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Annual
Safety Review
2024

Foreword and Executive Summary





Foreword and Executive Summary

The EASA Annual Safety Review 2024 provides a comprehensive review of the safety performance of the aviation system in 2023. This reflects our unwavering commitment to aviation safety and the industry's collaborative efforts in upholding the highest standards of safety.

In 2023, air traffic reached 95.5% of 2019 levels, with the early months of 2024 now matching pre-pandemic traffic volumes. Global large aeroplane commercial aviation safety performance in 2023 was encouraging. The number of fatal accidents dropped to two, compared with a stable average of around 10 in recent years (2020-2022). There were 77 fatalities in 2023, marking a decrease from 2022. This is the second-lowest fatality count in the past decade but clearly still gives no grounds for complacency.

In the EU, over 7.3 million commercial air transport flights took to the skies in 2023 – which were accomplished without any fatal accidents involving an EASA member state operator. Across most of the operational domains, the number of fatal accidents and fatalities was close to the lowest levels of the preceding decade and lower than in 2022. However, non-commercial aeroplane and helicopter operations saw some exceptions.

Despite the positive safety performance in most domains, it is important to be alert to the fact that past performance offers no guarantee of a safe future. We must focus our risk management efforts to ensure a safe, secure and resilient aviation system is maintained. There has seldom been a time when the industry has faced such a broad range of operational risks that require our efforts and attention.

The geo-political landscape continues to impact aviation safety significantly, leading to reduced airspace availability and particularly to the manipulation of GNSS signals through jamming and spoofing. On the latter, the Agency has taken a number of collaborative, coordinated risk mitigation measures. We have also warned states and operators of threats to safety through the EU Conflict Zones Alerting Mechanism, and shared real-time information via the European Information Sharing and Cooperation Platform on Conflict Zones.

For the current year, the Tokyo Haneda runway collision that occurred in January 2024 confirmed the importance of further actions to improve runway safety. EASA has established a Runway Safety Task Force with the National Authorities and industry with the goal of developing concrete actions, applying modern technology wherever possible to reduce the risk of ground accidents.

Across various parts of the industry we also see new risks caused by the impact of climate change. In 2023, EASA launched the European Network on Impact of Climate Change on Aviation (EN-ICAA) which brings together aviation and scientific experts to help the industry be better prepared for the future and to identify the right priorities in this area.

Our industry has suffered a great deal in recent years, losing over two million jobs globally. While there are huge growth prospects ahead, we must overcome our staffing and resource challenges if we are to achieve our full potential.

The next step in our safety collaboration is the SAFE 360° Conference on 23-24 September, which focuses on more immediate operational issues. In October, the EASA Annual Safety Conference will consider the challenges from a more strategic standpoint. Our teams look forward to the discussions with you at these events.



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Introduction





EASA would like to welcome you to the 2024 edition of the EASA Annual Safety Review (ASR)¹. The analysis presented in this review provides the most important aviation safety statistics for Europe in 2023 and a comparison with the past. It is also the data-driven input that supports the European Safety Risk Management (SRM) process and, hence, the European Plan for Aviation Safety (EPAS).

The ASR provides both a statistical summary of aviation safety in the EASA Member States and identifies the most important safety challenges faced by European aviation today, outlining the safety risks per aviation and operational domain in dedicated appendices.

The ASR supports the identification of safety issues, which are further assessed and prioritised using the experience of EASA Member States and the aviation industry to connect the data with the current and future strategic priorities of the Agency and the safety priorities contained in the EPAS. The identification of safety issues is a part of the SRM and benefits in addition to the ASR from the valuable inputs from the Network of aviation safety Analysts (NoA) and Collaborative Analysis Groups (CAGs).

How the safety review is produced

Information sources

The data presented in the ASR are based on the occurrences collected up to March 2024 by the Agency under Regulation (EU) 996/2010 on accident and serious incident investigation, and Regulation (EU) 376/2014 on occurrence reporting, analysis, and follow-up, and complemented through the active search of those events from other official sources. This data collection enables the analysis of two specific data sources:

- **EASA's occurrence database:** The main source of data is the Agency's own database, which covers occurrences and other safety-related information reported to the Agency in its role as the competent authority, and accidents and serious incidents notified to the Agency by Safety Investigation Authorities worldwide. 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 and other safety-related information reported to the competent authorities of the EASA Member States, the reporting of which is governed by Regulation (EU) 376/2014 on the reporting, analysis and follow-up of occurrences in civil aviation.

The figures and analyses presented in the ASR may differ from safety reports prepared by other organisations and regulators, which is due to differences in collection methods, the definitions of the data collected and the subsequent analyses. It is important to identify and understand these differences when comparing safety reports and to keep in mind that each report has its own merits.

Unless otherwise specified, the data presented in the ASR core document for the domain-specific chapters are solely based on the accidents and serious incidents collected in the EASA's occurrence database. Unlike the ASR core document, the data presented in the ASR appendices are based on all occurrences collected in the ECR. For the purpose of the analyses in the appendices, the values 'significant incident', 'major incident', 'occurrence with no flight intended' and 'observation' of the occurrence class attribute were consolidated into 'incident'.

1 Publication of the Annual Safety Review is mandated by Article 72(7) of REGULATION (EU) 2018/1139 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency.



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 a common risk classification of occurrences at the national and EASA levels. As a result, the ERCS was developed to measure the risk using a 2-dimensional matrix. The ERCS is part of the legal framework of Regulation (EU) 376/2014, through a Commission Delegated Regulation² published in 2020 and later a Commission Implementing Regulation³, published in 2021. The application of the ERCS is mandatory as of January 1, 2023.

Within the ERCS safety risk matrix, the severity is addressed by identifying the worst likely accident outcome that would have occurred if the occurrence being scored had escalated into an accident, which considers both the size of the aircraft involved and the most likely type of accident. Secondly, the probability is measured, by looking at how close the occurrence was to that worst likely accident outcome, based on a weighted barrier model.

EASA began applying this scheme in 2017, and risk classified all the accidents and serious incidents of the previous editions of the ASR. For the 2024 edition however, where the presented data make use of the ERCS, the ASR solely relies on the risk classification performed by the competent authorities in 2023 and includes occurrences other than accidents and serious incidents.

The ERCS is useful because the classification of occurrences into accidents, serious incidents, or incidents does not necessarily provide an accurate picture of the risk of those occurrences. For example, a very close near mid-air collision would be classified as a serious incident, while a collision between a ground handling vehicle and an aircraft leading to substantial damage to the latter would be classified as an accident. In terms of risk, the serious incident in this example would be of a higher risk category than that of the accident. In addition, the combination of probability and severity would differ significantly. For each domain, an analysis using ERCS-applied occurrence data provides an overview of the risks that were present during the analysed period; however, it does not predict the future risks, which will change due to changing circumstances and the remedial effects of safety mitigating actions.



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- 2 COMMISSION DELEGATED REGULATION (EU) 2020/2034 of 6 October 2020 supplementing Regulation (EU) No 376/2014 of the European Parliament and of the Council as regards the common European risk classification scheme
 - 3 COMMISSION IMPLEMENTING REGULATION (EU) 2021/2082 of 26 November 2021 laying down the arrangements for the implementation of Regulation (EU) No 376/2014 of the European Parliament and of the Council as regards the common European risk classification scheme



Chapter overview

This document is split into nine chapters. Chapters 2 to 8 cover one operational domain within the European aviation system. Unless otherwise specified, the scope of each domain in Chapters 2 to 6 is the EASA Member State, either as the state of operator or the state of registry. For the Aerodromes and Ground Handling and Air Traffic Management and Air Navigation Services (ATM/ANS) chapters, the scope is the EASA Member State as the state of occurrence. Chapter 9 reviews the reporting rates in the ECR, and Chapter 10 provides an overview of EASA's monitoring of the Member State's oversight capabilities.

The chapters of this ASR 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 of EASA Member State:** This provides an overview of the most important statistics across all the different operational domains. It helps to identify which domains are likely to need the greatest focus in the EPAS.

Chapter 2 – Aeroplanes

- **Commercial air transport complex aeroplanes:** This covers all commercial air transport operations (passenger and cargo) involving aeroplanes with a maximum certificated take-off mass exceeding 5 700 kg, or aeroplanes equipped with turbofan engine(s) or more than one turboprop engine (e.g., airline, air taxi, air ambulance).
- **Commercial air transport other than complex aeroplanes:** This covers all commercial air transport operations (passenger and cargo) involving aeroplanes other than complex aeroplanes (e.g., airline, air taxi, air ambulance, sightseeing).
- **Non-commercial operations complex aeroplanes:** This covers non-commercial operations involving aeroplanes with a maximum certificated take-off mass exceeding 5 700 kg, or aeroplanes equipped with turbofan engine(s) or more than one turboprop engine (e.g., business, demonstration, flight training/instructional, relocation).
- **Specialised operations:** This covers all aerial work/Part SPO operations involving aeroplanes and includes a wide range of different operational activities (e.g., agriculture, aerial advertisement, or photography operations) conducted by EASA Member State registered aeroplanes or EASA Member State Air Operator Certificate (AOC) Aeroplanes holders.
- **Non-commercial operations other than complex aeroplanes:** This covers all non-commercial operations involving other than complex aeroplanes and includes analysis of leisure flights as well as flight training and other general aviation activities. Additional information regarding microlights and aircraft registered in third countries has also been included.

Chapter 3 – Helicopters

- **All helicopter operations:** This covers an analysis of all EASA-certified or validated helicopter operations, except for Nationally Regulated Operations (NRO).
- **Commercial air transport:** This covers all commercial air transport operations involving EASA-certified or validated helicopters such as Helicopter Emergency Medical Service (HEMS), air taxi or sightseeing, as well as flights to offshore oil, gas and renewable energy installations.



- **Specialised operations:** This covers all aerial work/Part SPO operations involving EASA-certified or validated helicopters such as sling load, advertisement, or photography with an EASA Member State as the state of operator or state of registry.
- **Non-commercial operations:** This covers all non-commercial operations involving EASA-certified or validated helicopters with an EASA MS as state of operator or state of registry. Training flights are included within the non-commercial operations definition.

Chapter 4 – Balloons

This chapter covers all operations involving hot air balloons.

Chapter 5 – Sailplanes

This chapter covers all operations involving sailplanes.

Chapter 6 – Unmanned Aircraft Systems (UAS)

This chapter covers operations involving UAS within the EASA Member States; therefore, the scope for this chapter is EASA Member State as the state of occurrence..

Chapter 7 – Aerodromes and ground handling

This chapter covers aerodrome and ground handling operations that occur within the EASA Member States; therefore, the scope for this chapter is EASA Member State as the state of occurrence.

Chapter 8 – Air Traffic Management/Air Navigation Services (ATM/ANS)

This chapter covers ATM/ANS occurrences within the EASA Member States; therefore, the scope of the chapter is EASA Member State as the state of occurrence.

Chapter 9 – ECR reporting and risk classification

This chapter reviews the reporting rates in the ECR over 2016-2023, and ERCS level of completion for 2023.

Chapter 10 – Standardisation

This chapter provides an overview of EASA's standardisation activities which entail assessing the National Competent Authorities' (NCAs) ability to discharge their safety oversight responsibilities on a continuous basis, as well as verifying the implementation of the rules. It provides a summary of information about the application by each Member State of the EASA Basic Regulation and of the delegated and implementing acts adopted on the basis thereof.⁴

4 Article 85, paragraph 7 of Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency.



Typical structure for each domain-specific chapter and appendix

Each of the domain chapters in this ASR contains specific information that is useful in understanding the analysis of that domain. The structures of the chapters and appendices, as described below, are as similar as possible across the domain chapters to afford the ability to compare information in each domain.

- **Key statistics:** Every chapter begins with a set of key statistics that provide information on the Tier 1 Safety Performance Indicators (SPIs) for that domain, which includes details on the number of fatal accidents, non-fatal accidents and serious incidents. The key statistics part also outlines the number of fatalities and serious injuries in the domain. In all cases, the figures for 2023 are followed by a comparison with the annual averages over the past 10 years that helps to provide a reference on how this year's performance relates to historical trends; this information is also provided in a graphical format. The key statistics are then complemented with a figure outlining the occurrence categories⁵ assigned to the serious incidents and accidents in the past five years.
- **Domain-specific analysis:** As every domain is different, 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.
- **Domain-specific appendix:** The domain-specific appendix provides the 2023 overview of the relative safety risk level and frequency of each key risk area (KRA). In the context of a safety performance framework, the KRAs are the Tier 2 SPIs for the domain. The KRAs are ordered based on their risk levels that were determined by the competent authorities using the ERCS.

The domain-specific appendix continues with an occurrence data analysis related to Human Factors (HF) and Human Performance (HP), presented for all domains. The term HF describe human characteristics, abilities, and limitations. The knowledge of HF is used throughout the aviation industry to design systems, equipment and work in ways that support humans in performing at their best. HP refers to how people perform their tasks. Following safety occurrences, HF and HP knowledge can also be used diagnostically to better understand what went wrong, what went right and, more importantly, to understand how to prevent such occurrences from happening again. Within the ECR, HF and HP have been identified as having contributed to occurrences, based on information derived from investigations.

An airworthiness analysis concludes the domain-specific appendix for the product-related domains. The term airworthiness includes design, production, maintenance, and organisations thereof. Within the ECR, airworthiness is identified as having contributed to occurrences, based on information derived from investigations. The attribute 'event type' in the European Co-ordination centre for Accident and Incident Reporting Systems (ECCAIRS) taxonomy allows regulators and industry to code the causes and contributing factors to occurrences. A first level of airworthiness analysis shows the contribution of the aircraft system loss and malfunction to the occurrences, including the distribution of the main Air Transport Association (ATA) chapters. A second level of analysis goes a step further, showing the contribution of design, production, and maintenance to aircraft system loss and malfunction, i.e., highlighting the systemic root cause of a system or equipment failure.

