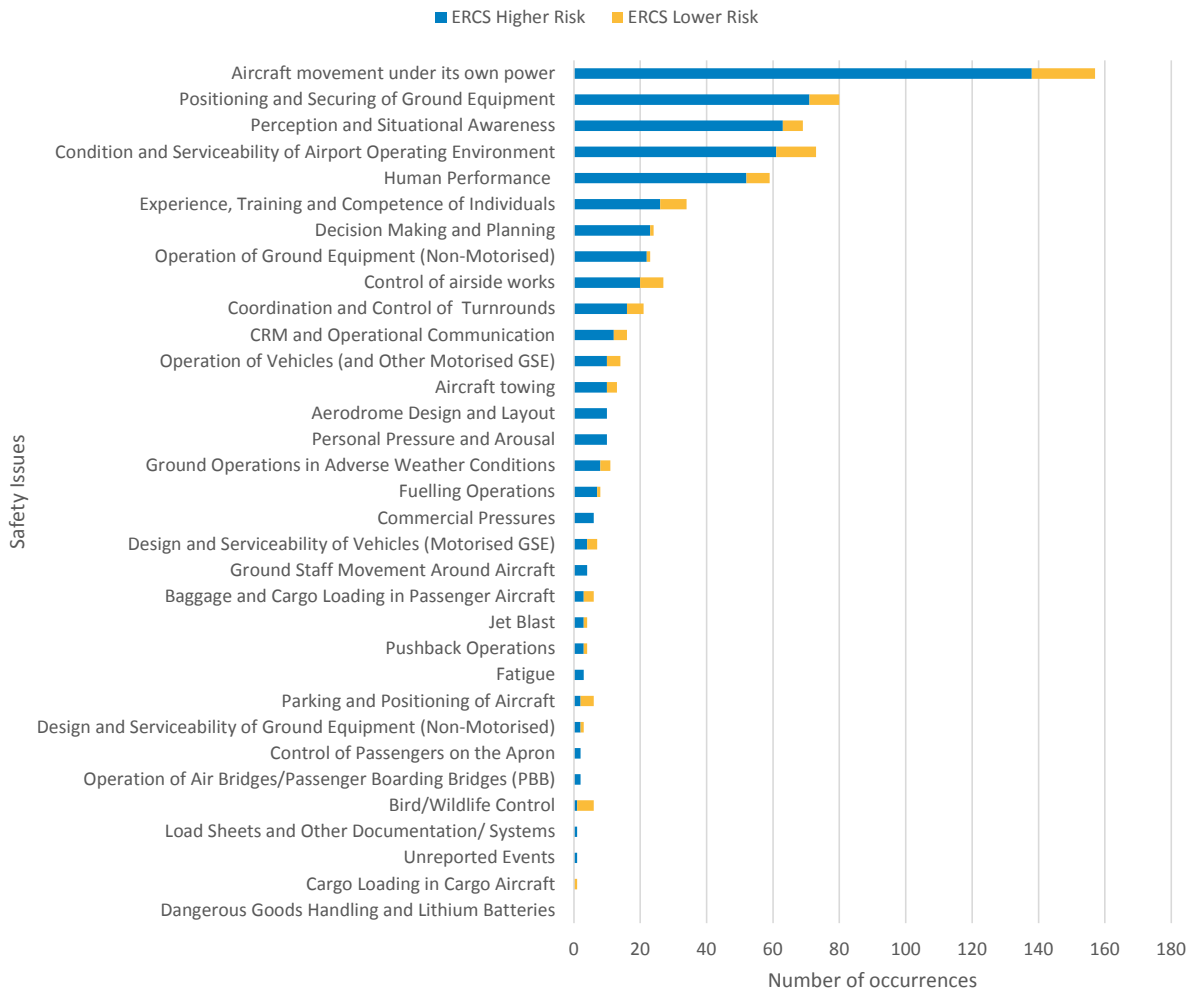


Figure 77. Number Of Accidents And Serious Incidents By Safety Issue and ERCS Severity, 2014-2018

6.1.2.3 Safety Risk Portfolio

The safety risk portfolio presented below is purely based on occurrence data, mainly accidents and serious incidents, in the EASA occurrence database for 2014-2018. When the ERCS is fully implemented, it will be possible to extend the analysis to incident data in the ECR, which will be more comprehensive.

The Aerodromes and Ground Handling CAG has defined a problem statement for each Safety Issue to further specify what needs to be addressed. These are presented in the tables below, in alphabetical order.

AERODROMES AND GROUND HANDLING

Bands of Aggregated ERCS Risk Score (2014-2018)

SAFETY ISSUES	Key Risk Areas								
	Ground Collision	Aircraft Upset	Runway Excursion	Obstacle Collision in Flight	Terrain Collision	Aircraft Environment	Airborne Collision	Taxiway Excursion	Runway Collision
Aircraft movement under its own power	x	o	x	o				x	x
Perception and situational awareness	o	o							
Coordination and control of turnarounds	x	x	o	o		o			
Decision making and planning	o	x	x	o	o				o
Positioning and securing of ground equipment	o	o						o	
Experience, training and competence of individuals	x	x	x	x	o		o		o
Control of airside works	x	o	x	o	o	o	o	o	o
Fuelling operations		x	o	o	o	o			
Condition and serviceability of airport operating environment	x	x	x	x	o	o		x	x
Ground operations in adverse weather conditions	x	o	o			o		o	

X = Higher risk occurrences
O = Lower risk occurrences

Priority 1 Priority 2 Priority 3 Priority 4

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Table 25. Aerodrome And Ground Handling Safety Risk Portfolio

Bands of Aggregated ERCS Risk Score (2014-2018)

SAFETY ISSUES	Key Risk Areas								
	Ground Collision	Aircraft Upset	Runway Excursion	Obstacle Collision in Flight	Terrain Collision	Aircraft Environment	Airborne Collision	Taxiway Excursion	Runway Collision
Crew Resource Management (CRM) and operational communication	x	o	o			o			o
Aerodrome design and layout	o	o	o	o	o		o		
Personal pressure and arousal	o	o							
Operation of ground equipment (Non-Motorised)	o	o							
Aircraft towing	x				o				
Commercial pressures	o	o							
Operation of vehicles (and Other Motorised Ground Support Equipment (GSE))	o	o							
Design and serviceability of vehicles (Motorised GSE)	o				o				
Ground staff movement around aircraft	o	o							
Baggage and cargo loading in passenger aircraft	o	o				o			
Jet blast	o	o							
Bird/Wildlife control		o	o	o					
Design and serviceability of ground equipment (Non-Motorised)	o								
Operation of air bridges/ Passenger Boarding Bridges (PBB)	o	o							
Load sheets and other documentation/ systems	o	o							
Pushback operations	o	o							
Fatigue	o	o							
Parking and positioning of aircraft	o	o							
Unreported safety events	o	o							
Cargo loading in cargo aircraft		o							
Control of passengers on the apron	No Data								
Dangerous goods handling and lithium batteries									

6.1.2.4 Operational Safety Issues

Title	Problem statement
Aircraft movement under its own power	The management, handling or coordination of aircraft movement under its own power may lead to damage and/or injuries.
Aircraft towing	The management, handling or coordination of towing operations may lead to damage and/or injuries.
Apron/Stand Design and Layout	Apron/Stand design and layout problems that may induce the potential for collisions, aircraft damage, and injuries. Continuous monitoring of occurrences related to Aerodrome Design and Layout.
Baggage and Cargo Loading in Passenger Aircraft	Inadequate management or handling of the baggage and cargo loading process that may lead to ground damage or other safety effects.
Bird/Wildlife Control	Insufficient control of birds and wildlife that may lead to either damage or loss of control.
Cargo Loading in Cargo Aircraft	The management or handling of the cargo loading process that may lead to ground damage or other safety effects.
Condition and Serviceability of Airport Operating Environment	The management of the condition and serviceability of the airport operating environment including maintenance of ATM/CNS Equipment, Aerodrome Surfaces, Visual Aids, Markings/Signage, Lights, Snow/Ice Removal, FOD control and other infrastructure.
Control of Airside Works	Improper supervision, coordination and control of airside works may lead to damage and/or injuries.
Control of Passengers on the Apron	Insufficient control of passengers on the apron or any other operational area of the aerodrome or airport.
Coordination and Control of Turnarounds	The management, handling or coordination of the turnaround process.
Dangerous Goods Handling and Lithium Batteries	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 to prevent injuries.
Design of Air Bridges/Passenger Boarding Bridges (PBB)	Design of air bridges that may lead to ground collisions or injuries.
Design of Ground Support Equipment (Non-Motorised)	Design of non-motorised airport ground support equipment including steps, baggage trollies/dollies may lead to damage and/or injuries.
Design of Vehicles (Motorised GSE)	Design of motorised airport ground support equipment including belt loaders, baggage trucks, catering trucks, fuel bowsers and pushback equipment etc. may lead to damage and/or injuries.
Embarkation and Disembarkation of Passengers	The change of centre of gravity during embarkation/disembarkation might lead to ground tipping and related potential damage and injuries.
Emergency/Abnormal Operations	The supervision, coordination and control of emergency/abnormal operations may lead to damage, injuries, and/or impaired responses to emergencies.

Fuelling Operations	The management and handling of the refuelling process and its coordination/oversight.
Ground Operations in Adverse Weather Conditions	Negative effects of adverse weather on ground operations including low visibility, high winds, thunderstorms, and extreme temperatures etc.
Ground Staff Movement around Aircraft	Unsafe movement of personnel takes place around an aircraft 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.
Handling of Passengers with Reduced Mobility	Handling of passengers with reduced mobility may lead to injuries.
Jet Blast	The management of ground running or taxi patterns lead to injuries or damage due to jet blast.
Load Sheets and Other Documentation/ Systems	Errors and omissions in load systems and documentation or systems for recording loading of aircraft.
Occurrence Reporting and Sharing of received Information	Occurrences reported to authorities and/or organisations are not always shared with the organisations involved in the occurrence. Example: Report submitted by an airline concerning a ground handling issue is not always shared with the ground handling provider and/or the aerodrome operator.
Operation of Air Bridges/Passenger Boarding Bridges (PBB)	The operation of air bridges that may lead to ground collisions or injuries.
Operation of Ground Equipment (Non-Motorised)	Operation of non-motorised ground equipment that may lead to ground collisions or injuries.
Operation of Vehicles (and Other Motorised GSE)	The operation of vehicles/motorised ground equipment that may lead to ground collisions or injuries.
Parking and Positioning of Aircraft	The marshalling, parking or positioning of aircraft that may to lead to damage or injuries. This includes problems with visual parking aids and stand allocation.
Positioning and Securing of Ground Equipment	The positioning or inadequate securing of ground equipment such as baggage trolleys/dollies, Unit Load Devices (ULDs) etc. or steps that may be blown around the apron in bad weather.
Pushback Operations	The management, handling or coordination of the pushback may lead to damage and/or injuries.
Runway/Taxiway Design and Layout	Runway/Taxiway design and layout problems that may induce runway incursions or the potential for collisions and aircraft damage. Continuous monitoring of occurrences related to Aerodrome Design and Layout.
Serviceability of Air Bridges/Passenger Boarding Bridges (PBB)	Serviceability and maintenance of air bridges that may lead to ground collisions or injuries.
Serviceability of Apron/Stand	Serviceability and maintenance of aprons/stands that may lead to collisions, damage, and/or injuries.

Serviceability of Runways/Taxiways	Serviceability and maintenance of runways/taxiways that may lead to collisions, damage, and/or injuries.
Serviceability of Ground Equipment (Non-Motorised)	Serviceability of non-motorised airport ground support equipment including steps, baggage trollies/dollies may lead to damage and/or injuries.
Serviceability of Vehicles (Motorised GSE)	Serviceability of motorised airport ground support equipment including belt loaders, baggage trucks, catering trucks, fuel bowsers and pushback equipment etc. may cause damage and/or injuries.
Terminal Design and Layout	Terminal design and layout problems that may induce the potential for collisions, aircraft damage, and injuries. Continuous monitoring of occurrences related to Aerodrome Design and Layout.
Transition of Ground Handling service contracts	The transition of the ground handling operations between service providers might induce damage and/or injuries.
Transition of Other Aerodrome Related Service Contracts	The transition of other aerodrome related services (example: passenger bridges, Passengers with Reduced Mobility (PRM) service) between service providers might induce damage and/or injuries.
Unreported Events	Events go unreported due to fear of repercussions/lack of training etc. For damage to composite structures there might be more significant damage not visible.
Worker Fatigue leading to Human Error	Inability to recruit and retain ground handling staff is leading to staff shortages, long working hours and an ageing workforce. In the long term, if left unchecked, commercial growth & expectations will exceed human resources, resulting in unsustainable operations with possible safety critical impact on flight safety due to human error.

PP. 130-132
ABOVE
Table 26. Operational Safety Issues With Problem Statements

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TOP
Table 27. Human Factors related Safety Issues With Problem Statements

BELOW
Table 28. Organisational Safety Issues With Problem Statements

6.1.2.5 Human Performance Safety Issues

Title	Problem statement
Crew Resource Management (CRM) and Operational Communication	Ineffective CRM and communication (including ground crew-ground crew and ground crew-cockpit crew), including Language Proficiency, Use of Standard Terminology, Hand Signals, Visual Communication, Distraction from external sources (ex. Mobile Phones).
Decision Making and Planning	Incorrect or inadequate planning and decision making by individuals.
Experience, Training and Competence of Individuals	Individuals (all types of actors) have insufficient experience, training or competence to perform the duties that they have been assigned. This can be as a result of having a seasonal workforce or high staff turnover.
Fatigue	Inability of individuals to perform at their best due to fatigue. In the aerodromes environment, both physical and mental fatigue can become a safety issue. Staff can have long working hours and overtime during peak season.
Perception and Situational Awareness	Incorrect perception and inadequate situational awareness of individuals. This can be the result of a noisy or inadequately lit environment.
Personal Pressure and Arousal	Inability of individuals to perform to their best due to pressure or lack of/ excessive arousal. Aerodromes experience peak traffic followed by very low traffic flows, causing problems with both over and under work.
Weather Effects	Inability of individuals to perform at their best due to the effect of weather.

6.1.2.6 Organisational Safety Issues

Title	Problem statement
Commercial Pressures	Commercial pressures (e.g. Seasonal Workforce/ Contracts/On-Time Performance/Non-Aviation Regulations) have an effect on Safety.
Effectiveness of Safety Management	Lack of or Ineffective implementation of Safety Management Systems.
Operational Stability	Unpredictable operational disruptions have an effect on safety.
Recruitment and staffing	Aviation career opportunities fail to attract a younger workforce.
Safety Culture	Inadequate Safety Culture in all levels of the organisation (including Senior Leadership Role in Safety)

CHAPTER 7
ATM/ANS

The scope of this chapter covers accidents and serious incidents related to the provision of Air Traffic Management / Air Navigation Service (ATM/ANS) services in the EASA Member States (MS) and the analysis thereof. The analysis includes accidents and serious incidents extracted from the EASA's Occurrence Database, which occurred within an EASA MS as State of Occurrence, involving at least one CAT aircraft, either fixed wing aeroplane with MTOW of 2250 kg or above, or small (CS-27) or large (CS-29) helicopter. It should be noted that CAT helicopter operations were included in the statistics of this chapter last year for the first time.

It is worth noting that the accidents and serious incidents mentioned in this chapter are those related to the provision of ATM/ANS services, which means that the ATM system may or may not have had a contribution to the given occurrence, but may play a role in preventing or mitigation of similar occurrences in the future. These are named as "ATM/ANS related". Among them, there are occurrences where the ATM/ANS provision of services was a factor contributing to the occurrence, or at least the ATM/ANS services played a role in aggravating the occurrence encountered by the aircraft. These events are usually known as events with "ATM/ANS contribution". In the chapter, these two categories are distinguished when necessary.

The ATM/ANS Collaborative Analysis Group (CAG) launched in 2017 has developed an ATM/ANS Safety Risk Portfolio identifying key risk areas and main safety issues in relation to the ATM/ANS provision of services. The group is updating the portfolio on regular basis and working to analyse the safety issues identified. The chapter introduces the key statistics on ATM/ANS occurrences and concludes with an update of the ATM/ANS safety risk. The safety issues included in the portfolio are prioritised based on the analysis of accidents and serious incidents collected in the EASA database and its associated European Risk Classification Scheme (ERCS) score. The safety issues will be later completed by the ATM/ANS group with expert advice and additional occurrence data analysis from other sources (e.g., European Central Repository) as to prioritise the safety issue assessments and derive actions that will be included in the European Plan for Aviation Safety (EPAS).

7.1.1 Key Statistics

The key statistics for this domain are in the tables below and include a comparison of the number of fatal and non-fatal accidents and serious incidents for the 10-year period 2008-2017 and the year 2018. It also includes a comparison of fatalities and serious injuries in those accidents.

Table 30 shows that there was one non-fatal accident with contribution from ATM/ANS services provided in EASA MS in 2018. Fatal accidents with ATM/ANS contribution remained at zero for the last ten-year period, and the non-fatal accidents (one) and serious incidents (four) were lower than the average in previous ten-year period. Two fatal accidents and four non-fatal accidents ATM/ANS related occurred in 2018. The total number of non-fatal accidents and the number of serious incidents ATM/ANS related in 2018 remains lower than the average of the preceding ten-year average period. With regard to fatalities and injuries, the number of fatalities in events where there was ATM/ANS contribution, was zero and there was

2008 - 2017 total	TIMESPAN	2018	
7	ATM/ANS related	2	↑
	FATAL ACCIDENTS		
0	ATM/ANS contribution	0	=
55	ATM/ANS related	4	↓
	NON-FATAL ACCIDENTS		
12	ATM/ANS contribution	1	↓
334	ATM/ANS related	38	↑
	SERIOUS INCIDENTS		
133	ATM/ANS contribution	4	↓

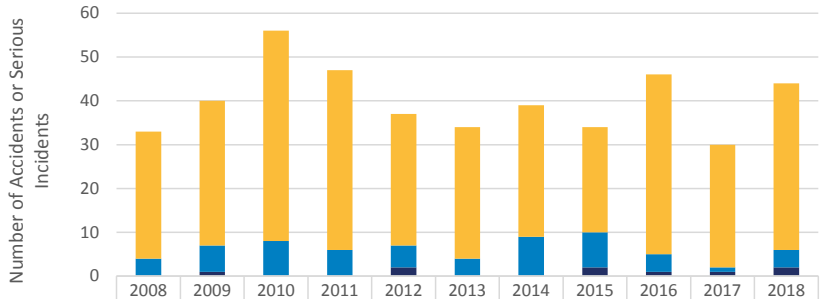
2008 - 2017 total	TIMESPAN	2018	
24	ATM/ANS related	12	↓
	FATALITIES		
0	ATM/ANS contribution	0	=
50	ATM/ANS related	3	↑
	SERIOUS INJURIES		
2	ATM/ANS contribution	1	↓

Table 29. Key Statistics For ATM/ANS

one serious injury in 2018. For the ATM/ANS- related occurrences, the fatalities and serious were twelve and three, respectively.

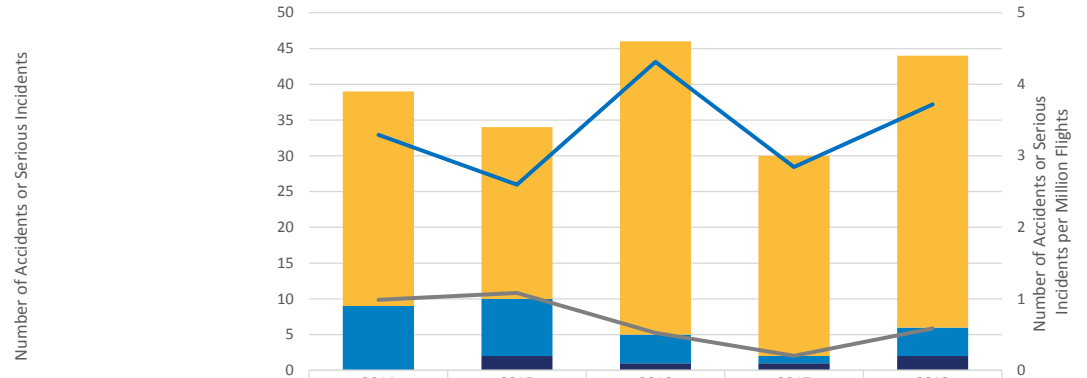
Figure 78 shows the number of accidents and serious incidents throughout the last decade. In the last four years, fatal accidents with some relation to ATM/ANS have occurred. These accidents mainly involved helicopters and none of them had ATM/ANS contribution. The last accident with ATM relation that involved only CAT fix-wing aeroplanes occurred in 2012.

Figure 79 shows that the rate of ATM/ANS related accidents (fatal and non-fatal) per millions of IFR controlled flights has increased in 2018 after a decreasing trend since 2015, but still below 1 accident per million flights. The rate of serious incidents, despite the steady increase of flights, does not show a stable trend.



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Serious Incident	29	33	48	41	30	30	30	24	41	28	38
Non-Fatal Accident	4	6	8	6	5	4	9	8	4	1	4
Fatal Accident	0	1	0	0	2	0	0	2	1	1	2

TOP **Figure 78.** Number Of ATM/ANS Related Accidents And Serious Incidents Per Year 2008-2018

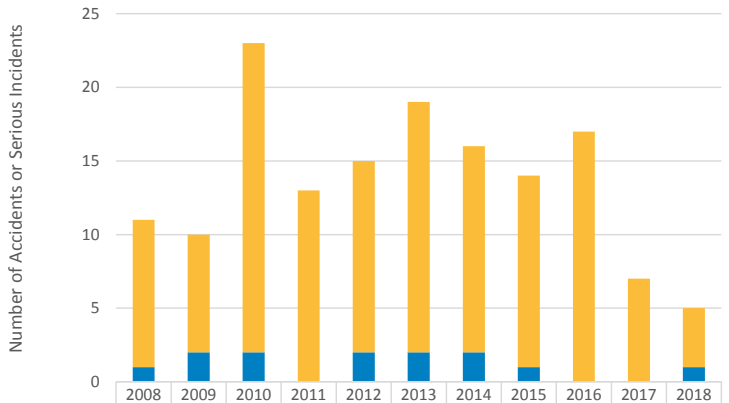


	2014	2015	2016	2017	2018
Serious Incident	30	24	41	28	38
Non-Fatal Accident	9	8	4	1	4
Fatal Accident	0	2	1	1	2
Serious incident rate per million flights	3.29	2.60	4.31	2.84	3.72
Accident rate per million flights	0.99	1.08	0.53	0.20	0.59

BELOW **Figure 79.** Rates Of ATM/ANS Related Accidents And Serious Incidents Per Year 2014-2018

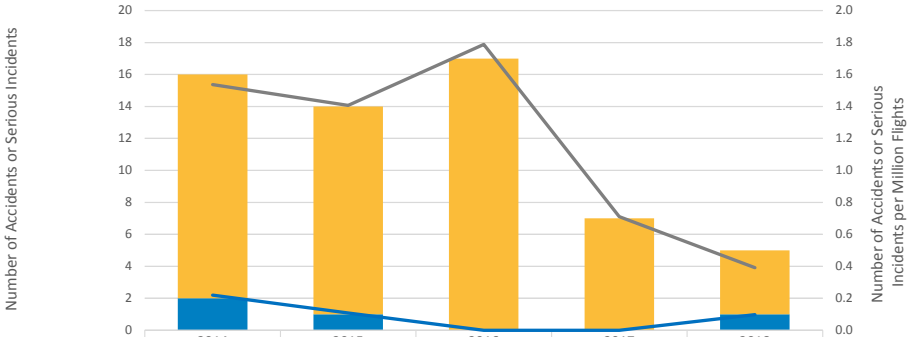
Figure 80 illustrates that, when looking at those occurrences with some level of contribution of the ATM/ANS services, no fatal accidents have occurred in the last decade, with only one non-fatal accident in 2018, after two consecutive years without any accident. The number of serious incidents with ATM/ANS contribution has decreased to a minimum of four in the last decade.
The decreasing trend in the last 5 years is also observed in the rate of serious incidents with ATM/ANS contribution, as Figure 81 illustrates. The accident rate has increased when compared to the previous two years, which was zero. This fluctuation is of no surprise with such low numbers of accidents and serious incidents.

The statistics of accidents and serious incidents does not necessarily represent an accurate picture of the risk of past events, as each occurrence of the same kind may bear a different risk, and even some accidents may be considered to bear lower risk than some serious incidents. For example, a near-miss involving an aircraft with the Traffic Alert and Collision Avoidance System (TCAS) unserviceable



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Serious Incident	10	8	21	13	13	17	14	13	17	7	4
Non-Fatal Accident	1	2	2	0	2	2	2	1	0	0	1
Fatal Accident	0	0	0	0	0	0	0	0	0	0	0

TOP
Figure 80. Number Of ATM/ANS Contribution Accidents And Serious Incidents Per Year 2008-2018

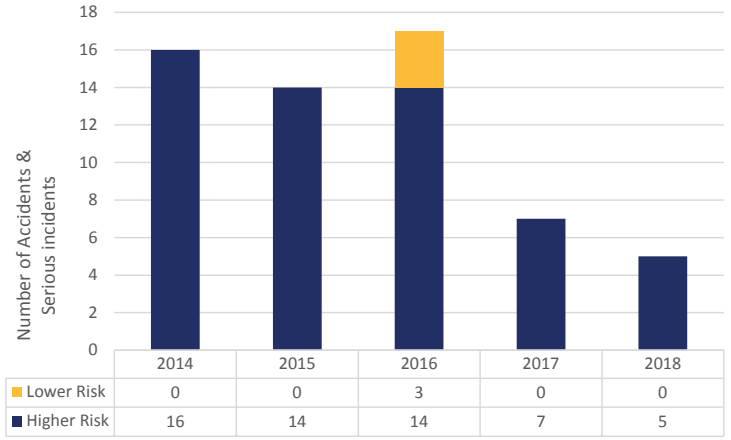


	2014	2015	2016	2017	2018
Serious Incident	14	13	17	7	4
Non-Fatal Accident	2	1	0	0	1
Fatal Accident	0	0	0	0	0
Accident rate per million flights	0.2	0.1	0.0	0.0	0.1
Serious incident rate per million flights	1.5	1.4	1.8	0.7	0.4

BELOW
Figure 81. Rates Of ATM/ANS Contribution Accidents And Serious Incidents Per Year 2014-2018

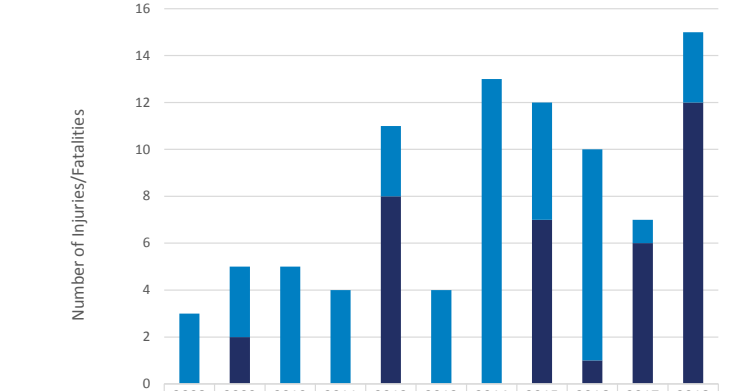
may be classified as a serious incident, while a collision between a ground handling vehicle and an aircraft would be classified as an accident.
However, based on the potential credible consequences of both events, the serious incident notionally would bear higher risk than the described accident. This led the Regulation (EU) 376/2014 to consider the development a common risk classification scheme i.e. the ERCS to risk classify all occurrences reported to the European Aviation Authorities.