⁵ In accordance with the ICAO Accident/Incident Data Reporting (ADREP) taxonomy. Each category has a unique name and identifier to permit common, a text definition, and usage notes to clarify the category and aid in coding occurrences.



The link with the European Plan for Aviation Safety (EPAS)

The EPAS constitutes the Regional Aviation Safety Plan (RASP) for EASA Member States in the ICAO EUR region and sets out the strategic safety priorities and objectives for the European aviation system, presents the main risk affecting that system and defines the necessary actions to mitigate those risks, to further improve aviation safety in Europe. The plan is prepared by EASA, with technical inputs from the EASA Advisory Bodies representing Member States and industry. The EPAS looks at aviation safety in a systemic manner. The safety priorities and corresponding mitigating actions are determined through the European SRM process.

More information on the EPAS can be found on the EASA website: <https://www.easa.europa.eu/easa-and-you/safety-management/european-plan-aviation-safety>

The European SRM Process

The main safety risks and corresponding mitigation actions feeding the EPAS are developed through the European SRM process, which is defined in 5 specific steps as described below:



Identification of safety issues: The identification of safety issues is the first step in the SRM process and is performed through the analysis of occurrence data and other safety-related information and supporting information by the Collaborative Analysis Groups (CAGs). These safety issues are formally captured by the Agency and are then subject to a preliminary safety assessment (the safety issues are listed in Volume III of the EPAS); 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 NoA and CAGs. The outputs 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: The safety issues assessed as posing the highest risk to aviation safety are subject to a more detailed Safety Issue Assessment (SIA). The assessment process is led by EASA and is supported by the NoA and the CAGs; this external support is vital to achieving the best possible results. The SIA provides potential mitigating actions for the EPAS and is followed by an impact assessment through the Best Intervention Strategy (BIS) document, defining possible mitigation actions, assessing the implications and benefits of each possible action, and making recommendations on the best mitigation action(s) to be implemented in the EPAS.

Definition and programming of safety actions: Using the combined SIA/BIS, formal EPAS actions proposals are then submitted to the EASA advisory bodies. Once discussed, agreed upon and the required resources secured, the actions are then included in the next version of the EPAS. Prior to publication, the EPAS is approved by the EASA Management Board. Actions that are low-cost or require more rapid intervention are often fast-tracked and appear in the next available update of the EPAS. In some cases, more immediate safety actions are needed that could be completed before the next EPAS is published. Naturally, these are not included within EPAS. Such actions could include the publication of a Safety Information Bulletin (SIB) or take the form of immediate Safety Promotion activities.

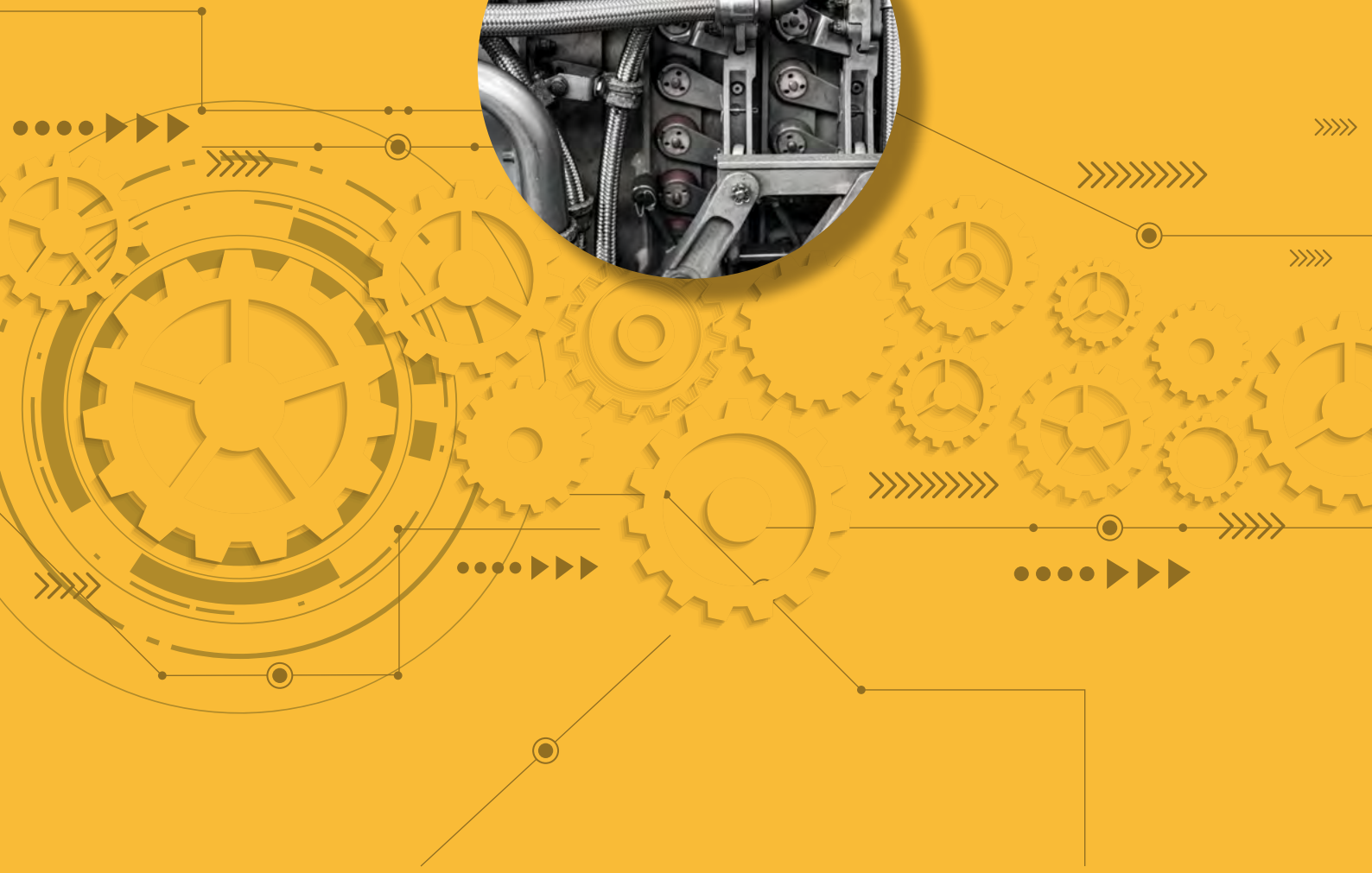
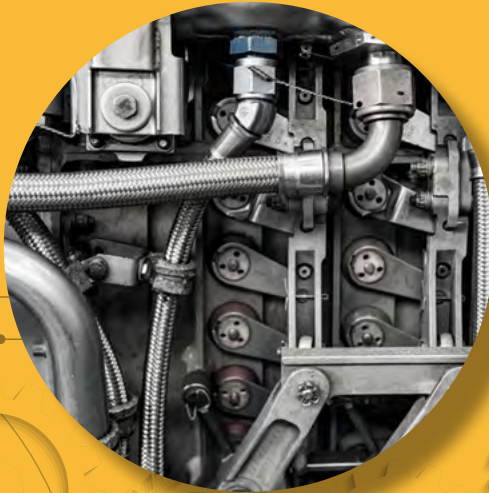
Implementation and follow-up: The next step in the process involves the implementation and follow-up of the actions that have been included within the EPAS. There are different types of actions within the EPAS, including research, rulemaking, Member State tasks, safety promotion, and evaluation.

Safety performance measurement: The final stage in the process is 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 (SPF) has been developed that identifies different tiers of SPIs. Tier 1 transversally monitors all the domains and the overview of the performance in each domain. Tier 2 covers the KRAs at domain level, while Tier 2+ monitors the safety issues. The ASR is the annual review of the (SPF) and identifies safety trends and highlights priority domains, KRAs and safety issues. From this step, the SRM process begins again.

The occurrences, that are reviewed and analysed during the production of the ASR, support the identification of safety issues (step 1 of the European SRM process). In addition to the safety intelligence gained through analysing occurrence data, roadmaps have been developed for the general aviation and the rotorcraft domains. These domain-specific roadmaps, which are monitored and will continue to develop, augment the overall safety intelligence picture when determining the safety priorities contained in the EPAS.

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Chapter 1
Safety overview

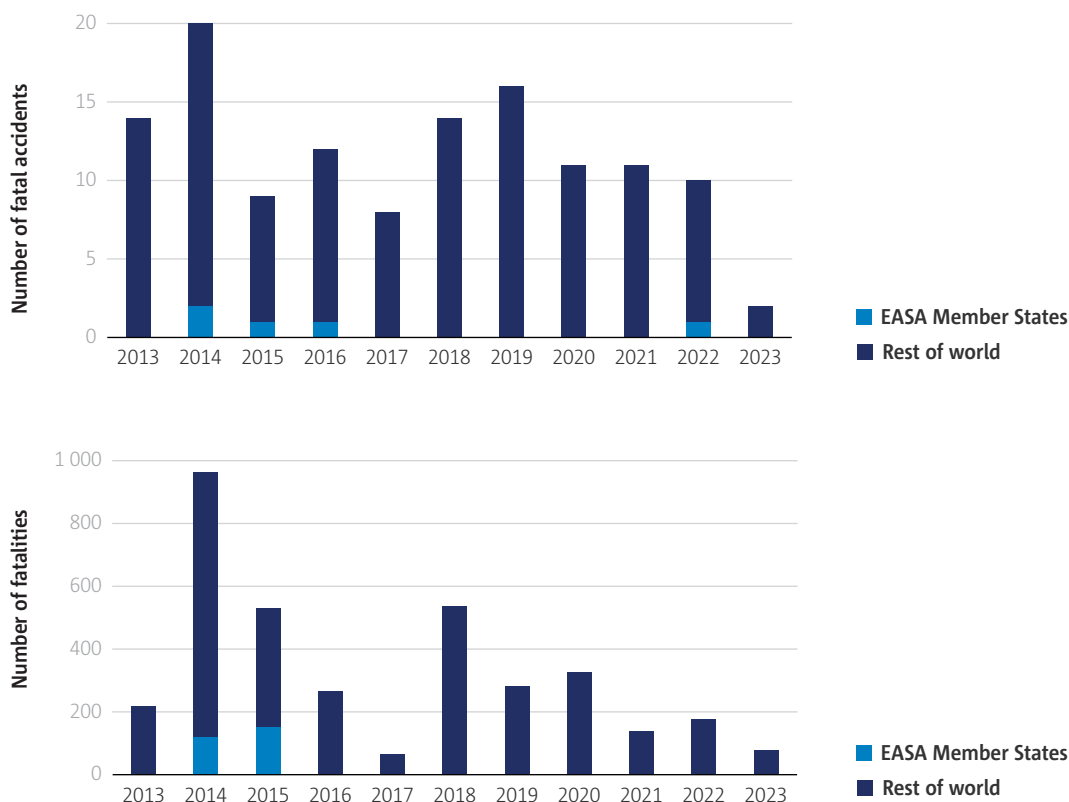




1.1 Global airline fatal accidents

This section covers large aeroplane passenger and cargo operations worldwide⁶. The figures show the contribution of EASA Member State operators to the number of global fatal accidents and fatalities. Figure 1.1 shows that the number of fatal accidents in recent years has stabilised since 2020 and dropped to two accidents of passenger aeroplane commercially operated in the world in 2023. This low number of fatal accidents in 2023 is the lowest in the decade. For the context of these safety figures, it is to be noted that after two years of severe traffic reductions in 2020 and 2021 the aviation industry in Europe experienced, a strong recovery in terms of traffic since summer 2022 but did not recover fully the level of pre-COVID-19 pandemic traffic yet. Indeed, the overall passenger traffic for the full year of 2023 was 4.5% lower than in 2019 for the European region. These statistics indicate that there has been again a substantial recovery in 2023. The resilience of demand for air transport is evident despite various challenges such as inflationary pressures and higher airfares.

With 77 fatalities, the number of fatalities in 2023 is the second lowest in the decade and close to the record of the so-called safest year in large aeroplane commercial aviation, which was set in 2017 with 66 fatalities. The accident involving an ATR 72 on January 15, 2023, near Pokhara in Nepal, accounted for most of the total number of fatalities (72 out of 77) in large aeroplane passenger and cargo operations worldwide in 2023.

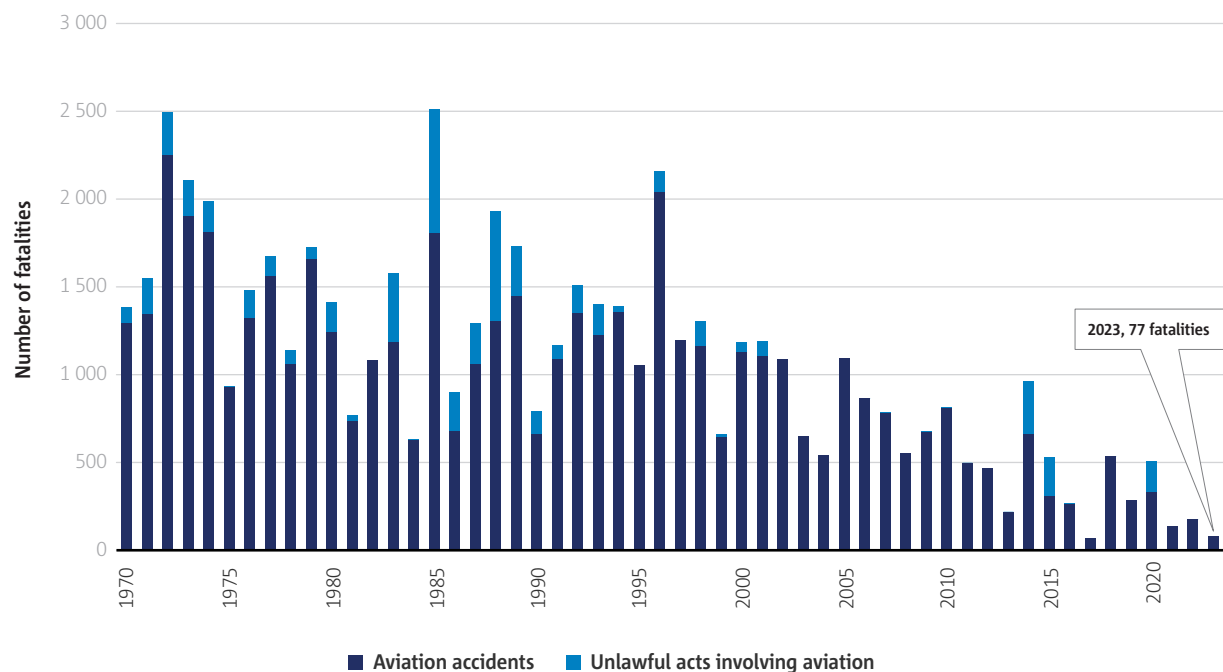


► **Figure 1.1** Fatal accidents and fatalities involving large aeroplane passenger and cargo operations, EASA Member States and the rest of the world

6 Large aeroplane commercial air transport, is defined as aircraft with a maximum take-off mass (MTOM) above 5 700 kg, carrying passengers or cargo. Under EASA regulations, commercial air transport includes all flights carrying passengers or cargo for remuneration or hire.



The definition of an accident is set out in EU law⁷ and in Annex 13 to the Convention on International Civil Aviation (Chicago Convention). Although this definition excludes unlawful acts (such as stowaway, hijacking, bombs, shot down, etc.), such acts have often been investigated by safety investigation authorities and the management of safety and security risks are increasingly connected. The data presented in Figure 1.2 has been divided to show the fatalities related to accidents and those related to unlawful acts. Whereas accidents have reduced markedly since 1970 and then more slowly in recent years, fatalities related to unlawful acts have re-emerged since 2014. When focussing on the last decade (2014-2023), the fatalities caused by unlawful acts represent a fourth of the total number of fatalities with fortunately an improvement over the last three years since there have been no civil aviation accidents due to unlawful acts during this period. This observation, in conjunction with the current challenges associated with the developing geopolitical situations with numerous conflict zones worldwide, increasingly focuses concern on security matters that require an integrated risk management approach in order to be adequately mitigated.



► **Figure 1.2** Fatalities involving large aeroplane passenger and cargo operations worldwide

The same requirements that define an aviation accident also require that these accidents must be investigated with a view to understanding the causes and preventing similar events in the future. Based on the information from accident reports and from preliminary information where the investigations are ongoing, the fatal accidents between 2019 and 2023 had the following characteristics:

- The most common underlying cause of these accidents is associated to flight crews' errors or confusion and/or flight crews' management of challenging circumstances created by technical failures or poor weather conditions, including heavy rains and thunderstorms, during approach. Safety management continues to emerge as an important factor in preventing accidents;

⁷ Regulation (EU) No 996/2010 of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation and repealing Directive 94/56/EC



- Aircraft upset, runway excursion and terrain collision remain as the most common accident outcomes. The most common flight phase for fatal accidents is approach and landing, however, accidents occurring en-route contribute to more than half of the total number of fatalities;
- The design of safe and effective human-machine interfaces remains a challenge and although progress continues to be made in this area, many aircraft continue to operate with older designs that do not take account of lessons learned from previous accidents;
- Cargo accidents continue to be slightly disproportionately represented in fatal accidents, at approximately 32% of the accidents over the past five years.









1.2 EASA Member States cross domain safety overview

Each domain presented in this review provides the number of fatal accidents and fatalities for 2023 as compared with the preceding ten years, 2013-2022. These figures are consolidated here, to provide a cross-domain safety overview.

In almost all domains, the number of fatal accidents and fatalities was close to the minimum of the preceding decade and lower compared to 2022. The exceptions to this are the non-commercial aeroplane and helicopter operations, as identified in Table 1.1.



AIRCRAFT DOMAIN	FATAL ACCIDENTS 2023	FATAL ACCIDENTS 2013-2022 MIN - MAX	FATALITIES 2023	FATALITIES 2013-2022 MIN - MAX	FATALITIES 2013-2022 MEDIAN
AEROPLANES 					
CAT operations with complex aeroplanes	0	0 - 2	0	0 - 150	1
CAT operations with aeroplanes other than complex	0	0 - 1 ⁸	0	0 - 4 ⁸	0 ⁸
Non-commercial operations with complex aeroplanes	0	0 - 2	0	0 - 10	0
Specialised operations	3	3 - 11	3	3 - 31	11
Non-commercial operations with aeroplanes other than complex	35	35 - 59	68	49 - 90	74
HELICOPTERS 					
Overall	7	5 - 11	11	9 - 29	20
CAT operations	1	0 - 4	4	0 - 22	6
Specialised operations	1	0 - 4	1	0 - 11	1
Non-commercial operations	5	2 - 8	6	1 - 20	7
BALLOONS 					
	0	0 - 3	0	0 - 3	1
SAILPLANES 					
	11	9 - 27	7	7 - 31	18

► **Table 1.1** Cross-domain comparison of EASA Member States aircraft fatal accidents and fatalities

⁸ 2014-2022, no data available before 2014 for this operational domain.



A separate table is used for aerodromes and ground handling, and for ATM/ANS. The table 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 involved operators or aircraft registered outside of a Member State. This is identified in Table 1.2.

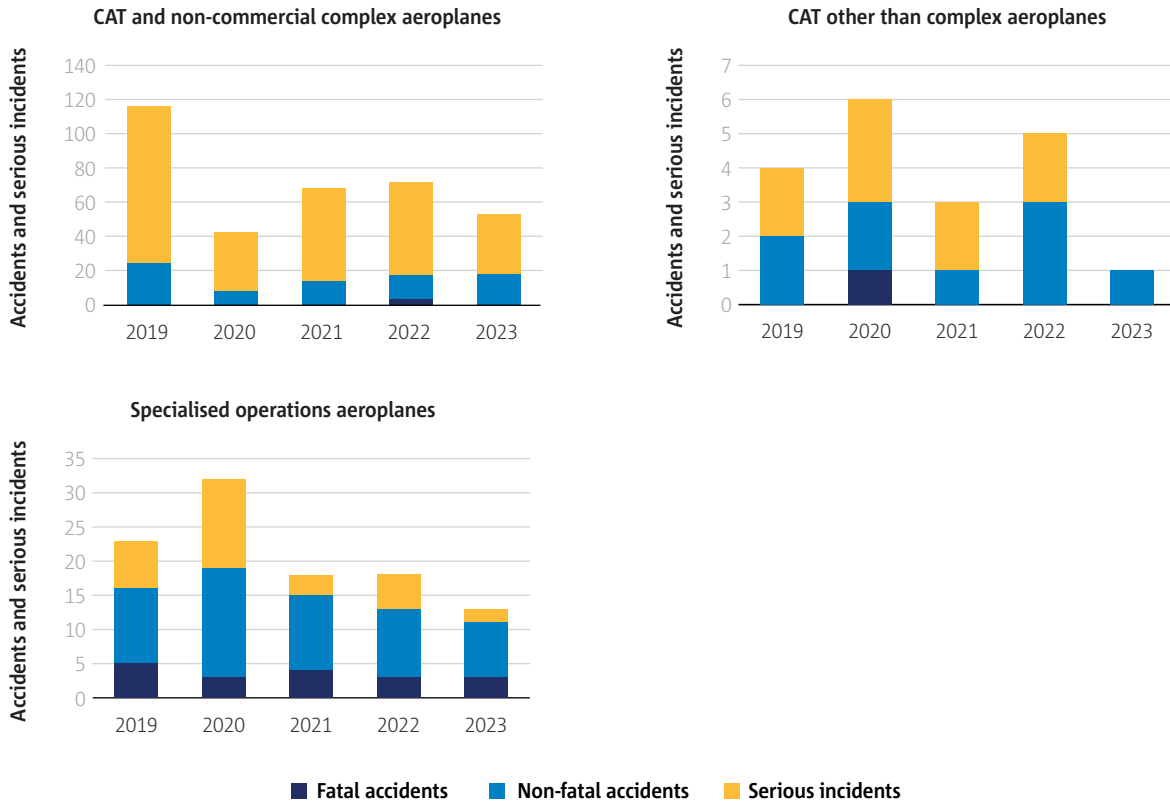
INFRASTRUCTURE DOMAIN	FATAL ACCIDENTS 2023	FATAL ACCIDENTS 2013-2022 MIN - MAX	FATALITIES 2023	FATALITIES 2013-2022 MIN - MAX	FATALITIES 2013-2022 MEDIAN
AERODROMES AND GROUND HANDLING 	0	0-0	0	0-0	0
AIR TRAFFIC MANAGEMENT AND AIR NAVIGATION SERVICES 	0	0-0	0	0-0	0

► **Table 1.2** Cross domain comparison of EASA Member States infrastructure fatal accidents and fatalities

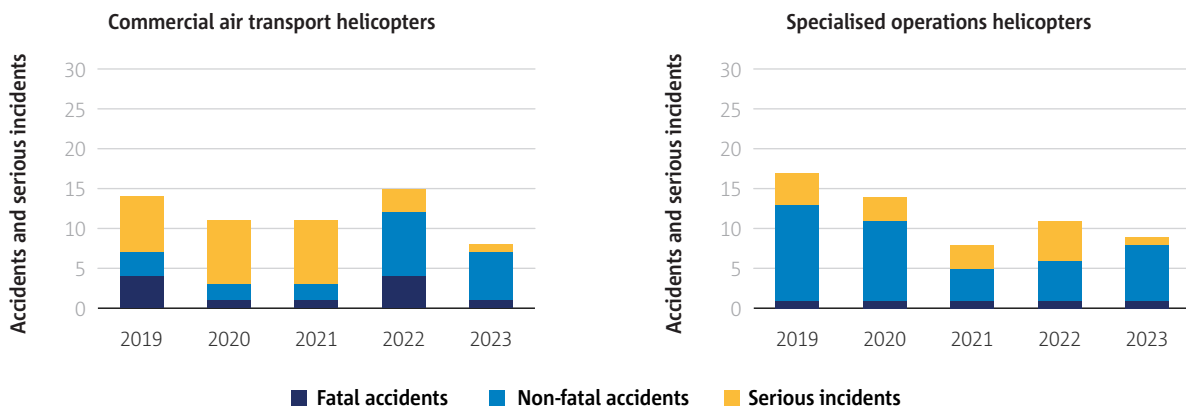




The following graphs (Figures 1.3 to 1.6) show the number of fatal accidents, non-fatal accidents and serious incidents for each aircraft domain while providing a visual comparison. Please note that the scale of the Y-axis is not the same for each chart, although they have in some cases been adjusted to make a comparison easier.



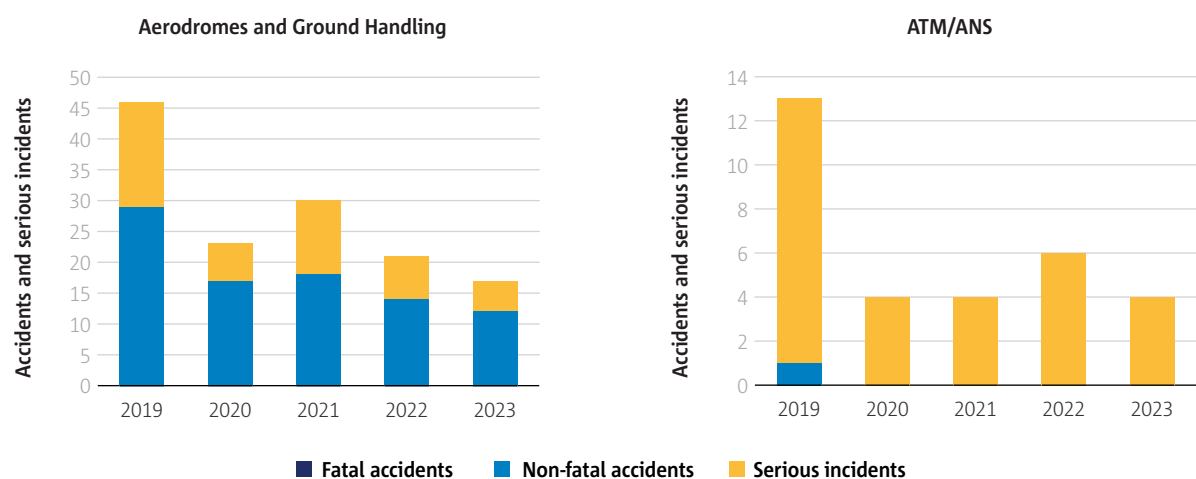
► **Figure 1.3** EASA Member States accidents and serious incidents per year for Commercial air transport (CAT) and Non-commercial complex aeroplanes (NCC), CAT other than complex aeroplanes and Specialised Operations (SPO) aeroplanes



► **Figure 1.4** EASA Member States accidents and serious incidents per year for CAT helicopters and SPO helicopters



► **Figure 1.5** EASA Member States accidents and serious incidents per year for NCO other than complex aeroplanes and helicopters, and all sailplane and balloon operations



► **Figure 1.6** EASA Member States infrastructure related accidents and serious incidents per year

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Chapter 2
Aeroplanes





This chapter covers aeroplane operations. The chapter is divided into five main sections:

1. Commercial air transport (CAT⁹) passenger and cargo operations conducted by EASA Air Operators Certificate (AOC) holders with complex aeroplanes with a maximum certificated take-off mass exceeding 5 700 kg or equipped with (a) turbofan engine(s) or more than one turboprop engine. Examples include airline, air taxi, air ambulance, etc.
2. CAT passenger and cargo operations conducted by EASA AOC holders with non-complex aeroplanes, having a maximum take-off mass below 5 700 kg or not equipped with (a) turbofan engine(s) or more than one turboprop engine. Examples include airline, air taxi, air ambulance, sightseeing, etc.
3. EASA Member State registered, or operated complex aeroplanes carrying out non-commercial complex (NCC) operation with a maximum certificated take-off mass exceeding 5 700 kg or equipped with (a) turbofan engine(s) or more than one turboprop engine. Examples include business, demonstration, flight training/instructional, relocation, etc.
4. Specialised operations (SPO) conducted by EASA Member State registered aeroplanes or EASA Member State AOC holders. Examples include agriculture, aerial advertisement, photography, etc.
5. Non-commercial operations (NCO) conducted by EASA Member State registered non-complex aeroplanes, having a maximum take-off mass below 5 700 kg or not equipped with (a) turbofan engine(s) or more than one turboprop engine, and not covered in the sections above.