The main purpose of this method is to associate a risk score to each occurrence store in the EASA's database. Figure 82 shows the distribution of aggregated higher and lower risk events with ATM/ANS contribution in the last 5 years. As indicated by Figure 82, an overall decrease in risk levels has been observed in recent years.
The fact that only one non-fatal accident occurred in the last three years and that most of the serious incidents that occurred in the last five years were classified as higher risk suggest that performance of the system can be further improved and that effort should still be dedicated towards this objective.
As can be seen in Figure 83 below, the number of fatalities per year in ATM/ANS related accidents does not follow a clear pattern. It highly depends on the size of aircraft involved in accidents that occurred. In 2018, the two accidents that occurred resulted in twelve fatalities.



	2014	2015	2016	2017	2018
Lower Risk	0	0	3	0	0
Higher Risk	16	14	14	7	5

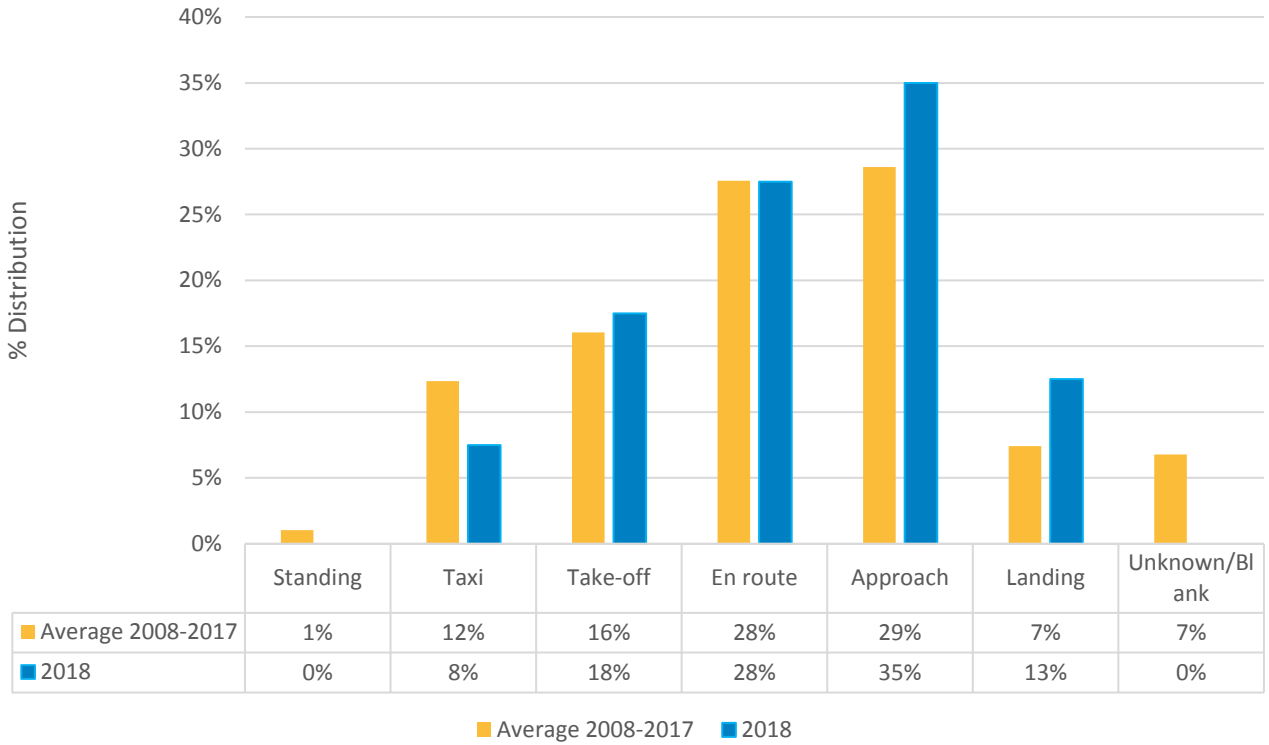
Figure 82. Higher And Lower Risk Scored Accidents And Serious Incidents With ATM/ANS Contribution Per Year 2014-2018



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total Seriuos Injuries	3	3	5	4	3	4	13	5	9	1	3
Total Fatalities	0	2	0	0	8	0	0	7	1	6	12

Figure 83. Fatalities And Serious Injuries In ATM/ANS Related Accidents Per Year, 2009-2018

7.1.1.1 Phase of flight



	Standing	Taxi	Take-off	En route	Approach	Landing	Unknown/Blank
Average 2008-2017	1%	12%	16%	28%	29%	7%	7%
2018	0%	8%	18%	28%	35%	13%	0%

Figure 84. Phase Of Flight In ATM/ANS Related Accidents And Serious Incidents Per Year 2008-2018

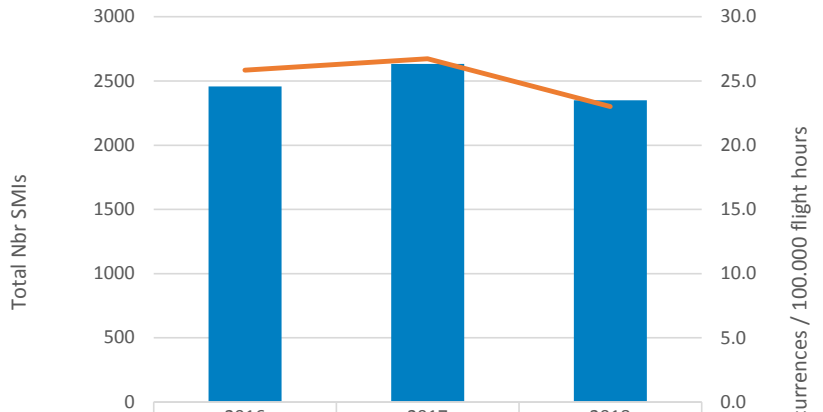
With regard to the flight phase, the majority of ATM/ANS-related accidents and serious incidents took place during the en-route and approach phases, followed by take-off, taxi and landing phases. By comparing the percentages of flight phase distribution in 2018 data with the 2008-2017 average, differences are not remarkable and follow the same distribution, with a small increase in the proportions of events in the approach phase. "Unknown/blank" corresponds to those occurrences where no data is available for one or both aircraft involved in the event. The number of occurrences categorised under "unknown/blank" has decreased, indicating a better and more complete coding of occurrences in the database.

7.2 SEPARATION MINIMA INFRINGEMENTS

This section provides a more detailed analysis of Separation Minima Infringement (SMI) occurrences reported by the EASA Member States.

The sampled data covers accidents, serious incidents and incidents, reported by the EASA Member States under Regulation 376/2014, where the prescribed separation minima between aircraft was not maintained by ATC, regardless of the underlying causes. The data was extracted from the European Central Repository (ECR) and duplicate reports were eliminated. The analysis covers last three years since the entry into force of the Regulation 376/2014. Figure 85 shows that in 2018, the absolute number of SMIs decreased by 10% (2350 vs. 2632) after a slight increase in 2017. This has been observed despite the increase in IFR traffic in Europe by 3.8%, according to Eurocontrol figures. When normalised by traffic the rate of SMI per 100.000 flights decreased to 13.8% in 2018. This indicates that the ATM system is robust and remains safe despite in the increase in IFR traffic.

Figure 85. Number Of Separation Minima Infringements Reports, 2016-2018



	2016	2017	2018
SMIs	2457	2632	2350
Rate [SMIs / 100.000 IFR flight hour]	25.8	26.7	23.0


COA619
061 B737
LOF5414
049 E145
COA186
043 B752
BTA331
038 AT43
COA260
018 MD80

7.3 SAFETY RISK PORTFOLIO OF THE ATM/ANS DOMAIN

This section describes the key risk areas and the safety issues of concern in the ATM/ANS domain that were derived from the occurrence data available in the EASA database, using analysis of accidents and serious incidents. These top risk areas and safety issues are collected in the form of a safety risk portfolio for the ATM/ANS services.

In essence, the analysis of these occurrences has been used to populate a list of indicators (key risk areas and safety issues) of the performance framework in the ATM/ANS domain. The portfolio is then used to prioritise the assessment of safety issues, to target analysis activities in the main key risk areas and to prioritise safety actions, involving various ATM/ANS partners in the recently established ATM CAG, which includes ANSPs, Aviation Authorities, Eurocontrol, organisations of aviation professionals, and airlines.

It is worth noting that the ATM/ANS safety risk portfolio that is described below is a snapshot of the risks borne by past events derived by the limited data analysed,

i.e. accidents and serious incidents. This is considered as an intermediate step towards the final ATM/ANS safety risk portfolio. The incorporation of additional occurrence data not analysed by the Aviation Safety and Investigation Authorities, for example, occurrences reported to the ECR or occurrences analysed by the SMS of organisations providing ATM/ANS services, may change the risk picture shown. This helps to identify additional precursors of accidents, thereby making for a more proactive analysis . In addition, the safety risk portfolio may add other criteria, based on qualitative expert judgement of the ATM CAG members and the EASA operational departments that consider, for example, the effectiveness of existing controls and barriers and the expected risk reduction by recently implemented safety actions. This will help close the gap of risks that are not observable in the data sample. By supplementing the analysis with this additional information, the safety risk portfolio may change both in terms of additional safety issues and a different prioritisation for analysis of safety issues.

7.3.1 Key Risk Areas

To identify the top key risk areas in the ATM/ANS domain, the ATM/ANS related accidents and serious incidents of the last 5 years were assessed, risk classified using the draft common risk classification scheme (ERCS), and the ERCS risk scores aggregated. The results are illustrated in Figure 86. The figure depicts the number of higher risk occurrences per key risk area in the x-axis and the aggregated ERCS risk score of those higher risk occurrences for each key risk area in the y-axis, which is used as a proxy of the associated safety risk. It shows that the top key risk areas in the ATM/ANS domain are, runway collision and airborne collision, which are ranked higher in the aggregated ERCS score and frequency of occurrences. In a second layer of priority, the key risk areas of runway excursion, terrain collision and injuries are placed. Finally, a third layer of priority includes the remaining key risk areas (i.e., ground collisions, aircraft upset, technical failures, obstacle collisions and security). The figures indicate that the average risk in the runway incursion events reported is higher than the average risk per mid-air collision event.

The top key risk areas highlighted above, are defined by their most credible accident outcome and by the immendiate precursors of that accident outcome:

Runway Collision: This key risk area includes all occurrences involving actual or potential runway collisions between an aircraft and other aircraft, vehicle or person that occurs on the runway of an aerodrome or other designated landing area. This includes occurrences 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. It does not include occurrences involving wildlife on the runway.

Airborne Collision: This key risk area includes occurrences involving actual or potential airborne collisions between aircraft while both aircraft are airborne and between aircraft and other controllable airborne objects such as drones (which excludes birds and wildlife). This includes all separation-related occurrences regardless the cause, AIRPROX reports and genuine TCAS/ACAS alerts. It does not include false TCAS/ACAS alerts caused by equipment malfunctions or loss of separation with at least one aircraft on the ground, which may be coded as runway or movement area collision if the occurrence meets the criteria.