The data presented are based on the accidents and serious incidents collected by the Agency under Regulation (EU) 996/2010 on accident and serious incident investigation and Regulation (EU) 376/2014 on occurrence reporting, follow-up, and analysis, and through the active search of those events from other official sources.

For each section, the key statistics and occurrence categories are presented in the core document.

The list of fatal accidents associated with the scope of this chapter is provided in Appendix 1, as is a list of fatal accidents involving non-certified aeroplanes (Annex I lists aircraft, the operation of which involves low risk for aviation safety).

Advanced statistics associated with the scope of this chapter are then provided in a domain-specific Appendix 2 – Advanced Statistics Aeroplanes, giving an overview of the safety risks for these types of operations at the European level. The advanced statistics are solely derived from occurrence data from the European Central Repository (ECR).

9 As per REGULATION (EU) 2018/1139 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, 'commercial air transport' means an aircraft operation to transport passengers, cargo or mail for remuneration or other valuable consideration.

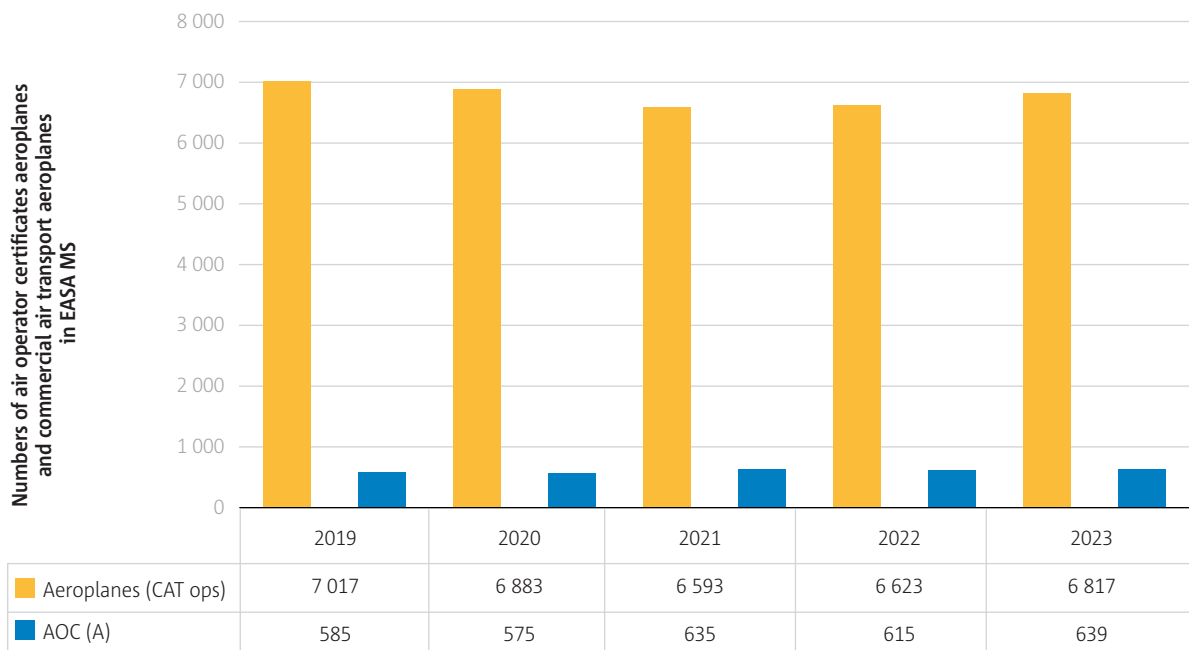


2.1 Commercial Air Transport (CAT) - complex aeroplanes

This section covers the CAT passenger and cargo operations conducted by EASA AOC holders with complex aeroplanes with a maximum certificated take-off mass exceeding 5 700 kg or equipped with (a) turbofan engine(s) or more than one turboprop engine. Examples include airline, air taxi, air ambulance, etc.

Numbers of AOC holders and AOC aeroplanes

Figure 2.1 shows the number of AOC holders and the number of commercial air transport aeroplanes within EASA Member States. It shows that in 2023, the number of AOC aeroplane holders has slightly increased in comparison to the previous year and has reached the highest number in the reference period. The number of CAT aeroplanes, with slight increase in 2022 has further increased in 2023 but has remained below the numbers of the years 2019 and 2020.



► **Figure 2.1** Numbers of AOC Aeroplanes and CAT aeroplanes in EASA Member States



Key statistics

The key statistics for this domain are depicted in Table 2.1 and Table 2.2, and include a comparison of the number of accidents (fatal and non-fatal) and serious incidents for the last year and the previous 10-year period¹⁰. They also include a comparison of the fatalities and serious injuries sustained in those accidents during the same timeframe. In 2023 there was no fatal accident involving EASA CAT AOC holders. The number of non-fatal accidents is higher than the previous 10-year period, while the number of serious incidents is lower.

10 out of 18 non-fatal accidents had resulted in substantial damage to an aircraft. These cases encompassed a runway overrun on landing and collision with a parked helicopter, explosion of a main landing gear wheel, left nosewheel fracture and separation during crosswind landing, left wingtip colliding with a lamppost, all main landing gear wheels damage at landing, two tail strikes, one hard landing and two collisions on ground between two aircraft.

	Total number of occurrences per occurrence class over 2013-2022	Number of occurrences per occurrence class in 2023	Comparison 2023 vs yearly average of 2013-2022 per occurrence class
Fatal accidents	6	0	↓
Non-fatal accidents	153	18	↑
Serious incidents	639	33	↓

► **Table 2.1** Key statistics for CAT complex aeroplanes

	Number of fatalities	Number of serious injuries
Total number over 2013-2022	277	71
Yearly max number over 2013-2022	150	15
Yearly min number over 2013-2022	0	3
Total number in 2023	0	7

► **Table 2.2** Fatalities and serious injuries involving CAT complex aeroplanes

Figure 2.2 shows that the number of non-fatal accidents in 2023 has increased in comparison to the previous year. The number of serious incidents has decreased in comparison with the previous year and was the second lowest of the period. The air traffic in 2023 had further recovered and reached approximately 88% of the 2019 traffic level¹¹. These figures should be considered in the context of the recovery from the COVID-19 pandemic, the impact of the Russian Federation's invasion of Ukraine and other conflict zones leading to the rerouting of the affected traffic.

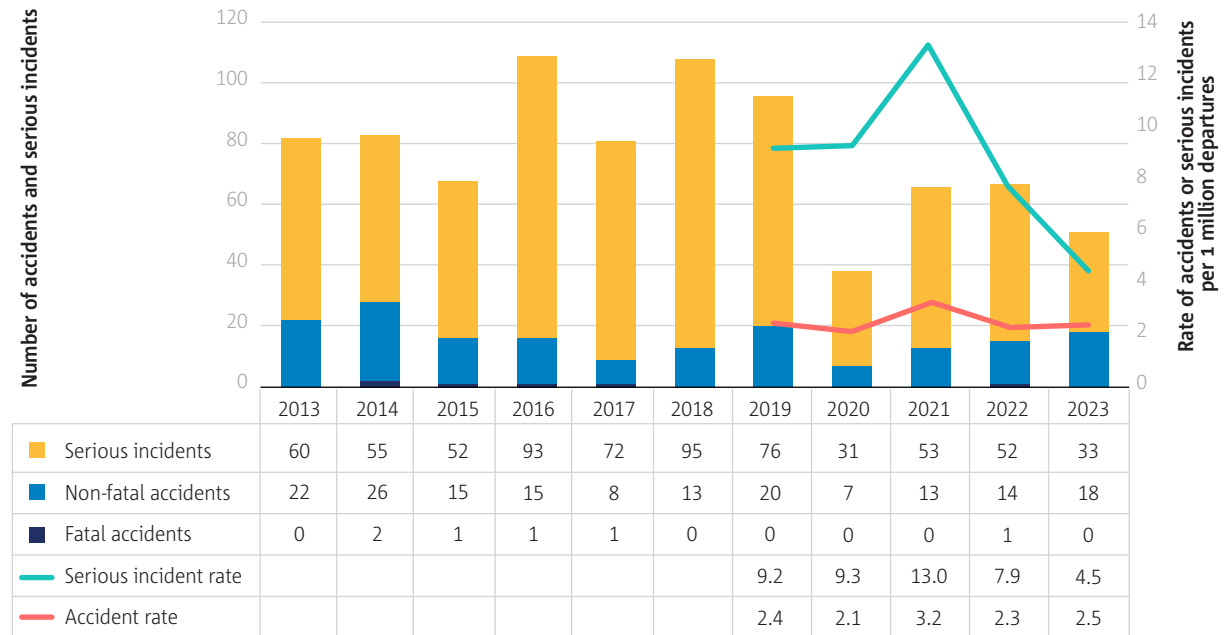
Figure 2.2 also shows that the rate of accidents has increased by 0.2 and serious incidents have decreased by 3.4 occurrences per 1 million flights in 2023 compared to the previous year. The rates are displayed for years

¹⁰ On 4 August 2018, 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 an 'Annex I aircraft' of Regulation (EU) 2018/1139) and the specific type of operation being carried, this accident has not been included in the statistics of this chapter.

¹¹ Source: EUROCONTROL

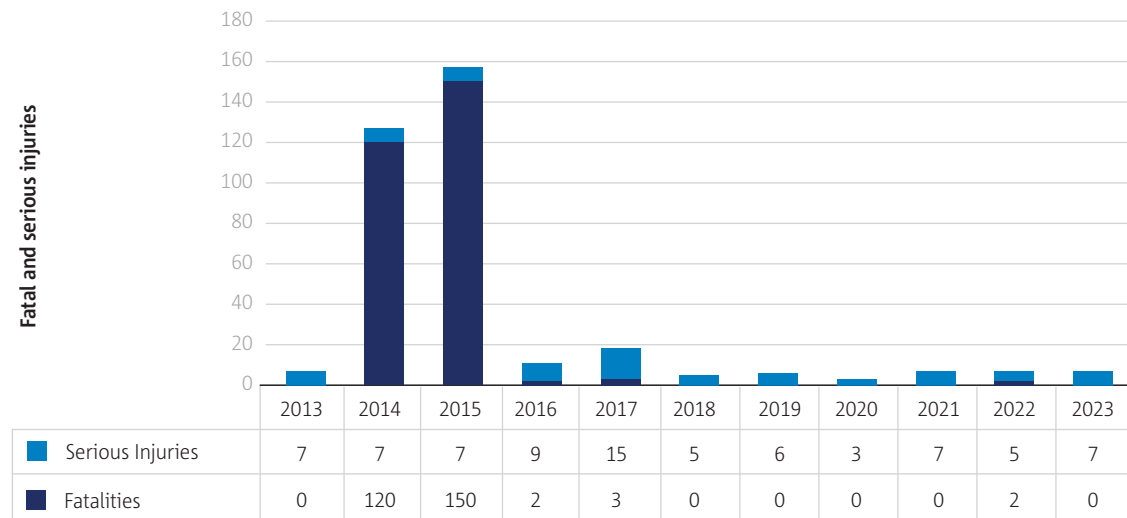


2019 onwards due to a change in exposure data (number of flights) structure by the data provider. The rate of accidents in 2023 was the second highest in the period and slightly above the result of 2019. The rate of serious incidents, which at times bear a higher risk than accidents, was the lowest in the reference period.



► **Figure 2.2** Numbers and rates of fatal accidents, non-fatal accidents, and serious incidents per million departures involving CAT complex aeroplanes

The number of serious injuries, slightly increased in 2023, when compared to the previous year. In 2023 two serious injuries were attributable to encounters with turbulence during flight, a passenger being injured by falling from the stairs and an accidental parking brake setting during pushback causing injury to a ramp agent. The number of fatalities per year relates to the operation type (passenger or cargo), size and occupancy of the aeroplane involved in the accident.