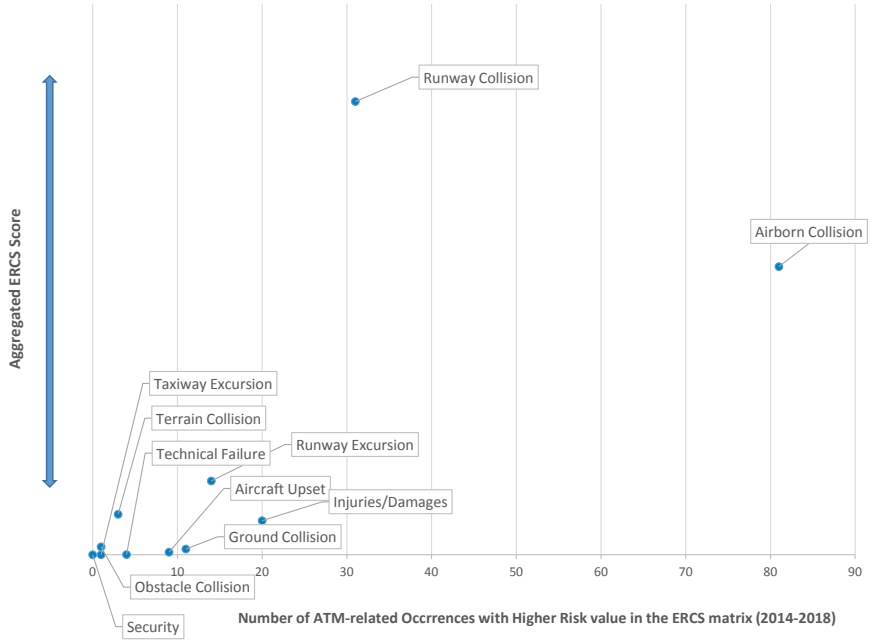


Figure 86. Comparison Of Number Of Occurrences And Aggregated ERCS Score Per Key Risk Area, 2014-2018

7.3.2 Safety Risk Portfolio

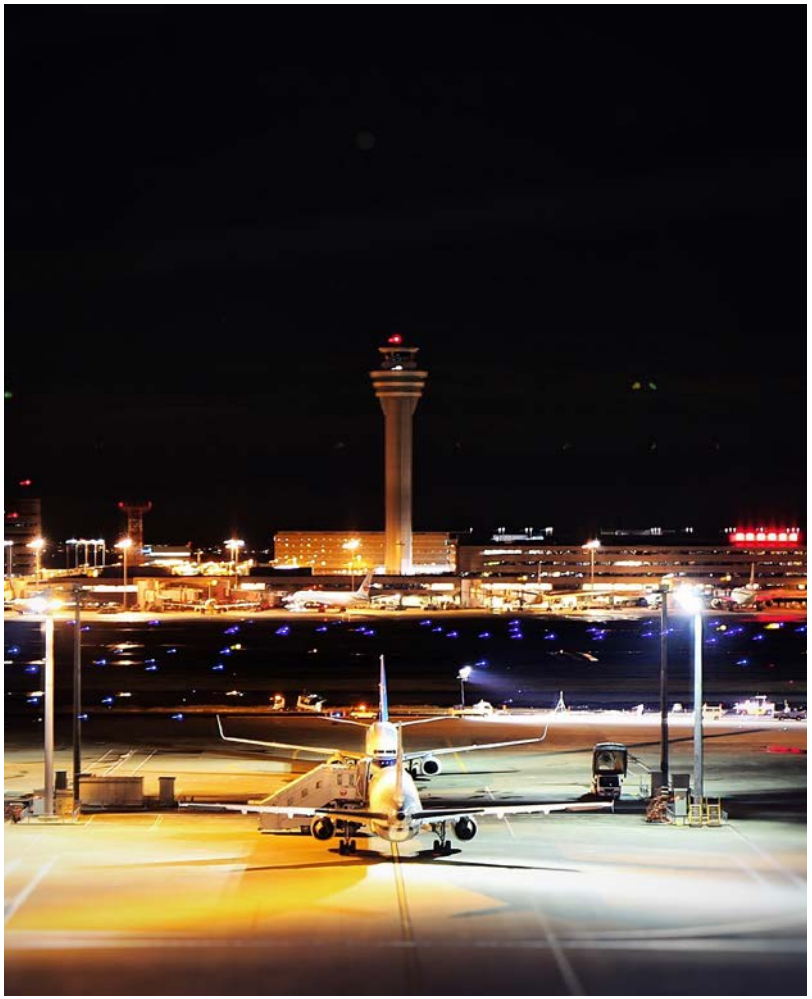
The safety risk portfolio derived from the sample of ATM/ANS related accidents and serious incidents in the last five years is shown in Table 30.

The top row of the table includes the key risk areas ranked by the agreggated ERCS score. Along the left-hand side are the safety issues, also ranked by the aggregated ERCS risk score.

This indicator is used as a proxy of the risk associated with the safety issue, based exclusively on the occurrences reported and linked to these safety issues. It is considered to be a better reference than the pure sorting by the number of accidents and serious incidents.

Some safety issues depicted were identified by the ATM CAG group and EASA operational departments but had not been found in the data sample. This does not mean that they are not relevant, it only means that they are not observable in the data. This is not surprising, as many of them are emerging issues which have not yet resulted in occurrences.

The ATM/ANS risk portfolio is being further modified by inputs from the ATM CAG and EASA operational departments, with additional expert judgement to prioritise the analysis of safety issues.



The safety issues with higher risk scores identified in the Table 30, based on the data, are as follows:

- **Undetected occupied runway**. Involves runway incursions with aircraft landing/taking-off and the ATC missing that the runway is occupied by a vehicle or aircraft that had received a clearance to be on the runway.

- **Deconfliction IFR vs VFR flights**. Involves ineffective deconfliction of IFR vs VFR flights in an airspace class where IFR-VFR are not provided (i.e., class D, E, and G), which may lead to AIRPROX events and ultimately to airborne collision.

- **Airspace Infringement.** 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.

- **High energy runway conflict.** Involves runway incursions in which, at the time of the ATCO becoming aware of the conflict, the aircraft has reach a certain high kinetic energy, the landing aircraft is close to the runway threshold or is already lined-up, in case of taking-off, and in the time available to ATC to prevent a collision is very short.

- **ACAS RA not followed by the pilot**. Involves encounters where the TCAS system installed on board of aircraft triggered a Resolution Advisory message and one of the aircraft's flight crew (or both) did not follow the instruction given by the TCAS to resolve the conflict and avoid the mid-air collision.

- **Provision of weather information (wind at low height).** It involves inaccurate or missing wind-related information provided to the crew by ground (e.g., tail wind on ground, gusts) during the approach phase, which may lead to increase of non-stabilised approaches and thus increasing the risks of runway excursions.

It is worth noting that this ranking and the list of safety issues in the Table 30 may change when additional occurrence data, that is, other than accidents and serious incidents, are added and/or when complemented with qualitative criteria evaluated by the ATM CAG and EASA operational departments.

One example of additional criteria that could be used is to prioritise safety issues that involve not only ATM/ANS related occurrences, but those that have contribution from the ATM/ANS services, and therefore, where the ATM/ANS has greater managerial control to mitigate the risks.

AIR TRAFFIC MANAGEMENT / AIR NAVIGATION SERVICES

Bands of Aggregated ERCS Risk Score (2014-2018)

SAFETY ISSUES	Key Risk Areas								
	Runway Collision	Airborne Collision	Runway Excursion	Terrain Collision	Injuries/ Damage	Obstacle Collision In Flight	Ground Collision	Aircraft Upset	Taxiway Excursion
Undetected occupied runway	x	o							
Deconfliction IFR/VFR		x							
Airspace infringement		x							
High energy runway conflict	x		o	o					
Wind information (wind at low height)		o	x					o	
TCAS RA not followed		x							
Without transponder (due to failure) or dysfunctional one		x							
Weather information (turbulence/windshear/convective weather)		o	o		x			o	
Landing/takeoff without clearance	x	o							
Integration of RPAS/Drones		x							
Blind spot		x							

X = Higher risk occurrences
O = Lower risk occurrences

Priority 1 Priority 2 Priority 3 Priority 4

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Table 30. ATM/ANS Safety Risk Portfolio

Bands of Aggregated ERCS Risk Score (2014-2018)

SAFETY ISSUES	Key Risk Areas								
	Runway Collision	Airborne Collision	Runway Excursion	Terrain Collision	Injuries/ Damage	Obstacle Collision In Flight	Ground Collision	Aircraft Upset	Taxiway Excursion
Level Bust		x		o	o			o	
ATM influence on the non-stabilised approaches			x	o				o	
Navigation service		o		o					
Surveillance service		o		o					
Coordination/handling of pushback							o		
Air/Ground communications		o							
Ground Operations in Adverse Weather Conditions	No Data								
Cybersecurity									
New technologies and automation (e.g. rTWR, SWIM)									
ATCO-pilot operational communication									
Procedure design and obstacle publication									
Understanding and monitoring system performance interdependencies									
Safety Culture									

APPENDIX 1
LIST OF FATAL ACCIDENTS

1.1 Aeroplanes

1.1.1 Commercial Air Transport Airline and Air-Taxi

Local date	State/area of occurrence	Location	Aeroplane	Headline
20/08/2008	Spain	Madrid Airport	MCDONNELL DOUGLAS	Loss of control on take-off from Madrid Barajas, due to incorrect take-off configuration and disabled warning. Post-crash fire.
01/06/2009	South Atlantic Ocean	Close to waypoint TASIL	AIRBUS - A330 - 200	Loss of control during cruise due to incorrect handling of technical failure. Aircraft crashed into the sea.
10/02/2011	Ireland	Cork Airport	SWEARINGEN - SA227 - BC	Loss of control during landing below weather minima. Impacted runway inverted.
11/11/2012	Italy	Roma Fiumicino Airport	AIRBUS - A320	Loading crew caught between loader and baggage door during aircraft ground handling operation.
24/07/2014	Mali	80 km south-east of Gossi	DOUGLAS - DC9 - 80 - 83	Loss of control due to incorrect engine power. Anti-icing system not activated leading to the blockage of the engine pressure sensor by ice crystals. Aircraft stalled and crashed.
20/10/2014	Russian Federation	Vnukovo Airport, Moscow	DASSAULT - FALCON 50 - EX	Aircraft collided with a snowplough vehicle during take-off run. Aircraft was destroyed by fire.
24/03/2015	France	Prads-Haute-Bléone, France	AIRBUS - A320 - 200 - 211	First officer alone in the cockpit, initiated a rapid descent - Aircraft impacted mountainous terrain.
08/01/2016	Sweden	Oajevágge, Sweden	BOMBARDIER - CL600 2B19	An Inertial Reference Unit (IRU) malfunction resulted in crew spatial disorientation and loss of control. Aircraft crashed into a mountainous terrain.

1.1.2 Non-commercial Complex - Business[1]

Local date	State/area of occurrence	Location name	Aeroplane type	Headline
10/12/2012	Cyprus	Larnaca	CESSNA - 750 - NO SERIES EXISTS	A service vehicle struck the right wingtip. The vehicle driver was trapped and suffered fatal injuries.
29/04/2013	Congo, Democratic Republic of the	Kinshasa /N'djili	DASSAULT - FALCON 900EX	Aircraft collided with an individual who was not authorised to be on the runway.
12/01/2014	Germany	Near Trier-Föhren Airport	CESSNA - 501	Aircraft collision against power pole during approach in low visibility conditions.
03/10/2015	United Kingdom	Near Chigwell	BEECH - 200 - B200	Aircraft loss of control shortly after take-off in low visibility conditions.
04/01/2018	Finland	Kittilä airport	GULFSTREAM - GULFSTREAM 150	Fatal injuries to captain due to door opening violently.

1.1.3 Specialised Operations

Local date	State/area of occurrence	Location name	Aeroplane type	Headline
11/01/2008	Slovenia	Trbovlje	ANTONOV - AN2	Aircraft crashed into mountain during low visibility conditions
26/04/2008	Germany	Eisenach-Kindel	ZLIN - Z37	Runway excursion after aborted take-off at airshow, aircraft impacted spectators
10/05/2008	Romania	Ulmeni	PZL OKECIE	Aircraft crashed during crop spreading operation, post-impact fire
14/05/2008	Bulgaria	Topoli village, near LBWN	LET	Collision with power lines during manoeuvring at low height
30/05/2008	Spain	near Lillo y Villatobas	PILATUS - PC6	In flight structural failure in turbulence
14/06/2008	France	Connantre (51)	PIPER - PA38	Loss of control in flight, collision with the ground during an air race

1 The scope of this sub-chapter has changed from previous year, covering now the whole NCC Business spectrum. Statistics in previous years' publications are likely to defer.