► **Figure 2.3** Fatal and serious injuries per year involving CAT complex aeroplanes



Occurrence categories

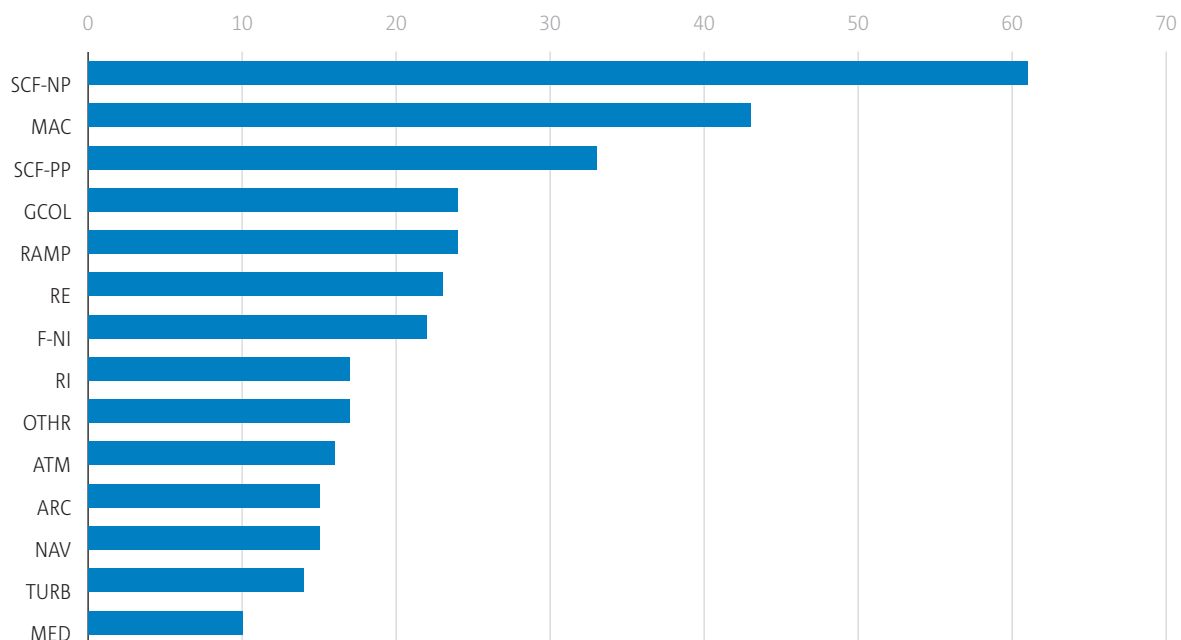
Figure 2.4 outlines the top occurrence categories assigned to the accidents and serious incidents in the past five years. Occurrences are categorised using the ICAO Accident/Incident Data Reporting (ADREP) taxonomy for occurrence categories, developed for supporting common coding of the main elements of an occurrence that should be investigated, recorded, and analysed.

Categories are of different natures, for example:

- Operational such as low altitude operations (LALT);
- Environmental such as turbulence encounter (TURB);
- Technical such as system/component failure or malfunction [non-powerplant] (SCF-NP);
- Consequential such as fire/smoke resulting from impact (F-POST); etc.

Multiple categories may therefore be assigned to a single occurrence. For example, if an engine failure occurred, and loss of control followed, the occurrence would be coded in both categories, i.e., SCF-PP: powerplant failure or malfunction and LOC-I: loss of control in flight. The sum of the numbers of occurrences per category may therefore be greater than the total number of occurrences that were realised in the period.

In the period of 2019-2023, the highest number of accidents and serious incidents were non-powerplant system/component failure related, followed by mid-air collision, and system component failure - powerplant categories. In 2023 the most accidents and serious incidents were non-powerplant system/component failure (main landing gear wheels damages and explosion, landing gear separations, decompression, overheat of the aft galley), ground collision (ground vehicle colliding with a taxiing aircraft, collision with two taxiing aircraft, winglet collision with lamppost) and mid-air collision related.



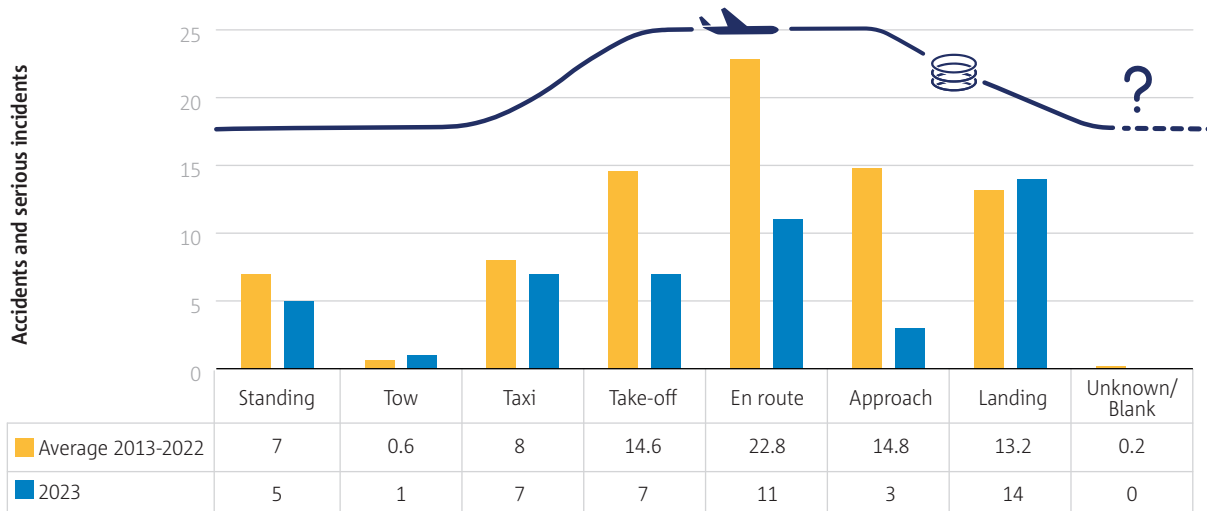
SCF-NP: System/component failure or malfunction [non-powerplant]; MAC: Airprox/ ACAS alert/ loss of separation/(near) mid-air collisions; SCF-PP: powerplant failure or malfunction; F-NI: Fire/ smoke (non-impact); RAMP: Ground handling; ATM: ATM/ CNS; GCOL: Ground collision; RE: Runway excursion; RI: Runway incursion - vehicle, aircraft or person; NAV: Navigation error; OTHR: Other; ARC: Abnormal runway contact; TURB: Turbulence encounter, MED: Medical

► **Figure 2.4** Numbers of occurrences by occurrence category involving commercial air transport complex aeroplanes



Phase of flight

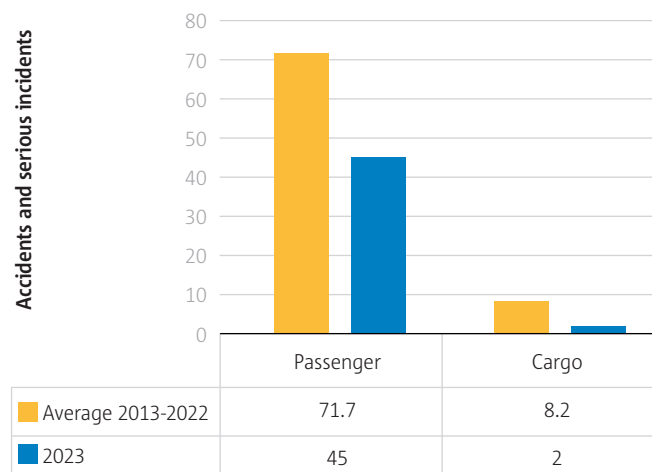
The numbers for 2023 in Figure 2.5 show a distribution of accidents and serious incidents per flight phase with a greater number during landing, and en-route. The number of accidents and serious incidents during landing, critical phase of flight, in 2023 was higher than the 2013-2022 average. The unknown/blank flight phase corresponds to those occurrences where no data was available, and it normally relates to the second aircraft in some of the occurrences.



► **Figure 2.5** Accidents and serious incidents by phase of flight involving CAT complex aeroplanes

Operation type

Figure 2.6 compares the number of accidents and serious incidents per operation type (passenger and cargo), showing the figures for the last year compared with the previous 10-year average. In 2023, like in 2020, 2021, and 2022, the number of occurrences for passenger flight operations remained below the 10-year average. The number of accidents and serious incidents for cargo flights was also lower than the 10-year average.

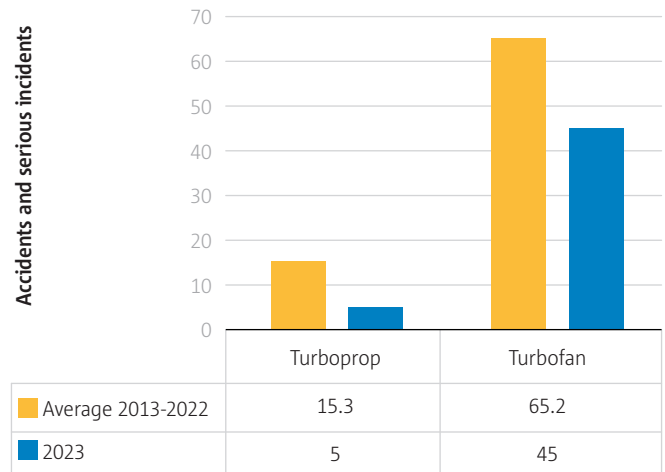


► **Figure 2.6** Accidents and serious incidents by operation type involving CAT complex aeroplanes



Propulsion type

Figure 2.7 shows the distribution by propulsion type for the last year compared with the previous 10-year average. The figure shows a similar pattern between the 2023 figures and the 2013-2022 average figure, although the absolute numbers are lower in 2023 compared with the 10-year average (2013-2022). The split between turbofan and turboprop is consistent with the aircraft fleet sizes and utilisation.



► **Figure 2.7** Accidents and serious incidents by propulsion type involving CAT complex aeroplanes





2.2 Commercial Air Transport (CAT) - other than complex aeroplanes

This section covers the safety performance of CAT passenger and cargo operations conducted by EASA AOC holders with non-complex aeroplanes, having a maximum take-off mass below 5 700 kg or not equipped with (a) turbofan engine(s) or more than one turboprop engine. Examples include airline, air taxi, air ambulance, sightseeing, etc. Due to data availability for this domain, this chapter covers a nine-year period from 2014.

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 last year and the previous 9-year period. Also included is a comparison of the fatalities and serious injuries sustained in those accidents during the same timeframe.

In 2023 there was no fatal accident and serious incident involving EASA CAT AOC holder operating other than complex aeroplanes. In 2023 there was one non-fatal accident that was mid-air collision of aircraft during final approach. Overall the number of non-fatal accidents was lower than the average of the previous 9-year period.

	Total number of occurrences per occurrence class over 2014-2022	Number of occurrences per occurrence class in 2023	Comparison 2023 vs yearly average of 2014-2022 per occurrence class
Fatal accidents	2	0	↓
Non-fatal accidents	11	1	↓
Serious incidents	14	0	↓

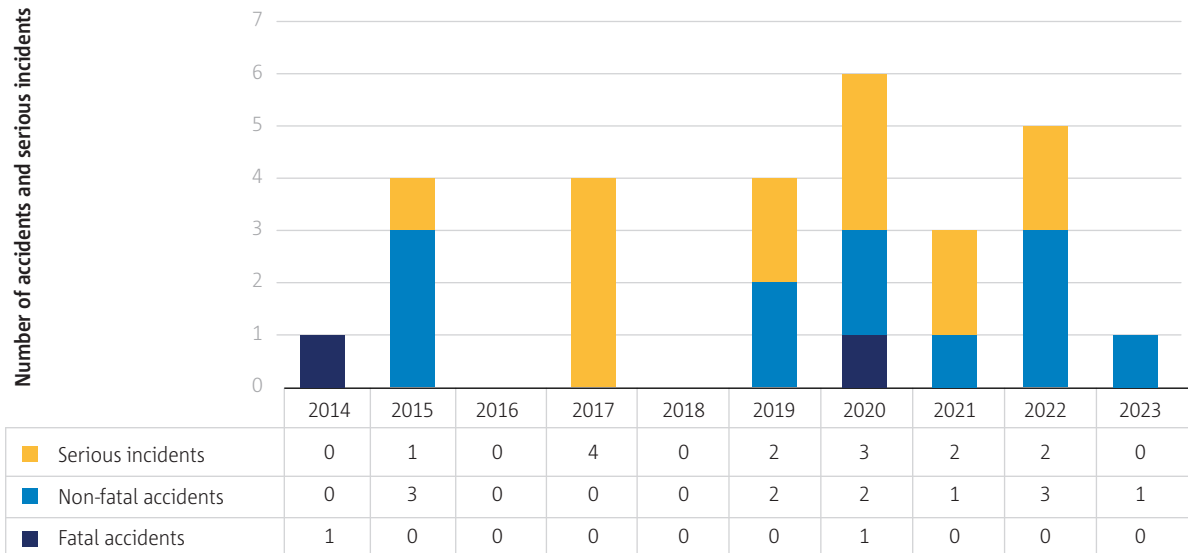
► **Table 2.3** Key statistics for CAT other than complex aeroplanes

	Number of fatalities	Number of serious injuries
Total number over 2014-2022	6	6
Yearly max number over 2014-2022	4	4
Yearly min number over 2014-2022	0	0
Total number in 2023	0	1

► **Table 2.4** Fatalities and serious injuries involving CAT other than complex aeroplanes

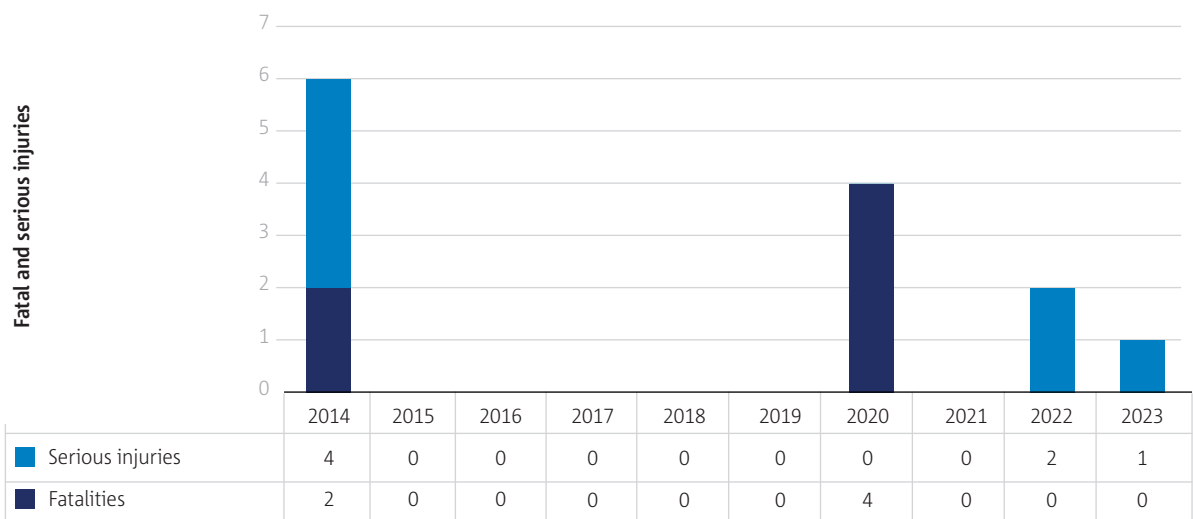


Figure 2.8 shows that the number of non-fatal accidents in 2023 has decreased, when compared with the previous year.



► **Figure 2.8** Numbers and rates of fatal accidents, non-fatal accidents and serious incidents per million departures involving CAT other than complex aeroplanes

The number of serious injuries, in 2023 decreased, when compared with the previous year. One serious injury in 2023 was attributable to a person on board being injured during mid-air collision of aircraft during final approach.



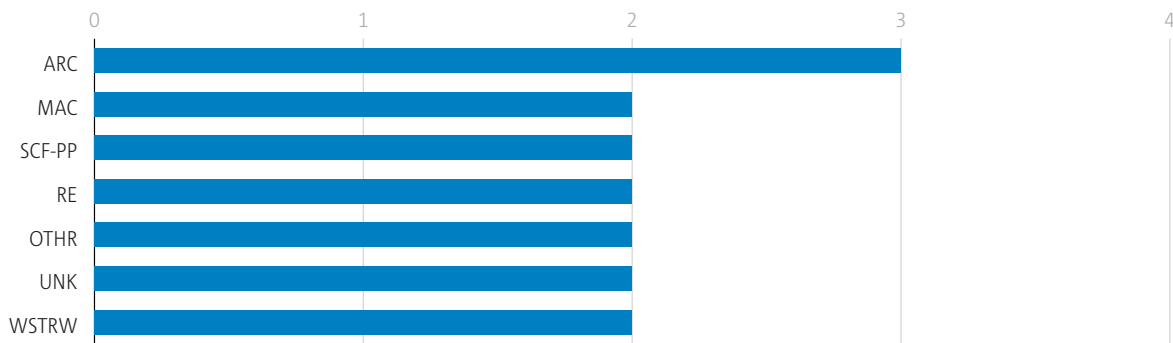
► **Figure 2.9** Fatal and serious injuries per year involving CAT other than complex aeroplanes



Occurrence categories

Figure 2.10 outlines the top occurrence categories assigned to the serious incidents and accidents in the past five years. Occurrences are categorised using the ICAO ADREP taxonomy for occurrence categories, developed for supporting common coding of the main elements of an occurrence that should be investigated, recorded, and analysed.

In the period of 2019-2023 the highest number of accidents and serious incidents were abnormal runway contact related. The non-fatal accident of 2023 was mid-air collision related.

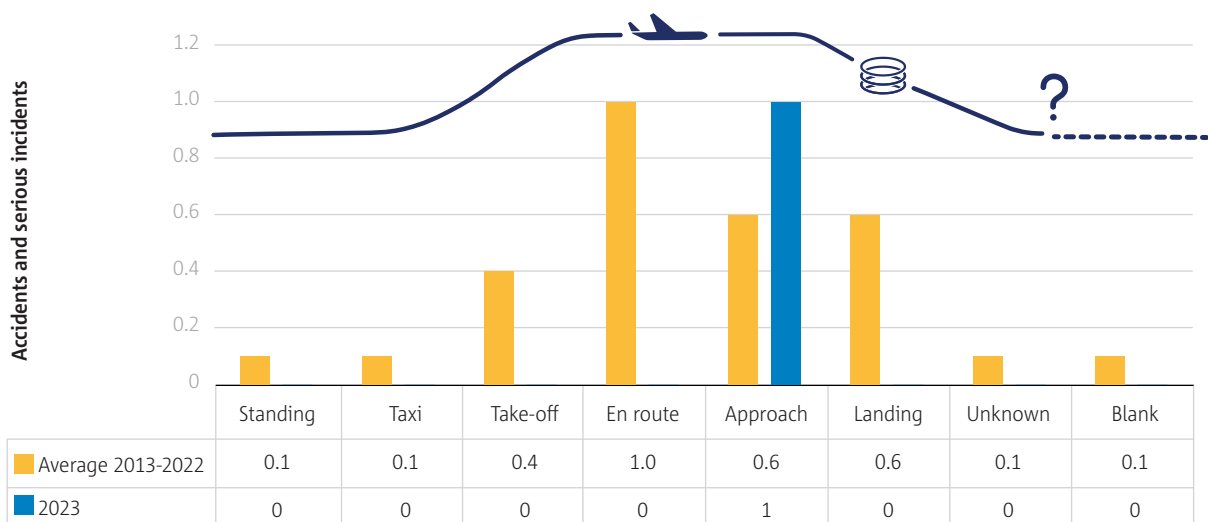


ARC: Abnormal runway contact; MAC: Airprox/ ACAS alert/ loss of separation/ (near) midair collisions; SCF-PP: powerplant failure or malfunction; RE: Runway excursion; OTHR: Other; UNK: Unknown or undetermined; WSTRW: Windshear or thunderstorm

► **Figure 2.10** Numbers of occurrences by occurrence category involving CAT other than complex aeroplanes

Phase of flight

The low numbers in this domain do not allow any comparison in terms of flight phase. However, the data are still presented for information in Figure 2.11.

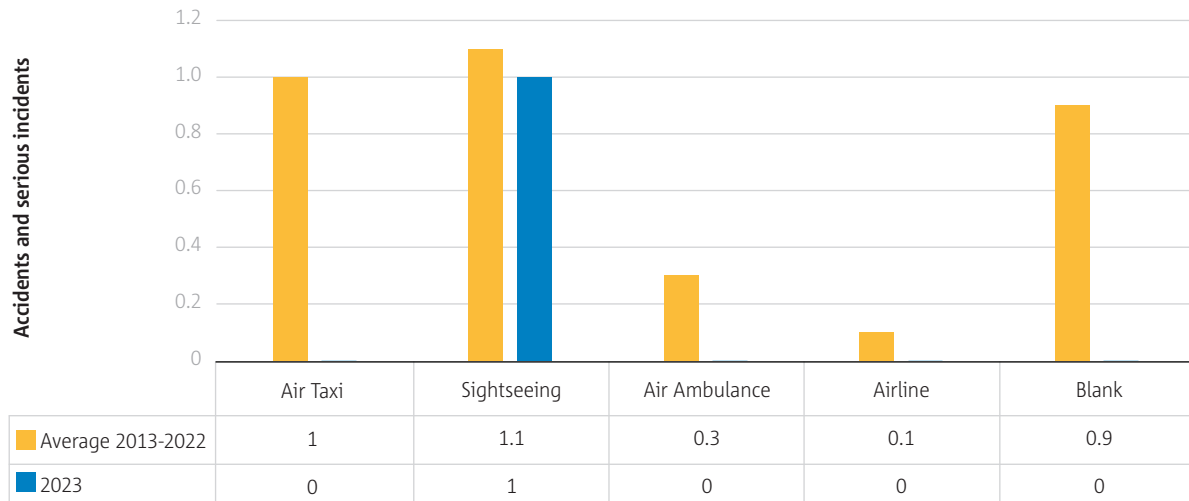


► **Figure 2.11** Accidents and serious incidents by phase of flight involving CAT other than complex aeroplanes



Operation type

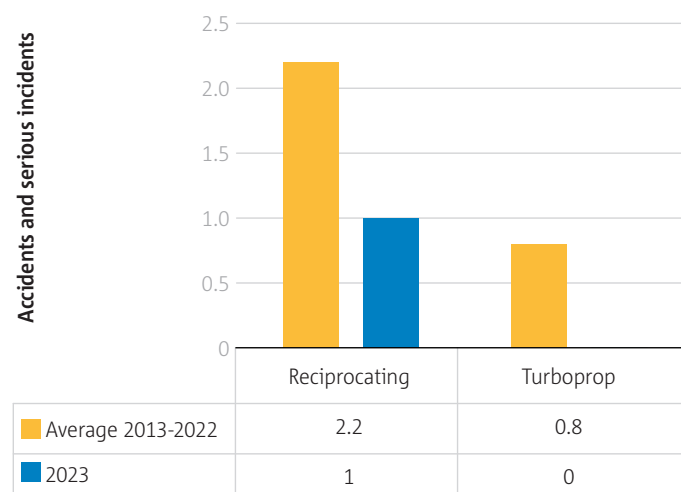
Figure 2.12 compares the number of accidents and serious incidents per operation type (passenger and cargo), showing the figures for the last year compared with the previous 10-year average.



► **Figure 2.12** Accidents and serious incidents by operation type involving CAT other than complex aeroplanes

Propulsion type

The low numbers in this domain do not allow any comparison between the two main propulsion types. However, the data are still presented for information in Figure 2.13.



► **Figure 2.13** Accidents and serious incidents by propulsion type involving CAT other than complex aeroplanes



2.3 Non-Commercial Complex (NCC) aeroplanes

This section covers the safety performance of complex aeroplanes performing NCC (e.g., business, demonstration, flight training/instructional, relocation, etc.):

- with a maximum certificated take-off mass exceeding 5 700 kg, or equipped with (a) turbofan engine(s) or more than one turboprop engine, and
- with an EASA Member State as state of operator or state of registry.

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 last year and the previous 10-year period. Also included is a comparison of the fatalities and serious injuries sustained in those accidents during the same timeframe.

	Total number of occurrences per occurrence class over 2013-2022	Number of occurrences per occurrence class in 2023	Comparison 2023 vs yearly average of 2013-2022 per occurrence class
Fatal accidents	5	0	↓
Non-fatal accidents	23	0	↓
Serious incidents	60	2	↓

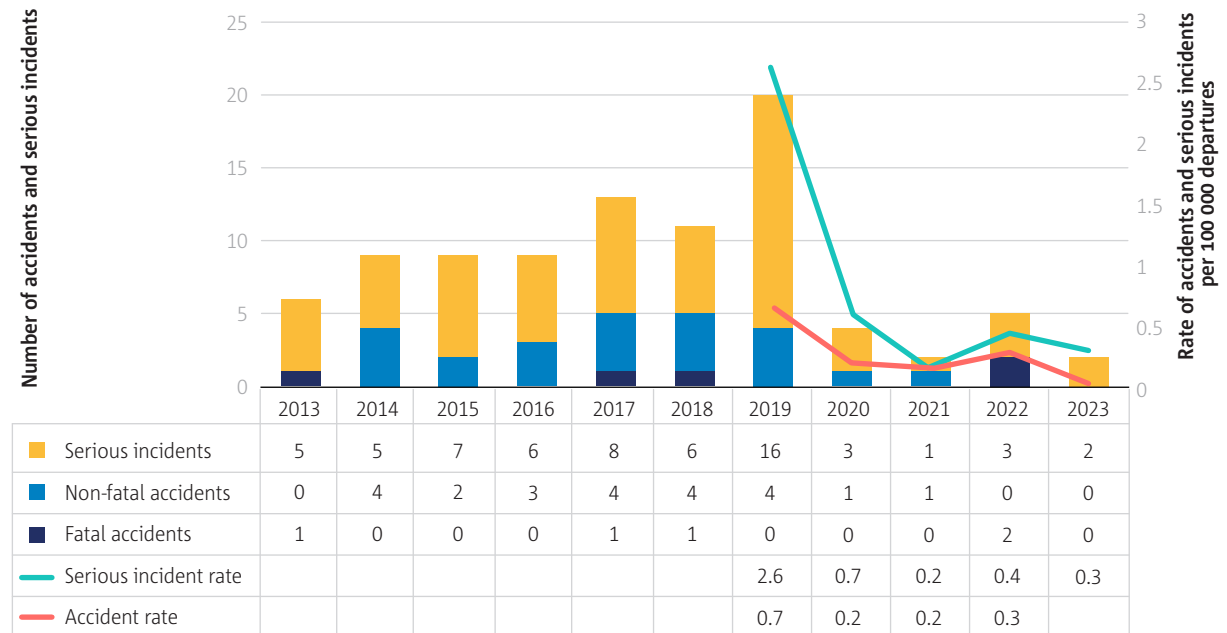
► **Table 2.5** Key statistics for NCC aeroplanes

	Number of fatalities	Number of serious injuries
Total number over 2013-2022	16	3
Yearly max number over 2013-2022	10	2
Yearly min number over 2013-2022	0	0
Total number in 2023	0	0

► **Table 2.6** Fatalities and serious injuries involving NCC aeroplanes

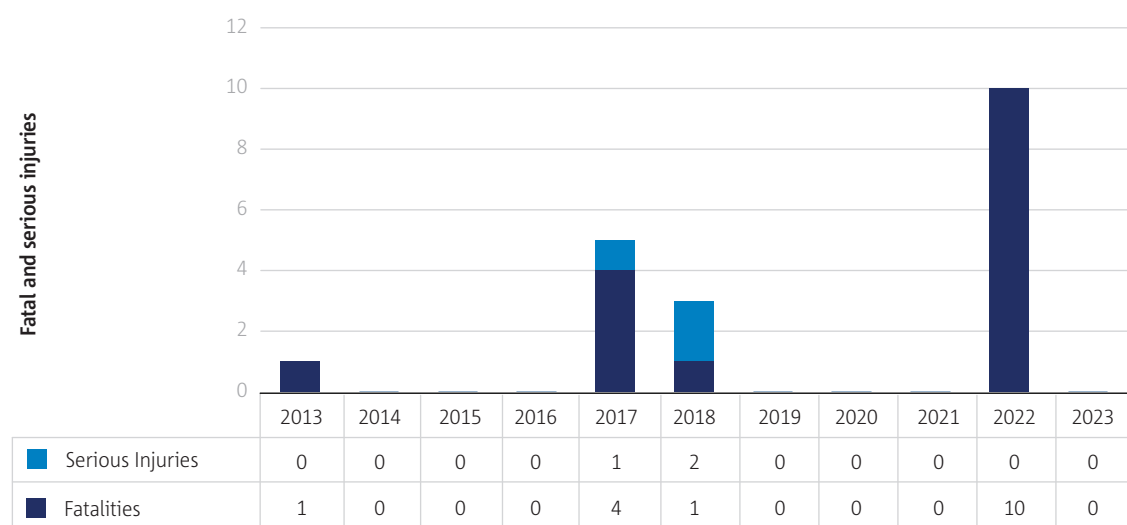


Figure 2.14 shows that during 2023, there were two serious incidents involving an EASA Member State registered or operated NCC aeroplane. One was near mid-air collision, and the other one electrical smell after departure related.