14/06/2008	France	Castres (81)	MININA GERARD MININA MG 3	Loss of control during practice for airshow
28/06/2008	Spain	Sa Pobla (Illes Balears)	CESSNA - 172 - N	Collision with terrain.
12/08/2008	Italy	località Val Vibrata, Corropoli, Teramo	PIPER - PA18 - 150	Piper PA18-150 - Loss of control in flight and ground impact- 1POB - 1OB Fatal - A/C Destroyed
20/06/2009	Czech Republic	200 m left RWY 24, LKCR	LET	Loss of control during parachute operations
08/07/2009	United Kingdom	Bishop Norton (Lincolnshire)	PERCIVAL	Mechanichal engine failure and in-flight fire
18/07/2009	Hungary	LHDK	ZLIN - Z42	Crash when performing low-level aerobatics
14/08/2009	Portugal	Evora - Bairro de Almeirim	BEECH - 99	Loss of control during single-engine go-around
23/08/2009	Germany	Erpfental near Ellwangen	CESSNA - F182 & ROBINSON - R44	Mid-air collision between aeroplane and helicopter near airshow
06/09/2009	Italy	LIPO Airport	MUDRY - CAP10	Aircraft impacted on ground during aerobatic manoeuvre.
09/10/2009	Italy	Canevare (Modena)	PARTENAVIA - P68	Loss of control inflight
28/05/2010	Czech Republic	LKTO	ZLIN - Z142	Aircraft crashed shortly after take-off
29/05/2010	Spain	Aldeanueva de Barbarroya (To)	PIPER - PA25	Stall during flight.
19/06/2010	United Kingdom	Methley Bridge (West Yorkshire	EXTRA - EA300	Aircraft crashed while performing an aerobatic display
17/08/2010	Spain	Aerodr. Casarrubios del Monte	ZIVKO - EDGE 540	Collision with terrain during aerobatic manoeuvre
04/09/2010	United Kingdom	Near Ryde, Isle of Wight	MOONEY - M20 & VANS - RV4	Mid-air collision during Merlin Trophy Air Race
05/09/2010	Germany	Lauf-Lillinghof	DE HAVILLAND - DH82 - A	Collision with airshow spectators during take-off

19/09/2010	Germany	Warngau (Miesbach)	EXTRA - EA300 & XtremeAir 3000	Mid-air collision during airshow
02/10/2010	France	Les Moëres	CESSNA - F172 - M & Aveko VL3B	Mid-air collision
12/10/2010	Spain	Navarra	ROBIN - DR400	Collision with terrain during cruise
11/01/2011	Italy	Airport LIRG	ROBIN - DR400 - 180R	Robin 400 180R while towing a sailplane in the take-off phase crashed.
02/06/2011	Netherlands	EHTE	CESSNA - F172	The aircraft crashed after pick up of a banner
18/06/2011	Poland	Plock - Wisla River	CHRISTEN - EAGLE II	Crash during aerobatics over river
04/07/2011	France	AD Dijon-Darois (21)	SOCATA	Stall of towing aircraft after sailplane release
30/08/2011	Poland	Nowy Targ	PZL OKECIE	Loss of control during approach and subsequent crash with post-impact fire
28/04/2012	Germany	Alkersleben	ZLIN - Z226	Aircraft touched the ground after a formation flight
05/05/2012	France	AD Buno Bonnevaux (91)	PIPER - PA25 - 235 & SLINGSBY - T31	Mid-air collision between a sailplane and an aeroplane above runway
17/06/2012	Romania	Banesti, Prahova	AEROSTAR R40S FESTIVAL	Collision with power cables on approach and subsequent crash and post-impact fire
22/07/2012	France	AD Couhé Vérac (86)	SALIS JEAN FOKKER DR-I	Loss of control and subsequent crash during airshow
07/09/2012	Italy	Rome	CESSNA - 402	Aircraft impacted terrain during aerial work operations - aerial photography
09/09/2012	Germany	Backnang-Heiningen	ROBIN - DR400 - 180R	Loss of control during take-off due to wake vortex
22/10/2012	Netherlands	EHAA	DIAMOND - DA40 & GENERAL AVIA - F22	Mid-air collision during photography flight
09/03/2013	Czech Republic	600m N Srbce (Chrudim)	ZLIN - Z37 - A	Aircraft collided with trees in IMC
05/05/2013	Spain	Madrid-Cuatro Vientos Airport (LECU)	HISPANO AVIACION - HA200 - D	Aircraft crashed during airshow
08/05/2013	Netherlands	Egmond aan Zee, Noord-Holland	CESSNA - 172 - P	Ditched in North Sea near Egmond

01/06/2013	Sweden	Söderhamn Airport	SAAB - 91	Engine failure during airshow due to loose spark plugs
29/06/2013	Germany	Eberswalde-Finow	ZLIN - Z526 - AFS	Aircraft crashed during aerobatics
30/06/2013	Sweden	Near Veberöd, Sweden	GRUMMAN - GA7	Crash in a field after reported engine problems
19/10/2013	Belgium	Gelbressee	PILATUS - PC6	Abrupt manoeuvre - left wing structural failure due to a significant overload - A/C out of control crashed into a ploughed field
20/04/2014	Finland	2 km from Jämi-järvi airfield EFJM, Satakunta	Comp Air 8 Turbine	During climb, right wing broke due to a fatigue failure - aircraft entered a spin, crashed and caught fire.
08/05/2014	Latvia	EVLA - Liepaja	PITTS - S2 - B	Aircraft crashed during aerobatic routine
06/06/2014	Czech Republic	near Krizanov airfield, LKKA	TECNAM - P92	Crashed shortly after take-off whilst sailplane towing. Sailplane disconnected and landed safely.
23/06/2014	Germany	Near Olsberg-Elpe	LEARJET - 35 - A & Military Aircraft	Mid-air collision.
05/07/2014	Poland	Topolów district Mykanów	PIPER - PA31P	Engine problems during climb-out, loss of height and collision with ground.
19/07/2014	Czech Republic	1 NM S LKKM	ZLIN - Z526 - F	The aircraft entered an inverted spin and impacted the ground
13/09/2014	France	At FL110 AD Tarbes Laloubère	CESSNA - U206 - F	Parachute opened upon parachutist leaving the aircraft, parachute struck the tail of the aircraft and damaged part of the stabilizer, loss of control of aircraft and subsequent crash
21/09/2014	Italy	near Venezia Lido Airport	XTREMEAIR - Xtreme 3000	Aircraft crashed during aerobatics performance
28/09/2014	Italy	Colle di Val d'Elsa, Siena	PITTS	Aircraft fell during aerobatic manoeuvres
30/05/2015	France	Blois	STAMPE - SV4 - C	During aerobatics session the aircraft entered into spin after a half loop manoeuvre and crashed
31/05/2015	Adriatic Sea	Tortoreto, Alba Adri-atica (TE)	VANS - RV8 - A & VANS - RV7	Collision of two aircraft in flight during an air show

01/08/2015	United Kingdom	near Oulton Park	OTHER - Military	Collision with terrain during airshow
01/08/2015	Romania	Stancuta, Braila county	PZL MIELEC - AN2 - R	Aircraft crashed shortly after take-off.
20/08/2015	Slovakia	Cervený Kamen	LET - L410 - UVP & LET - L410	Mid-air collision during en-route. Both aircraft were performing parachute dropping operations.
22/08/2015	United Kingdom	near EGKA - Shoreham Airport	HAWKER - HUNTER - T7 - T7	Aircraft crashed on a road during an air show.
23/08/2015	Switzerland	Dittingen LSPD	COMCO IKARUS - IKARUS C42 - B (x 2)	Mid-air collision during airshow
30/08/2015	Austria	Airfield Friesach Hirt, Carinthia	PITTS - S2 - B	Loss of control during Aerobatic show
20/05/2016	Germany	Rodigast	PZL OKECIE - PZL101	Loss of control and subsequent crash into forest
11/06/2016	Italy	Cecina	PILATUS - PC6	Parachutists reserve parachute opened prematurely. Parachutist hit the RH stabilizer - structural damage in flight and crash.
19/06/2016	Portugal	Canhestros – Ferreira do Alentejo	PILATUS - PC6 - B2H4	In-flight fuselage breakup due to material fatigue
18/09/2016	Hungary	Gödöllo Arboretum	PIPER - PA28 - 140 & CESSNA - 182 - D	Two aircraft collided with each other in the vicinity of the airport.
15/08/2017	Spain	Near the 55 kilometer point of N-340 road (Vejer de la Frontera)	PIPER - PA36 - 375	Bird strike followed by crash during fumigation work in a rice field (low altitude operation)
03/09/2017	Italy	Pontinia	CESSNA - 182 - P	Loss of control inflight - crash and fire.
16/09/2017	Slovakia	LZPE	ZLIN - Z37 - C	Loss of control and crash
13/05/2018	Ireland	Approximately 3.5 Nautical Miles (NM) west of Clonbullogue, Co. Offaly	CESSNA - 208 - B	Impact with terrain
31/05/2018	Netherlands	Just outside EHSE: Hoeven/Seppe	PIPER - PA25 - 235	Aircraft crashed in attempt to pick up commercial text banner

12/06/2018	Spain	LESB : Son bonet	AIR TRACTOR - AT802	Aircraft ditched
27/07/2018	France	Bouloc-en-Quercy	PILATUS - PC6 - B2H4	Wing strike with a skydiver
29/07/2018	Slovenia	AD Bovec	ROBIN - DR400 - 180R	Collision with the ground after towing, fire
08/08/2018	Mauritania	Diatar	AYRES - S2R - T - T34	Aircraft collision with the ground, fire.

1.1.4 Non-commercial Other Than Complex

Local date	State/area of occurrence	Location name	Aeroplane type	Headline
04/01/2016	Netherlands	North Sea, 4.5 NM west from Schoorl	CIRRUS - SR20	Unintended flight in IMC, loss of control and crash to the sea.
16/01/2016	Spain	Serranía de Cuenca Natural Park	SOCATA - TB20	Bird strike - left wing partial detachment - aircraft crashed and caught fire.
09/02/2016	Spain	near Beas de Segura	CESSNA - 172 - P	Aircraft asked a flight path deviation due to bad weather before crash
21/02/2016	France	near AD Vinon	JODEL	Loss of control during initial climb, aircraft crashed
25/02/2016	France	Saint-Héand	EXTRA - EA300 - 200	Collision with high level terrain in adverse weather conditions.
28/02/2016	Hungary	5km SW from Agostyán, Tata	CESSNA - FA152	Aircraft crashed in bad weather conditions.
20/03/2016	Ireland	EIAB - Abbeyshrule	OTHER	Aircraft crashed while executing rolls.
25/03/2016	Hungary	Dány térsége	TECNAM - P2002 - JF	Aircraft crashed due to unknown reasons
30/03/2016	Spain	Perales de Tajuña	CESSNA - 172 - R	A bird strike, wing separation in flight and a crash.
01/04/2016	France	Sondernach	ROBIN - HR100 - 210D	Aircraft crashed and caught fire. The aircraft impacted the ground with a significant pitch down attitude.
01/04/2016	Poland	Chmielewo	TECNAM - P2002	Aircraft lost control and collided with terrain on a steep angle.
20/04/2016	Czech Republic	near LKST - Strakonice	CESSNA - 150	Aircraft lost control and crashed into a meadow.
30/04/2016	United Kingdom	Whitwell-on-the-Hill	SLINGSBY - T67 - MII	Loss of control in flight - Aircraft crashed into a field.
05/05/2016	Germany	Grafenau-Lichteneck	MORANE SAULNIER - MS893 - E	Aircraft collision with the ground due to unknown reasons.
06/05/2016	Austria	near LOAN - Wr.Neustadt / Ost	RANS - S12	Aircraft spin and crash during flight around the aerodrome.
19/05/2016	Spain	Arbizu	ROBIN - DR400 - 180	Aircraft crashed due to bird strike
01/06/2016	France	Coëx	VANS - RV4	Engine shut-down in flight and crash.
09/06/2016	United Kingdom	Near Cushendun,	COMCO IKARUS - IKARUS C42 - FB80	Aircraft crashed into the sea for unknown reasons.

03/07/2016	Germany	Mosbach	OTHER	Loss of Control during take-off.
05/07/2016	Spain	LECU - Madrid / Cuatro Vientos	CIRRUS - SR22	Aircraft crash at the aerodrome during touch and go landing.
08/07/2016	United Kingdom	1 nm north of Dinton, Wiltshire	YAKOVLEV - YAK52	After loss of engine power and unsuccessful forced landing the aircraft crashed in field.
10/07/2016	Austria	LOWZ : Zell am see	PIPER - PA28 - 161	Aircraft not able to maintain climb due to low speed during take-off and stalls followed by crash.
03/08/2016	France	LFCV - Villefranche de Rouergue	JODEL	Crash after unsuccessful landing.
06/08/2016	United Kingdom	English Channel, 1 mile from Winchelsea	PIPER - PA28 - 161	Engine problem reported - most likely carburettor icing, aircraft ditched and sank.
15/08/2016	France	LFNE - Salon / Eyguieres	EXTRA - EA300 - 200	Unconsciousness during a training flight in aerobatics and crash.
25/08/2016	France	Saint-Rémy de Maurienne	JODEL - D11	Loss of control during the initial climb - Aircraft crashed and caught fire.
01/09/2016	Germany	Herlazhofen	ROBIN - DR400 - 140B	Aircraft crashed after engine failure.
01/09/2016	Slovenia	near Cezsoca	PIPER - PA28 - 161	Aircraft crashed due to unknown circumstances.
03/09/2016	Germany	Dierdorf	OTHER	Aircraft crashed due to unknown circumstances.
04/09/2016	Germany	Stettiner Haff	SOCATA - TB20	Aircraft crashed into the ocean.
04/09/2016	Poland	Wrocanka	VANS - RV6	Loss of control shortly after take-off.
05/09/2016	Bulgaria	Dolna Banya airfield	TECNAM - P92	Aircraft collided with high voltage wires and crashed
06/09/2016	Spain	Close to Villanueva del Condado village (León - Spain)	ROBIN - DR400 - 180	On a long visual flight the AC came down at a meadow close to the village buildings.
14/09/2016	Austria	near Sankt Anton, Steißbachtal (Valluga-bahn)	AQUILA - AT01	Collision with cableway.