► **Figure 2.14** Fatal accidents, non-fatal accidents and serious incidents per year involving NCC aeroplanes

The number of fatalities and serious injuries per year is shown in Figure 2.15. In 2023 there were no fatalities and no serious injuries.



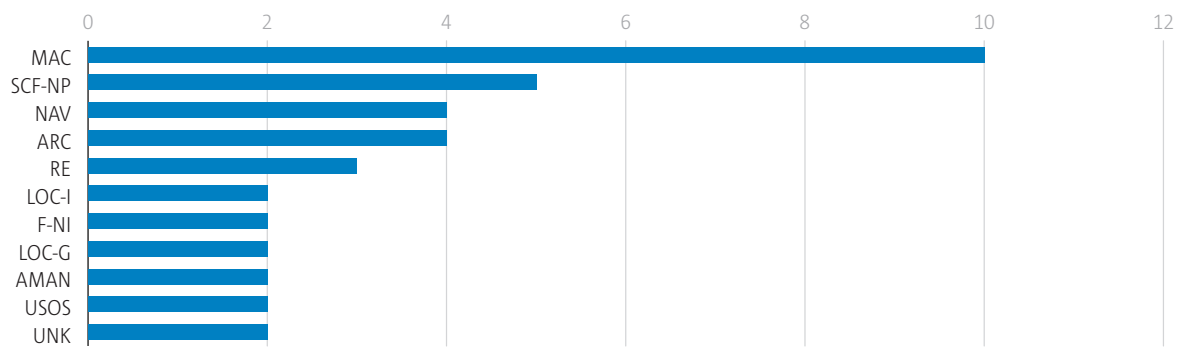
► **Figure 2.15** Fatal and serious injuries per year involving NCC aeroplanes



Occurrence categories

Figure 2.16 outlines the top 5 categories assigned to the serious incidents and accidents in the past five years. Occurrences are categorised using the ICAO ADREP taxonomy for occurrence categories, developed for supporting common coding of the main elements of an occurrence that should be investigated, recorded, and analysed.

In the period of 2019-2023 the highest number of accidents and serious incidents were mid-air collision occurrence category related, followed by system component failure or malfunction - non-powerplant.

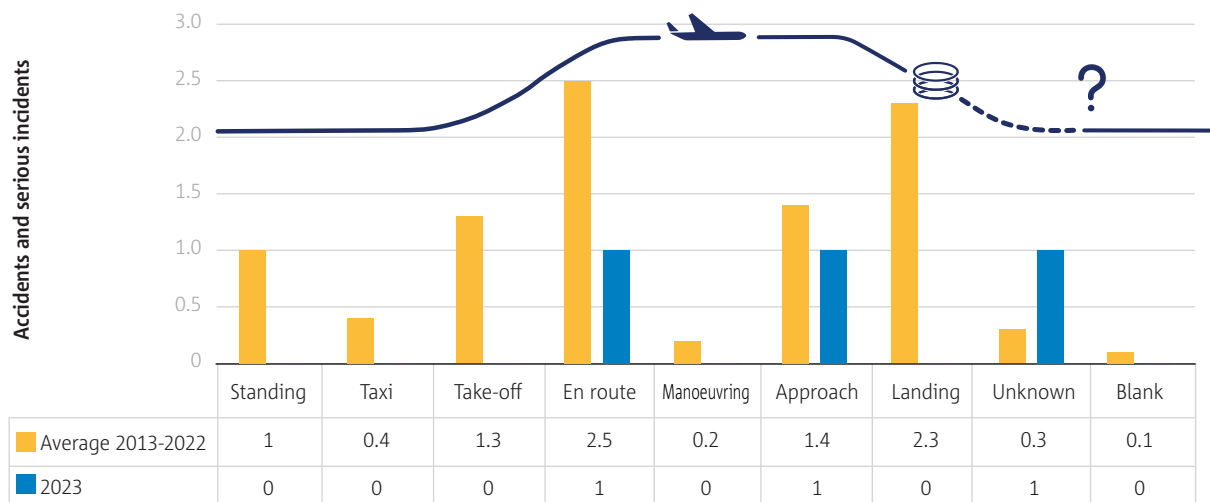


MAC: Airprox/ ACAS alert/ loss of separation/ (near) mid-air collisions; SCF-NP: System/component failure or malfunction [non-powerplant]; RE: Runway excursion; NAV: Navigation error; ARC: Abnormal runway contact; LOC-I: Loss of control - inflight; F-NI: Fire/ smoke (non-impact); LOC-G: Loss of control - ground; AMAN: Abrupt manoeuvre; USOS: Undershoot/overshoot; UNK: Unknown or undetermined

► **Figure 2.16** Numbers of occurrences by occurrence category involving NCC aeroplanes

Phase of flight

The low numbers in this domain do not allow any comparison in terms of flight phase. However, the data are still presented for information in Figure 2.17.

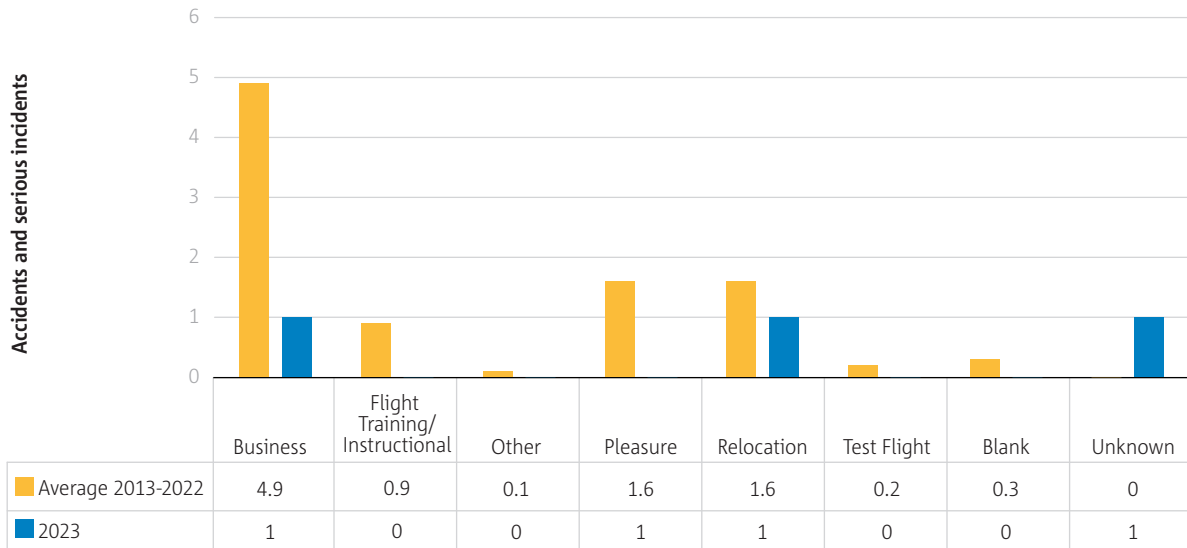


► **Figure 2.17** Accidents and serious incidents by phase of flight involving NCC aeroplanes



Operation type

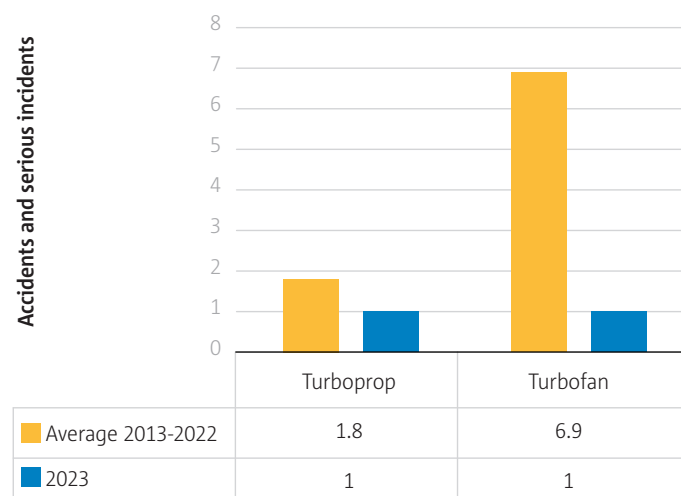
The low numbers in this domain do not allow any comparison in terms of operation type. However, the data are still presented for information in Figure 2.18.



► **Figure 2.18** Accidents and serious incidents by operation type involving NCC aeroplanes

Propulsion type

The low numbers in this domain do not allow any comparison between the two main propulsion types. However, the data are still presented for information in Figure 2.19.



► **Figure 2.19** Accidents and serious incidents by propulsion type involving NCC aeroplanes



2.4 Specialised Operations (SPO) aeroplanes

The scope of this section covers SPO involving aeroplanes of all mass categories having an EASA Member State as state of registry or state of operator.

Key statistics

The key statistics for this domain are in Table 2.7 and Table 2.8 and include a comparison of the number of accidents (fatal and non-fatal) and serious incidents for the last year and the previous 10-year period. It also includes a comparison of the fatalities and serious injuries sustained in those accidents during the same timeframe.

The cumulated number of fatal accidents, non-fatal accidents, and serious incidents in 2023 remained below the average of the preceding decade for each occurrence class. From the three fatal accidents in 2023, two of them occurred during parachuting operations, the third one was a loss of control at low altitude during crop spraying. In 2023, four out of eight non-fatal accidents resulted in runway excursions, one in the loss of control during U-turn after take-off, while towing a glider, one in one engine power loss in flight, one in a crash after wing strike during agricultural works, and another one in collision with a cable during a discovery flight in the aerodrome circuit. The numbers of fatalities and serious injuries in 2023 were close to the minimum values of the preceding decade.

	Total number of occurrences per occurrence class over 2013-2022	Number of occurrences per occurrence class in 2023	Comparison 2023 vs yearly average of 2013-2022 per occurrence class
Fatal accidents	58	3	↓
Non-fatal accidents	169	8	↓
Serious incidents	74	2	↓

► **Table 2.7** Key statistics for SPO aeroplanes

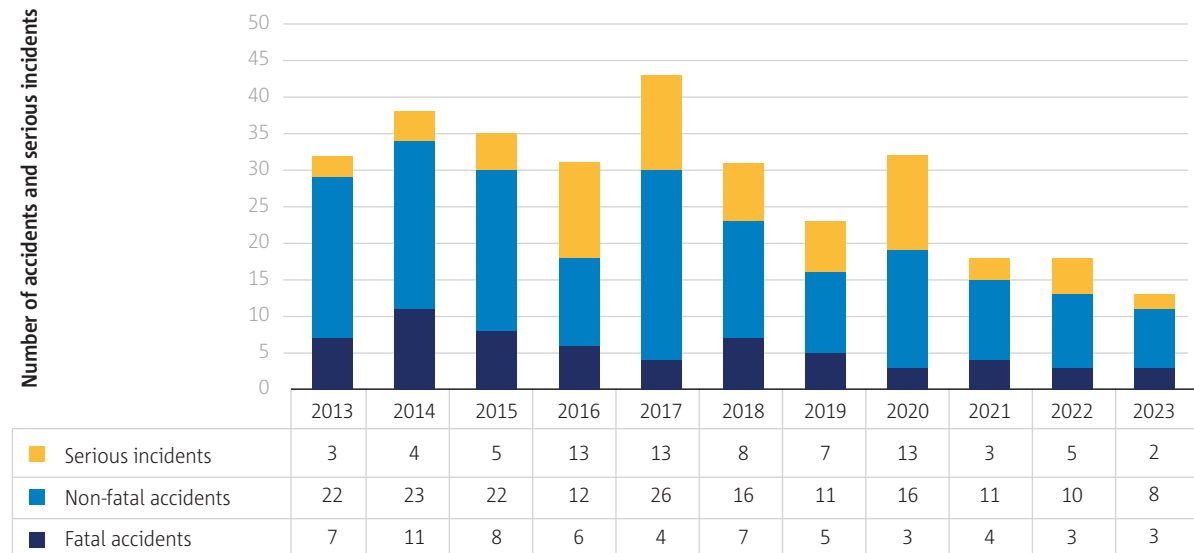
	Number of fatalities	Number of serious injuries
Total number over 2013-2022	120	56
Yearly max number over 2013-2022	31	16
Yearly min number over 2013-2022	4	1
Total number in 2023	3	1

► **Table 2.8** Fatalities and serious injuries involving SPO aeroplanes



The number of accidents and serious incidents per year is shown in Figure 2.20.