18/09/2016	Hungary	Gödöllo Arboretum	PIPER - PA28 – 140 and CESSNA - 182 - D	Two aircraft collided with each other in the vicinity of the aerodrome
27/09/2016	France	Saint Ambroix	VANS - RV8	Loss of control at low altitude. A/C crashed and caught fire.
02/10/2016	United Kingdom	near Topcroft Farm Airstrip	NORTH AMERICAN - P51 - D	Aircraft crashed into a tree during aborted landing.
04/10/2016	Slovakia	near Jakubovany	LANCAIR - 360	Probable hypoxia of the pilot and icing of the airframe.
15/10/2016	Romania	Luncani, Cluj County	CESSNA - 182	Skydiver's parachute was deployed while he was inside the aircraft and fell to the ground unconscious.
16/10/2016	Greece	east of Kalabryta	CESSNA - 172 - P	Aircraft crashed into mountain
17/10/2016	United Kingdom	near EGSN - Bourn	CESSNA - F150 - M	Aircraft crashed after take-off.
24/11/2016	Poland	EPZP - Zielona Góra	PIPER - PA31 - 350	Premature LG retraction and crash during take-off.
25/11/2016	France	Jarsy	SOCATA - TB20	Aircraft collision with mountain due to unintended flight into IMC.
04/12/2016	United Kingdom	over Lubenham	CESSNA - 150 – L and PZL BIELSKO - SZD51 - 1	Mid-air collision powered aircraft and sailplane; Sailplane crashed killing the pilot.
07/12/2016	France	in approach to LFSB (MLH) : Bâle Mul-house	PIPER - PA34 - 200T	Crash on a highway when trying to land - fire post impact
19/12/2016	Germany	Garz	TECNAM - P2006T	Aircraft crashed into the forest for unknown reasons.
15/01/2017	Spain	near LEMT - Casarru-bios Del Monte	TECNAM - P2002	Aircraft crashed into a field in a high nose down attitude.
15/01/2017	United Kingdom	Near Aston Rowant Nature Reserve	PIPER - PA30	Aircraft flying at low altitude in IMC condition, crashed into woodland.
02/02/2017	Germany	Melle	DIAMOND - DA20 - A1	Aircraft collided with a wind turbine.
20/02/2017	Guadeloupe	Petit Bourg	PIPER - PA28 - 161	Airplane crashed into a building.
27/03/2017	Ireland	Cloncoskoran, near Dungarvan Co. Wa-terford	RUTAN - LONGEZ	Aircraft crashed in a field due to engine failure.

09/04/2017	France	AD Chelles Le Pin	EVEKTOR AEROTECHNIK - SPORTSTAR RTC	Bounced landing, the student pilot lost the aircraft's control after initiating a go/around. The aircraft crashed in a field.
14/04/2017	Italy	Dovera (CR)	TECNAM - P92	A/C crashed on the ground during VFR flight.
17/04/2017	Portugal	Cascais	PIPER - PA31T	Loss of control after failure of critical engine during take-off
29/04/2017	Spain	Canillas de Aceituno	SOCATA - TB20	Direct impact against the terrain.
25/05/2017	United Kingdom	2 miles north of Skipness, Kintyre	PIPER - PA28R - 201	Aircraft in low stratus clouds, mist and fog, lost from radar, wreckage found in water
28/05/2017	United Kingdom	Apperknowle	EUROPA	A/C partial loss of power as a result of fuel vapour disrupting fuel supply to engine during take-off followed by crash in adjacent field.
18/06/2017	United Kingdom	Spanhoe Airfield, Northamptonshire	AUSTER	Aircraft stall and crash shortly after take-off.
26/06/2017	Czech Republic	LKHD : Hodkovice	PIPER - L4 - J	Aircraft crashed shortly after take-off.
05/07/2017	Switzerland	near LSGN - Neuchatel	CZECH SPORT - PS28 - NO SERIES EXISTS	Pilot lost control after take-off during initial climb.
19/07/2017	Finland	Lievestuore (municipality of Laukaa)	PIPER - J3C - 65 - 65	Aircraft crashed into a forest during final approach in bad weather condition.
21/07/2017	Poland	EPML	OTHER	Loss of control shortly after take-off
28/07/2017	Poland	EPLL	CESSNA - 152	Aircraft collided with trees during approach.
01/08/2017	Norway	Oppland county	AQUILA - AT01	Aircraft crashed into mountain.
02/08/2017	Portugal	Praia de São João da Caparica	CESSNA - 152	Forced landing on the beach due to engine failure. Aircraft collided with pedestrians
04/08/2017	Switzerland	Diavolezza/GR	PIPER - PA28 - 181	Collision with high terrain.
08/08/2017	Germany	Bodensee / Mainau	PIPER - PA46	The aircraft crashed into the Lake Bodensee north of Konstanz.
19/08/2017	Romania	Valcica village, Iasi county	OTHER	Aircraft crashed due to unknown reasons.
20/08/2017	Switzerland	Alp Tsanfleuron, Savièse VS	PIPER - PA28 - 161	Aircraft collided with terrain.

22/08/2017	Norway	near Holmestrand	PITTS - S2 - B	Pilot lost the aircraft control while performing aerobatics manoeuver and crashed.
26/08/2017	United Kingdom	near EGHA : Compton Abbas	DE HAVILLAND - DH82 - A	Engine problems after take-off - crash on return to airfield.
27/08/2017	Germany	Moormeerland	MORANE SAULNIER - MS883	Collision with the ground due to unknown circumstances.
09/09/2017	Italy	Salussola (BI)	PIPER - PA34	Aircraft crashed on the ground during VFR approach in poor weather conditions.
11/09/2017	United Kingdom	Wolferton, Norfolk	PIPER - PA28RT - 201	Rough running engine followed by Mayday call
12/09/2017	Switzerland	Braunwald/GL	MOONEY - M20K	Aircraft crashed in high terrain
12/09/2017	France	Ghisonaccia	DIAMOND - DA42	Aircraft crashed due to unknown reasons.
19/09/2017	Norway	near ENHA - Hamar / Stafsberg	VANS - RV4	Loss of control on approach, spin and crash.
26/09/2017	Czech Republic	near Noviny pod Ralskem	CESSNA - 421 - B	ENG1 failure en-route, spin, ENG2 shut-down; Crash and fire.
28/09/2017	United Kingdom	Grove Farm, Wolvey	EUROPA - EUROPA	On landing, runway excursion through hedge.
17/11/2017	United Kingdom	near Waddesdon	CESSNA – 152 and GUIMBAL - CABRI - G2	Aircraft Mid-air collision between a Cessna and a Guimbal helicopter fatal injuries.
04/01/2018	Finland	Kittilä airport, EFKT	GULFSTREAM - GULFSTREAM 150	Fatal injuries to captain due to door opening violently
08/01/2018	United Kingdom	Near Bredon Hill, Overbury, Worcestershire	PIPER - PA28 - 161	Aircraft struck trees in poor weather
23/01/2018	Germany	Philippsburg	EUROCOPTER - EC135 - P2 and PIPER - PA28RT - 201T	Mid-air collision
29/01/2018	Spain	Villamartín aerodrome, Cadiz	BREEZER	Loss of control followed by crash - during training flight in approach

31/01/2018	Italy	Boscomantico (VR) - LIPN	CESSNA - F150 - L	Aircraft crashed in mountainous area during proficiency check - during circuit pattern downwind in approach
11/02/2018	Norway	Near Svolvær airport Helle	PIPER - PA28 - 161	Crash into the sea shortly after take-off during night conditions whilst returning to departure airport for unknown reason
12/02/2018	Belgium	9,8 NM from EBZW outside the residential area of Bolderberg Heusden Zolder	BEECH - 33 - F33A	Aircraft collided with trees before coming to rest
10/03/2018	Germany	Bensheim	ZENAIR - CH601	Airplane crash
31/03/2018	France	Proche AD Saint Chamond	ROBIN - DR400 - 120	Runway overrun on take-off, collision with an obstacle
08/04/2018	France	AD Lens	YAKOVLEV - YAK18 - A	Aircraft crashed after a rolling to the left followed by a half loop at low height
19/04/2018	United Kingdom	Crumlin	CESSNA - 152	Aircraft crashed by unknown reasons
21/04/2018	Greece	13.26 km East of City of Nafpaktos	PIPER - PA28 - 140	Collision with cable during emergency landing
29/04/2018	Austria	next to LOWI - Innsbruck	RUTAN - VARIEZE	Crash after take-off.
08/05/2018	France	Marnaves	AQUILA - AT01	Aircraft hit tree tops at the top of a ridge, collision with the ground, post-impact fire
11/05/2018	France	AD Nancy-Essey	RUTAN - VARIEZE	Material separating from the aircraft in a crosswind encounter followed by spin, crash, and fire
22/05/2018	Netherlands	Country side near Stolwijk	CESSNA - F172 - N	Collision with trees followed by crash
31/05/2018	Hungary	Pécs-Pogány Airport, SW 1.8 km	OTHER - Generic	Aircraft crashed after take-off and caught fire after the impact
01/06/2018	Sweden	Opand airport	RIHN - DR107 - NO SERIES EXISTS	Accident - Small aeroplane.
02/06/2018	Italy	Malga Casarine - Trento	CESSNA - 152	After a manoeuver to over fly over a mountain the aircraft lost altitude and crashed

20/06/2018	Germany	Mosbach	JODEL - D9	Aircraft crashed shortly after take-off
04/07/2018	Austria	LOAV - Bad Vöslau	CESSNA - 172 - S	Aircraft stall on take-off and crash.
08/07/2018	Latvia	Parish Davini	BUCKER - BU133 - C	Aircraft terrain collision during emergency landing due to low engine oil pressure.
10/07/2018	Portugal	Farm field to 1.2NM West of runway 03 threshold	CESSNA - 152	Aircraft crash for unknown reasons during the RH downwind to runway 21
16/07/2018	France	AD Les Mureaux (close to rwy 10)	TECNAM - P2002 - JF	Loss of engine power in initial climb, collision with the ground, in instruction flight
17/07/2018	France	Mediterranean Sea, near San Giuliano	SOCATA - TB20	Low pass over the sea and crash.
23/07/2018	France	Saint-Pardoux-et-Vielvic	CESSNA - F172 - N	Trajectory deviation. Aircraft crashed
27/07/2018	Switzerland	near Col Durand	ROBIN - DR400 - 180	Collision with elevated terrain in mountainous area
28/07/2018	France	AD Charleville Mézières	ROBIN - DR400 - 180	Engine power loss during initial climb, aircraft turned left and stalled.
04/08/2018	Romania	near Fratau?ii Vechi airfield, LRSV	STEEN – SKYBOLT and STEEN - SUPER SKYBOLT	Collision of two A/C during training for air show
04/08/2018	Switzerland	Rengg Pass (LU)	SOCATA - TB10	Crash during cruise phase
06/08/2018	France	Mazoires	CESSNA - 172 - S	Loss of radio and radar contact, collision with the ground
09/08/2018	Germany	Münster	BEECH - 58	Crash in training flight - during approach
15/08/2018	Italy	Cimadolmo	PIPER - PA18 - 150	Aircraft crashed after a power line collision
16/08/2018	Poland	Smerek	TECNAM - P2002	Low flying; wheel hit a man.
21/08/2018	France	ALP Corlier	ROBIN - DR400 - 180	Aircraft landed before the runway threshold and overturned
24/08/2018	Bulgaria	LBWB	CIRRUS - SR22	Bounced landing with increased angle of attack and bank angle to the left
29/08/2018	France	Bourg-Saint-Maurice	VANS - RV7	Aircraft collision with mountain.

16/09/2018	France	Saint-Secondin	ROBIN - DR400 - 120	Loss of radar contact and collision with the ground
26/09/2018	Germany	Alkersleben	TECNAM - P92 - E	Aircraft crash after engine problems
14/10/2018	Germany	EDER - Wasserkuppe	CESSNA - F172 - N	Runway overrun and with bystanders.
16/10/2018	Germany	near EDKB - Bonn / Hangelar	TECNAM - P2008 - JC	Engine failure
03/11/2018	Italy	Airfield “Caorle” (LIKE)	SIAI MARCHETTI - SF260 - D	Aircraft crashed after a VFR approach
07/11/2018	Norway	Near Meraaker Airfield	VANS - RV6	Aircraft crashed for unknown reasons
13/11/2018	Spain		CESSNA - 150 - F	Lost control in flight. Aircraft destroyed
17/11/2018	France	Pleslin-Trigavou	SOCATA - TB20	Aircraft collided with trees on final approach and crashed into water
30/11/2018	Hungary	Rábasömjén	SCOTTISH AVIATION - BULLDOG	Aircraft crashed for unknown reasons
07/12/2018	Spain	Near LELL: Sabadell Airport	CESSNA - F177RG	Aircraft collided with a building and crashed during approach
10/12/2018	France	Beaubery	CIRRUS - SR22	Communication lost while en-route, collision with elevated terrain
15/12/2018	Netherlands	EHHV	OTHER	Shortly after lift-off (approx 100ft) aircraft fell and rolled; aircraft impacted with inverted attitude and was fully destroyed.
27/12/2018	United Kingdom	EGDM : Boscombe Down	EUROPA - EUROPA - UNDESIGNATED SERIES	Ground loop. Damage: Prop strike, collapsed out-rigger and broken wind-screen.

1.2 Helicopters

1.2.1 Offshore Commercial Air Transport

Local date	State/area of occurrence	Location	Helicopter	Headline
01/04/2009	United Kingdom	11 nm NE of Peterhead, Scotland	AEROSPATIALE - AS332 - L2	Loss of control inflight due to main rotor gearbox failure
11/07/2011	Myanmar	Yetagon oil rig, Andaman Sea	SIKORSKY - S76 - C	Power loss during take-off. Helicopter capsized during ditching
23/08/2013	United Kingdom	Samburgh Airport	AEROSPATIALE - AS332 - L2	Loss of control during approach to land at Sumburgh Airport. Crashed into the sea
29/04/2016	Norway	near Turøy	EUROCOPTER - EC225 - LP	Loss of control inflight due to main rotor gearbox failure

1.2.2 Commercial Operations - Other than Offshore

Local date	State/area of occurrence	Location name	Helicopter	Headline
02/03/2008	Antarctica	nr Neumayer II	EUROCOPTER - BO105 - CBS4	Helicopter crash during research mission
31/07/2008	Hungary	Near Bankháza-Kiskunlacháza	EUROCOPTER - EC135	Loss of control following power loss during HEMS operations
17/02/2009	Poland	Jerostow	PZL SWIDNIK - MI2	Loss of control during HEMS flight
14/08/2009	France	Dangé Saint Romain (86)	ROBINSON - R44	Loss of control during sightseeing flight

27/01/2010	Norway	Horten	ROBINSON - R44	Loss of control in poor visibility conditions
28/10/2010	Antarctica	A 53 NM de Dumont d'Urville	AEROSPATIALE - AS350 - B3	Loss of control due to loss of visual references in whiteout conditions
04/07/2011	Norway	Dalamot	AEROSPATIALE - AS350 - B3	Loss of control following abrupt manoeuvring
09/11/2011	Italy	Italy	AEROSPATIALE - AS365 - N3	Collision with wind turbine during HEMS operations
08/04/2012	Niger	Niger	AEROSPATIALE - AS350 - BA	Helicopter crashed in for as yet unknown reason
14/01/2014	Norway	Near Solihogda, Norway	EUROCOPTER - EC135 - P2	Collision with power lines during HEMS operations
17/07/2015	Slovakia	Under Kláštorná roklina gorge – Hornád canyon - Slovenský Raj	AGUSTA - A109 - K2	Collision with power cables during en-route HEMS operations
31/07/2015	Italy	Pizzo Zocca di val Masino (Sondrio)	AEROSPATIALE - AS350 - B3	Terrain collision during flight in adverse cloud condition
02/06/2016	Moldova	Haragis	EUROCOPTER - EC135 - T2	Helicopter crashed in a wood for as yet unknown reason
07/09/2016	Slovakia	Strelníky	BELL - 429	Terrain collision during HEMS operations in mountainous area.
08/09/2016	Austria	Carinthia, ca. 2346 m	ROBINSON - R66	Terrain Collision in mountainous area
24/01/2017	Italy	Monte Cefalone, Lucoli (AQ)	AGUSTA - AW139	Collision with mountain slope during HEMS operations
23/01/2018	Germany	Philippsburg	EUROCOPTER - EC135 - P2	Mid air collision with a Piper PAW139 during HEMS operations
15/12/2018	Portugal	1NM South of Valongo	AGUSTA - A109 - S	Collision with radio tower in poor visibility conditions during HEMS operations

1.2.3 Specialised Operations

Local date	State/area of occurrence	Location name	Helicopter	Headline
07/01/2008	Germany	Zuzenhausen	BELL - 206	Helicopter crashed in a forest during bad weather conditions
03/07/2008	Slovakia	near Brusno	MIL - MI8	Engine failure and subsequent crash
27/09/2008	Denmark	Kirke Såby	ROBINSON - R22	Fatal helicopter accident - vortex ring
10/02/2009	Hungary	Csepeli szennyvíz tisztító	ROBINSON - R44	Helicopter ditched in river
20/06/2009	France	Bregnier-cordon (01)	AEROSPATIALE - AS350 - B2	Helicopter loss of control and subsequent crash
23/08/2009	Germany	Erpfental near Ellwangen	ROBINSON - R44, CESSNA - F182	Mid-air collision between aeroplane and helicopter near airshow
02/09/2009	Switzerland	Fully/VS	AEROSPATIALE - AS350 - B3	Flight assistant on ground killed by falling wall during hovering of the helicopter
07/09/2009	Italy	Val d'Aosta	AEROSPATIALE - SA315	Rotor strikes rocks on ground
09/10/2009	France	Domjulien (88)	AEROSPATIALE - AS350 - B3	Collision with trees and ground due to adverse weather conditions
27/06/2010	Netherlands	Maasvlakte, Rotterdam	EUROCOPTER - EC130	Loss of control during hover
23/07/2010	Austria	Gahbuhel	BELL - 204 - B	Tail rotor collision with tree during sling load operation
31/07/2010	France	Bormes-les-Mimosas (83)	AEROSPATIALE - AS350	Vibrations during landing, hard landing
04/08/2010	French Guyana	2 Nm S-E Croisée d'Apatou	AEROSPATIALE - AS350	Collision with vegetation during sling load mission
08/08/2010	Belarus	Minsk-Barawaja	HUGHES - 369 - H - HS	Accident during low level aerobatic flight manoeuvres
17/08/2010	Algeria	Benbakhta, wilaya de Boumerdes	AEROSPATIALE - AS350 - B3	Loss of control and subsequent crash
08/03/2011	United Kingdom	Honister Slate Mine, Seatoller	AEROSPATIALE - SA341 - G	Aircraft missing - later found crashed in valley

26/04/2011	Italy	1.3 NM S-SE of Sulmona (AQ)	ROBINSON - R22	Helicopter R22 Accident - CFIT during aerial work
07/06/2011	Spain	Quincoces de Yuso	BELL - 407	Helicopter crash in mountainous area and post-impact fire
15/06/2011	Andorra	Pleta de Juclar (Canillo)	AEROSPATIALE - AS350 - B3	Helicopter crash during sling load operation
25/06/2011	Italy	Cison di Valmarino (TV)	SCHWEIZER - 269C	Helicopter impacts cables during aerial work
05/08/2011	Italy	Cogolo di Pejo (Trento)	AEROSPATIALE - AS350 - B3	Collision with obstacles during aerial work
14/09/2011	France	Vallorcine (74)	AEROSPATIALE - AS350 - B3	Collision with cable car cable, post-impact fire
18/10/2011	Belgium	10km from Liege	EUROCOPTER - EC120	Crashed during aerial work
11/01/2012	Norway	Mosjøen SE of	ROBINSON - R44	Helicopter crashed into ground during reindeer herding.
12/03/2012	Martinique	Le Lorrain	BELL - 47	Collision with power lines and subequent post-impact fire
14/03/2012	Gabon	near Iguela	BELL - 212	Collision with obstacles during sling load operations
06/04/2012	Belgium	Huy	ROBINSON - R22	Collision with cable in hover
29/06/2012	Germany	Lieser, nahe	HUGHES - 369 - D	Collision with powerline
09/09/2012	Germany	Roßfelder Glider Airfield	EUROCOPTER - EC120 - B	Loss of control during an airshow
29/06/2013	Switzerland	Switzerland	AEROSPATIALE - AS350 - B2	Crash due to loss of control caused by a previous rotor strike
01/07/2013	Switzerland	Switzerland	AEROSPATIALE - AS350 - B3	Helicopter crashed in a mountainous area and caught fire in unknown circumstances
12/11/2013	France	Saint-Chaffrey	AEROSPATIALE - AS350 - B3	Helicopter crash after hitting a cable of a chairlift
18/12/2013	Portugal	near Monchique	EUROCOPTER - EC120 - B	Helicopter collision with power lines and crash.
14/07/2015	Switzerland	Guggigletscher, Lauterbrunnen	AEROSPATIALE - AS350 - B3	Aircraft crashed in a mountainous snow-covered area during aerial work mission

31/12/2015	Réunion	Rempart du Maïdo	AEROSPATIALE - AS350 - B3	Aircraft turned back due to bad weather conditions and crashed shortly afterwards.
19/05/2016	Bulgaria	Gylovtsa village, Nesebar	KAMOV - KA26	Collision with power lines
13/05/2017	Switzerland	Petersgrat	AEROSPATIALE - AS350 - B2	While landing in a mountainous area, the helicopter overturned onto its side and rolled over.
26/09/2017	Sweden	Högheden	MD HELICOPTER - 369	Fatal helicopter accident during power line inspection flight
11/06/2018	Switzerland	near Attinghausen	AEROSPATIALE - AS350 - B3	Helicopter crash during sling load operations
13/06/2018	United Kingdom	Loch Scadavay	AEROSPATIALE - AS350 - B2	Helicopter crashed in a lake during sling load operations

1.3 Balloons

Local date	State/area of occurrence	Location	Aircraft	Headline
29/08/2008	Germany	Bobenheim	SCHROEDER - FIRE BALLOONS G	Uncommanded balloon lift off after landing. Two passengers fell from the basket resulting in one fatal injury.
01/01/2011	United Kingdom	Midsomer Norton	CAMERON - O120	Balloon deflated during flight and fell to the ground.
22/04/2011	Belgium	Oudenburg	KUBICEK - BB37 - N	Flight initiated in spite of poor weather forecast. High speed landing caused the basket to overturn.
25/06/2011	Switzerland	Fisibach/AG	WORNER	Loss of control of a balloon and hard landing

13/05/2012	France	Charly-sur-Marne (02)	SCHROEDER	Collision with a power line during a first flight
19/08/2012	France	Feings(41)	CAMERON	Hard landing, one passenger thrown from the basket.
23/08/2012	Slovenia	Ljubljana marshes	LINDSTRAND - LBL600C	Hot air balloon crashed in a storm.
06/08/2013	Switzerland	Haut-Intyamon/FR	CAMERON - Z105	Collision of balloon with power line
05/10/2014	France	Cazes Mondenard (82)	SCHROEDER - FIRE BALLOONS G	Precautionary bounced landing caused the basket to flip on its side resulting in a fire.
05/10/2014	France	Lauzerte	SCHROEDER - FIRE BALLOONS G	Balloon basked tipped over resulting in a fire.
12/07/2015	Spain	Vilanova del Cami	ULTRAMAGIC - S160	Balloon basket impacted against the top of a metal fence on final approach. The basket overturned and some occupants including the pilot were thrown out
08/10/2015	Italy	montescaglioso (MT)	SCHROEDER - FIRE BALLOONS G	Balloon forced landing after hitting power line
05/01/2016	France	Aurel	ULTRAMAGIC - M120	Person held onto the outside of the basket during take-off.

1.4 Sailplanes

Local date	State/area of occurrence	Location	Aeroplane	Headline
06/04/2015	Sweden	10 km SSE Nikkaluokta	GROB - G103C - TWIN III SL - TWIN III SL	Loss of control during wave flight (in cloud) and sailplane was destroyed in flight. Pilot bailed out but the student was killed.
12/04/2015	Germany	Oschatz	SCHEIBE - LSPATZ 55	Wing hit the ground during take -off. The sailplane swerved and overturned.
29/04/2015	France	La Piarre	GLASER DIRKS - DG800 (S)	Malfunctioning airbrakes control during a mountain flight resulting in autorotation and collision with terrain.
02/05/2015	Germany	Bad Münder, Bakede	SCHEMPP HIRTH - NIMBUS 3	Sailplane stalled and crashed into a forested area.
18/05/2015	Austria	Near Airfield Hohenems, Vorarlberg	LANGE - ANTARES 18T AND GLASER DIRKS - DG300 (ELAN-DG300)	Mid-air collision between two aircraft. One of the two aircraft crashed into the mountain rocks and caught fire. The other aircraft returned to the airfield and landed safely.
28/05/2015	Germany	Bartholomä	SCHEMPP HIRTH - JANUS	Sailplane crashed into the ground during a winch launch.
05/06/2015	Italy	East of Mount Paganella, at about 2 mm away from Comune di Terlago (TN)	SCHEMPP HIRTH - VENTUS 2CM	Sailplane crashed on a mountain slope.
07/06/2015	Hungary	LHEM	OTHER (R26 GOBE(HUNGARIAN AIRCRAFT INDUSTRY))	Two Sailplanes collided during approach. One Sailplane broke and crashed. Both passengers on board were fatally injured. The other sailplane managed to land.
14/06/2015	United Kingdom	Aston Down Airfield	SCHLEICHER - K8 - B	A Sailplane crashed into the roof of a building.
01/07/2015	Switzerland	Klosters-Serneus/GR	ROLLADEN SCHNEIDER - LS8 - 18	Sailplane accident
03/07/2015	Austria	Seitenstetten, NÖ	PILATUS - B4 - PC11	The sailplane hit the ground after an aerobatic manoeuvre.
13/07/2015	France	Eygliers	PIPISTREL (TAURUS 503)	Sailplane lost control in flight and collided with the ground.

02/08/2015	France	Saint-André	SCHEMPP HIRTH - VENTUS C	Sailplane collided with the mountain side and the wreckage was found at the altitude of 2700m.
06/08/2015	Germany	Füssen	ROLLADEN SCHNEIDER - LS8	The Sailplane lost control and crashed in a forested area
06/08/2015	Romania	MUCHIA CHEII, Masivul Postavarul	OTHER (M&D Flugzeugbau / JS1)	Aircraft crashed in a mountain area. Wreckage found several months after the accident.
11/08/2015	France	Embrun	ROLLADEN SCHNEIDER - LS1 (D)	Sailplane collided with trees and crashed to the mountain.
11/08/2015	Poland	ATZ EPPL	PZL BIELSKO - SZD50 - 2	Sailplane collided with a winch cable and crashed.
12/08/2015	Italy	Col FERRET	SCHEMPP HIRTH - ARCUS M	Motor glider crashed against a mountain slope.
20/08/2015	Germany	Purkshof	GLASER DIRKS - DG100	The rope disconnected from the sailplane during towing and crashed on the runway.
23/08/2015	Spain	near LEZL (SVQ): Sevilla	PIPISTREL (SINUS 912)	Pilot incapacitation in flight - Passenger took the controls - Aircraft crashed and caught fire.
24/09/2015	Norway	Hatten mountain, Lesja municipality	SCHLEICHER - ASW24	Sailplane crash - pilot bailed-out due to unknown reasons.
26/09/2015	Denmark	5 km øst for EKRS : Ringsted	SCHLEICHER - ASW24	The aircraft suddenly pitched nose down from level flights and hit the ground in a steep nose down attitude. The pilot died and the sailplane was destroyed.
03/10/2015	Poland	Miedzybrodzie Zywieckie	PZL BIELSKO - SZD48 - 3	Sailplane entered spin after a long flight and crashed.
13/12/2015	Germany	Koblenz-Winningen	OTHER (AVION-PLANEUR RF5(SPORTAVIA-PUTZER))	Touring Motor Glider (TMG) collided with a communication tower during a flight in fog.
24/12/2015	Namibia	Stryfontein Farm	SCHEMPP HIRTH - VENTUS CM	Powered Glider crashed, no details available.
03/01/2016	Germany	Near Kamp Lintfort Airfield (EDLC)	DIAMOND - HK36 - R	Aircraft crashed during a go-around

26/03/2016	France	Seillans	OTHER - Generic (Planeur Carman 15-34)	Pilot incapacitated due to a medical condition. This resulted in a loss of control, collision with trees and terrain.
03/04/2016	Austria	3,3 kmNorth from LOGL - Lanzen-Turnau	SPORTINE AVIACIJA - LAK19	Sailplane entered spin and crashed into terrain.
03/04/2016	Austria	Kötschach Mauthen	GLASER DIRKS - DG400	Sailplane crashed into a mountain
16/04/2016	Poland	EPST	PZL BIELSKO - SZD9	Sailplane crashed into the ground after winch cable was released.
20/04/2016	Slovakia	Lysá Polana	SCHLEICHER - ASW27 - 18E	During a competition flight, aircraft lost height below safe altitude due to an abrupt manoeuvre. The aircraft stalled and crashed with a nose down attitude.
03/05/2016	Germany	Bautzen	PIK - PIK20E - NO SERIES EXISTS	Crash on approach during sailplane competition.
04/05/2016	Slovenia	Near Airport LJSG	GLASER DIRKS - DG800 (C)	Sailplane accident possibly due to pilot incapacitation.
21/05/2016	Switzerland	Montricher LSTR	GLASER DIRKS - DG400	Sailplane collided with trees and crashed.
29/05/2016	Germany	Rhede/Emsland	LET - L23 (Super Blaník)	Sailplane crashed into a field under unknown circumstances.
19/06/2016	Germany	Bramsche	SCHEMPP HIRTH	Loss of control during approach causing the aircraft to enter spin.
22/06/2016	France	Authon	SCHEMPP HIRTH (ARCUS)	During a training flight, aircraft experienced loss of control followed by collision with terrain.
06/07/2016	Switzerland	Lenk/BE	GLASER DIRKS - DG800	Sailplane collided with elevated terrain.
21/07/2016	United Kingdom	Bradley	SCHLEICHER - ASW27	Loss of control in-flight, leading to ground impact.
09/08/2016	Germany	Lüsse	SCHLEICHER - ASW27	Sailplane fell to the ground during winch launch take-off.
27/08/2016	France	Sauto	SPORTINE AVIACIJA - LAK17 - A	Collision with a cable/wire followed by crash.
10/09/2016	Germany	Großrückerswalde	FLIGHT DESIGN - CT SUPRALIGHT	Two aircraft (sailplane) and an ultralight collided close to the threshold. Pilot of the ultralight died.
14/09/2016	Switzerland	L'Isle/VD	BINDER (EB29D)	Sailplane lost control entered a vertical dive and crashed.

04/12/2016	United Kingdom	Brentor	SCHLEICHER - ASW24	Sailplane winch launch failed. Pilot was not able to land safely due to down-draft. 1 POB 1 fatality.
04/12/2016	United Kingdom	over Lubenham	CESSNA - 150 - L AND PZL BIELSKO - SZD51 - 1	Mid-air collision between powered aircraft and sailplane.
19/03/2017	France	Le Vernet	GLASER DIRKS - DG1000 - M (DG1001M)	Sailplane collided with trees and ground.
29/03/2017	France	LFLE - Chambéry / Challes-les-Eaux	SPORTINE AVIACIJA - LAK17 - A	Sailplane crash during winch launch take-off.
08/04/2017	Germany	Eschbach	SCHLEICHER - ASW24 - E	Sailplane crashed into industrial area.
08/04/2017	United Kingdom	Currock Hill airfield	PZL BIELSKO - SZD55 - 1	Sailplane elevator not connected and crashed on aerotow.
12/04/2017	France	Valdeblore	SCHLEICHER - ASW22	Sailplane lost control, rolled onto its side and crashed into the ground.
03/05/2017	Poland	EPJL	PZL BIELSKO - SZD30 (Pirat)	During a winch launch, Sailplane made a steep climb, rolled and then crashed.
06/05/2017	Germany	Mannheim	SPORTINE AVIACIJA - LAK17	Sailplane spun shortly after release from winch-launch followed by crash.
14/05/2017	France	near LFDH - Auch Gers	SCHEMPP HIRTH - CIR-RUS	Loss of control at low height during a low turn speed and near the terrain.
20/05/2017	Hungary	Nyíregyháza	PZL BIELSKO - SZD30	Sailplane crash for unknown reasons.
10/06/2017	Italy	Riva Valdobbia (VC)	GLASFLUGEL - MOS-QUITO	Sailplane collided the terrain below mountain tip.
11/06/2017	Italy	Novi Ligure	OTHER (DFS Olympia Meise)	Sailplane lost wing during aerotow and crashed in city centre.
15/06/2017	Austria	near Karlhöhe	GLASER DIRKS - DG600 (18M)	Sailplane lost control and crashed in a mountainous area.
16/06/2017	Hungary	LHTL	SCHEIBE - SF25 - C	Motorised sailplane lost control and crashed during training exercise.

18/06/2017	Germany	Purkshof	GROB - G102 - ASTIR CS	Wing tip of the Sailplane hit ground during winch launch causing it to overturn.
24/06/2017	Germany	Bartholomä-Amalienhof	GROB - G103 - TWIN ASTIR	Sailplane lost control while searching for lift and fell to the ground.
13/07/2017	Hungary	Pirtó	SCHLEICHER - ASW27 - 18E	Sailplane crashed due to loss of control.
13/07/2017	United Kingdom	Near Brimslade Farm	DIAMOND - HK36 - TC (Super Dimona)	Aircraft crashed into a field due to unknown circumstances.
14/07/2017	France	Val des Prés	SCHEMPP HIRTH - VENTUS 2C	Loss of control in flight followed by sailplane collision with elevated terrain.
17/07/2017	France	LFOV (LVA): Laval Entrammes	CENTRAIR - 101 - A	Sailplane impacted the ground during winch launch take-off
04/08/2017	Germany	Rädicke	SCHLEICHER - ASW24 - E	Sailplane was found crashed on a field. Loss of control suspected.
13/08/2017	Switzerland	Villavolar	GLASER DIRKS - DG800B	The sailplane crashed onto a steep pasture and was destroyed upon impact.
27/08/2017	Croatia	Sinj - Kamešnica	GROB - G103 - TWIN ASTIR	Sailplane crashed below a mountain ridge.
30/08/2017	Poland	EPBC Warszawa Babice / ATZ EPBC	PZL BIELSKO - SZD50 - 3	Sailplane spun after the safety latch of the winch cable broke during winch launch, resulting in a crash.
10/09/2017	Germany	Hockenheim	ROLLADEN SCHNEIDER - LS8	Sailplane stalled during winch launching.
14/10/2017	Switzerland	Davos/GR	ROLLADEN SCHNEIDER - LS8 - 18	Sailplane crashed in approximately 2500 meter altitude in mountainous area. Circumstances unknown.
17/04/2018	France	AD Florac-Sainte Enimie	CENTRAIR - SNC34C	Loss of control in flight followed by crash.
10/06/2018	Italy	Località le Piaie - Belluno	ISF - MISTRAL - C	Sailplane crashed in mountainous area for unknown reasons.

10/06/2018	United Kingdom	Near Raglan, Monmouthshire	GROB - G109 - B	Sailplane impacted tree(s) whilst landing.
23/06/2018	Austria	LOSM - Mauterndorf	PILATUS - B4 - PC11AF	Sailplane crashed on winch take-off.
03/07/2018	Poland	Lupiny	PZL BIELSKO - SZD9	Sailplane accident (crash).
08/07/2018	Switzerland	Mettligrat (VS	SCHEMPP HIRTH - DISCUS 2C	Sailplane collided with terrain.
02/08/2018	France	Thones	ROLLADEN SCHNEIDER - LS4	Sailplane collided with elevated terrain.
08/08/2018	Poland	M. Klików	OTHER (HpH Ltd)	Sailplane missed a thermal lift and crashed.
11/08/2018	Germany	Braunschweig - Waggum	SCHLEICHER - KA6 - CR	A blocked aileron caused the sailplane to spin and crash.
12/08/2018	France	Orcières	SCHLEICHER - ASH25M	Collision with the ground.
19/08/2018	France	AD Colmar Houssen	CENTRAIR - 101 - A (Pegasus)	Loss of control of the tug ULM during take-off in sailplane tow. This resulted in a collision with runway and post-crash fire.
26/08/2018	France	Frontenas	SCHLEICHER - ASW17	Sailplane lost control in flight and collided with the ground.
11/09/2018	Switzerland	Bedretto/TI	IAR BRASOV - IS28M2 - GR	Sailplane crashed in mountainous area.
30/09/2018	Germany	EDLE (ESS): Essen/ Mulheim	SCHLEICHER - ASK18	Sailplane crashed on approach.

05/10/2018	Germany	on approach to EDFK : BAD KISSINGEN	DIAMOND - HK36 - R (SUPER DIMONA)	Sailplane crashed on approach.
08/12/2018	Spain	LEFM : Fuentemila-nos (Segovia)	GROB - G103A - TWIN ASTIR - TWIN II ACRO	Aircraft on final approach collided with another aircraft standing on ground.

1.5 Aerodromes and Ground Handling

Local date	State/area of occurrence	Location	Aircraft	Headline
25/07/2010	Spain	Aeródromo Casarrubios del Mont	OTHER	Gyroplane collided with person during taxi.
05/05/2012	France	AD Buno Bonnevaux (91)	PIPER - PA25 – 235, SLINGSBY - T31	Mid-air collision between a sailplane and an aeroplane above runway.
11/11/2012	Italy	Roma Fiumicino Airport	AIRBUS - A320	Loading crew caught between loader and baggage door.
10/12/2012	Cyprus	Larnaca	CESSNA - 750	A service vehicle struck the right wingtip, vehicle driver trapped.
20/04/2014	Finland	2 km from Jämijärvi airfield EFJM, Satakunta	OTHER	During climb, right wing broke due to a fatigue failure. Aircraft entered a spin, crashed and caught fire
24/12/2015	Spain	Ronda	SOCATA - TB9	Aircraft crashed and consumed by post-crash fire, incorrect fuel used.
19/07/2017	Finland	Lievestuore (municipality of Laukaa)	PIPER - J3C - 65 - 65	Aircraft crashed into a forest during final approach in bad weather condition.

1.6 ATM/ ANS

Local date	State/area of occurrence	Location	Aeroplane	Headline
02/08/2012	Spain	Approach to Santiago Airport (LEST)	CESSNA - 500	Unstabilised approach - Aircraft crashed on approach in heavy fog condition
30/09/2012	Austria	Ellbögen, Innsbruck distric, Tirol	CESSNA - 414	Aircraft crashed in wooded terrain in IMC weather conditions. Aircraft not airworthy and overloaded
17/07/2015	Slovakia	Hornád canyon - Slovenský Raj	AGUSTA - A109 - K2	Aircraft crashed on a river bank after strike with power cables during en-route EMS mission
31/07/2015	Italy	Pizzo Zocca di val Masino (Sondrio)	AEROSPATIALE - AS350 - B3	Controlled flight into mountain peak obscured by clouds
08/09/2016	Austria	Carinthia, ca. 2346 m	ROBINSON - R66	Helicopter crash in a mountainous area
24/01/2017	Italy	Monte Cefalone, Lucoli (AQ)	AGUSTA - AW139	Helicopter crashed into a mountain slope during a medical emergency flight
23/01/2018	Germany	Philippsburg	EUROCOPTER - EC135 - P2 PIPER - PA28RT - 201T	Mid-air collision
15/12/2018	Portugal	1NM South of Valongo	AGUSTA - A109 - S	Helicopter collision with radio tower in bad weather conditions.


Gates