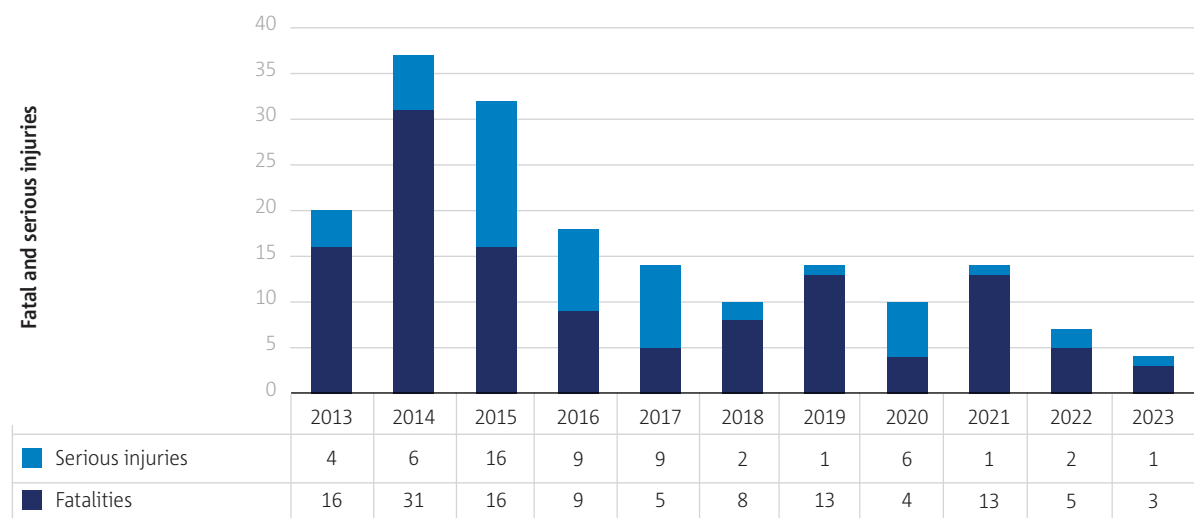
In 2023 the number of fatal accidents was equal to the minimum values of the preceding decade. Both the numbers of serious incidents and non-fatal accidents in 2023 were the lowest, when compared to the preceding decade. As in all years of the previous 10-year period, the number of non-fatal accidents is higher than the number of fatal accidents and the number of serious incidents in 2023.



► **Figure 2.20** Fatal accidents, non-fatal accidents and serious incidents per year involving SPO aeroplanes

The number of fatalities and serious injuries per year is shown in Figure 2.21.

In 2023 the number of fatalities was the lowest, and the number of serious injuries was equal to the lowest numbers observed in 2019 and 2021, when compared to the preceding decade. The number of serious injuries in 2023 is low in relation to the number of non-fatal accidents. Four of the eight non-fatal accidents resulted in aircraft being destroyed sustaining one serious and one minor injury, and remaining four in substantial damage to the aircraft, in one case sustaining a minor injury.



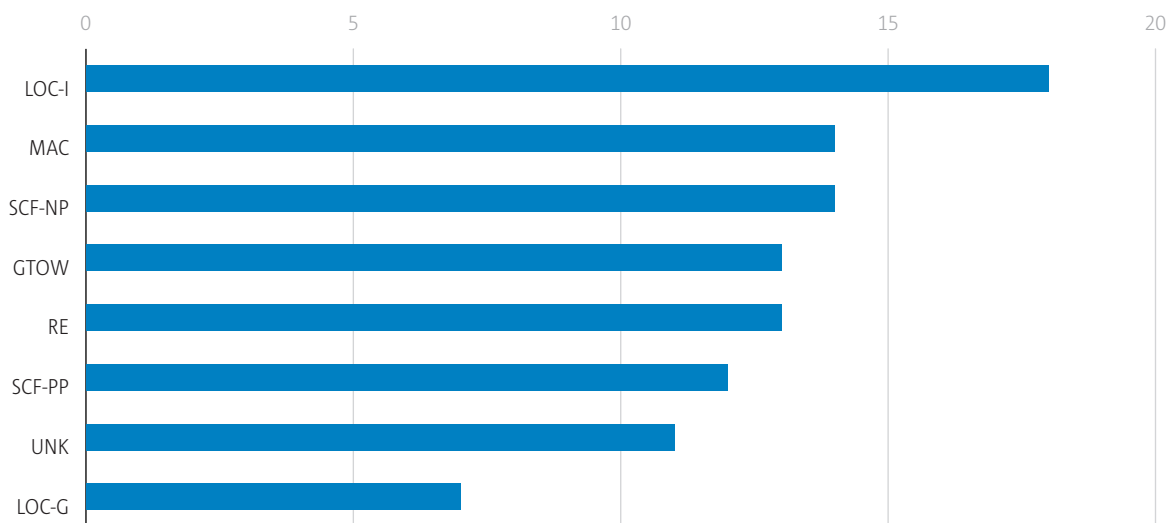
► **Figure 2.21** Fatal and serious injuries per year involving SPO aeroplanes



Occurrence categories

Figure 2.22 outlines the top 15 categories assigned to the serious incidents and accidents in the past five years. Occurrences are categorised using the ICAO ADREP taxonomy for occurrence categories, developed for supporting common coding of the main elements of an occurrence that should be investigated, recorded, and analysed.

In the period of 2019-2023, the highest number of accidents and serious incidents were loss of control in flight, followed by mid-air collision and system component non powerplant failure related occurrence categories. In 2023 the highest number of accidents and serious incidents were runway excursion related.



LOC-I: Loss of control - inflight; MAC: Airprox/ ACAS alert/ loss of separation/ (near) mid-air collisions; SCF-NP: System/ component failure or malfunction [non-powerplant]; GTOW: Glider towing related events; RE: Runway excursion; SCF-PP: powerplant failure or malfunction; UNK: Unknown or undetermined; LOC-G: Loss of control - ground

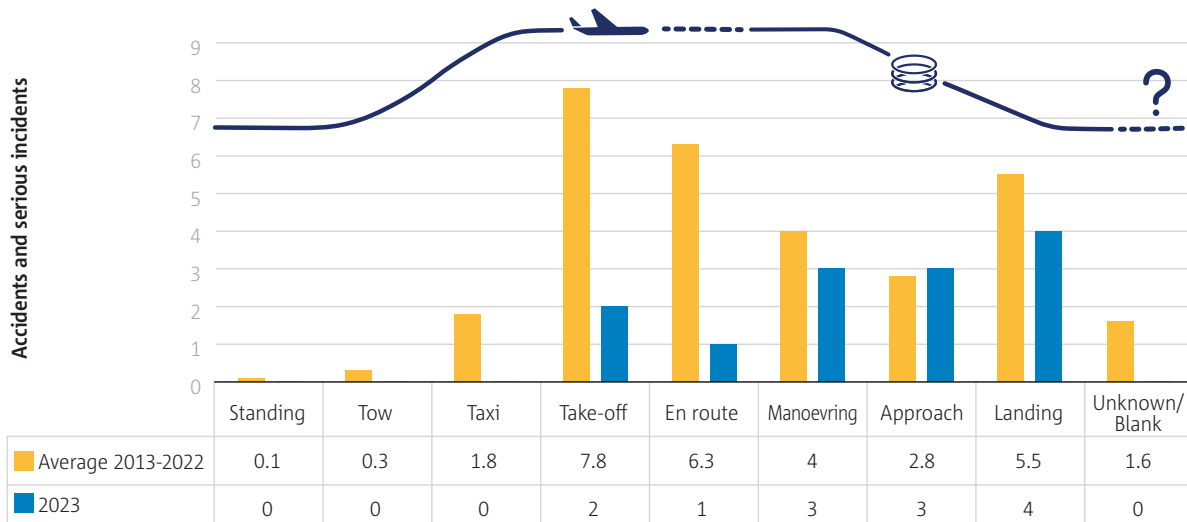
► **Figure 2.22** Numbers of occurrences by occurrence category involving SPO aeroplanes



Phase of flight

Figure 2.23 shows the distribution of accidents and serious incidents by flight phase.

The numbers of serious incidents and accidents in 2023 were lower than the average of the preceding decade for all flight phases except for the approach phase. In 2023, 10 out of the 13 accidents and serious incidents occurred during landing, approach, and manoeuvring.

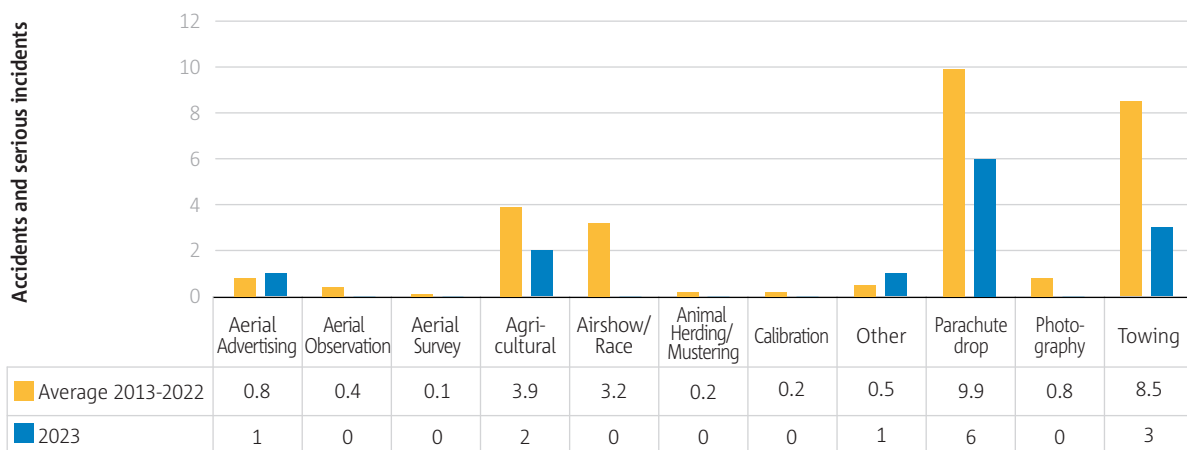


► **Figure 2.23** Accidents and serious incidents by phase of flight involving SPO aeroplanes

Operation type

Figure 2.24 shows the number of accidents and serious incidents by type of SPO.

In 2023 the number of accidents and serious incidents were lower than the average of the preceding decade for all operation types except aerial advertising and other operations. In 2023, nine out of the 13 serious incidents and accidents were in parachute and towing operations.



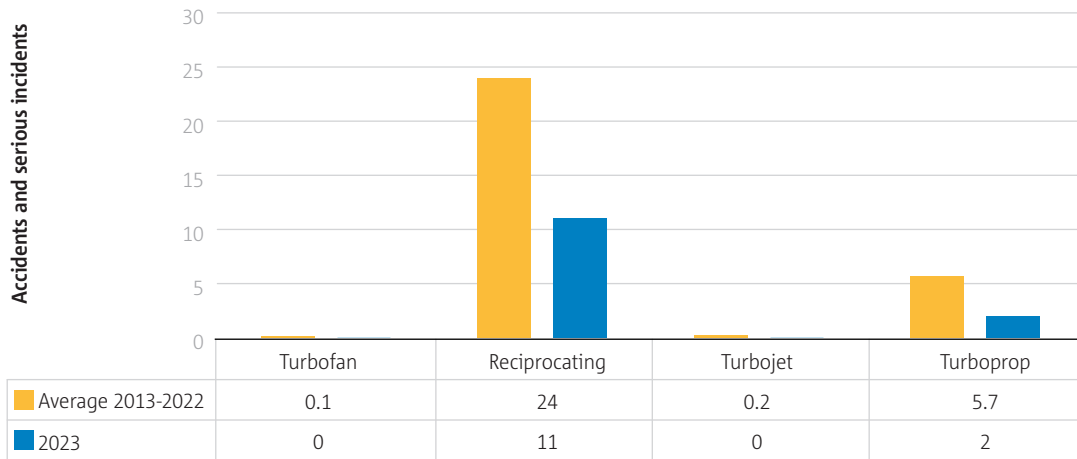
► **Figure 2.24** Accidents and serious incidents by SPO type involving aeroplanes



Propulsion type

Figure 2.25 shows the number of accidents and serious incidents by propulsion type.

The number of accidents and serious incidents in 2023 involving aircraft with reciprocating engines or turboprop engines were around half of the average of the preceding decade. There were no accidents or serious incidents involving turbofan and turbojet engines in 2023.



► **Figure 2.25** Accidents and serious incidents by propulsion type involving SPO aeroplanes





2.5 Non-Commercial Operations (NCO) other than complex aeroplanes

The scope of this section covers NCO conducted by EASA Member State registered non-complex aeroplanes, having a maximum take-off mass below 5 700 kg, or not equipped with (a) turbofan engine(s) or more than one turboprop engine, and not covered in the sections above. This dataset includes certified small aeroplanes as well as Light Sport Aeroplanes (LSA) and Very Light Aeroplanes (VLA). Ultralights, microlights, and other aircraft not certified are excluded from this dataset but are examined further in the microlights chapter. These statistics are therefore not fully comparable with previous editions of the ASR, apart from last year's edition, due to the better filtering of the dataset.

This chapter uses a consolidated dataset from the ECR database and the EASA database as its main source for the key statistics. However, the safety risks, HF/HP, and airworthiness figures (available in the Appendix 2) use the ECR database only.

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 last year and the previous 10-year period. It also includes comparison of the fatalities and serious injuries sustained in those accidents during the same timeframe.

Table 2.9 shows a decrease of fatal and non-fatal accidents in 2023. Fatal accidents decreased by 23%, non-fatal accidents by 30% and serious incidents increased by 10% compared to the 10-year average.

	Total number of occurrences per occurrence class over 2013-2022	Number of occurrences per occurrence class in 2023	Comparison 2023 vs yearly average of 2013-2022 per occurrence class
Fatal accidents	456	35	↓
Non-fatal accidents	2 547	178	↓
Serious incidents	962	106	↑

► **Table 2.9** Key statistics for non-commercial other than complex aeroplanes

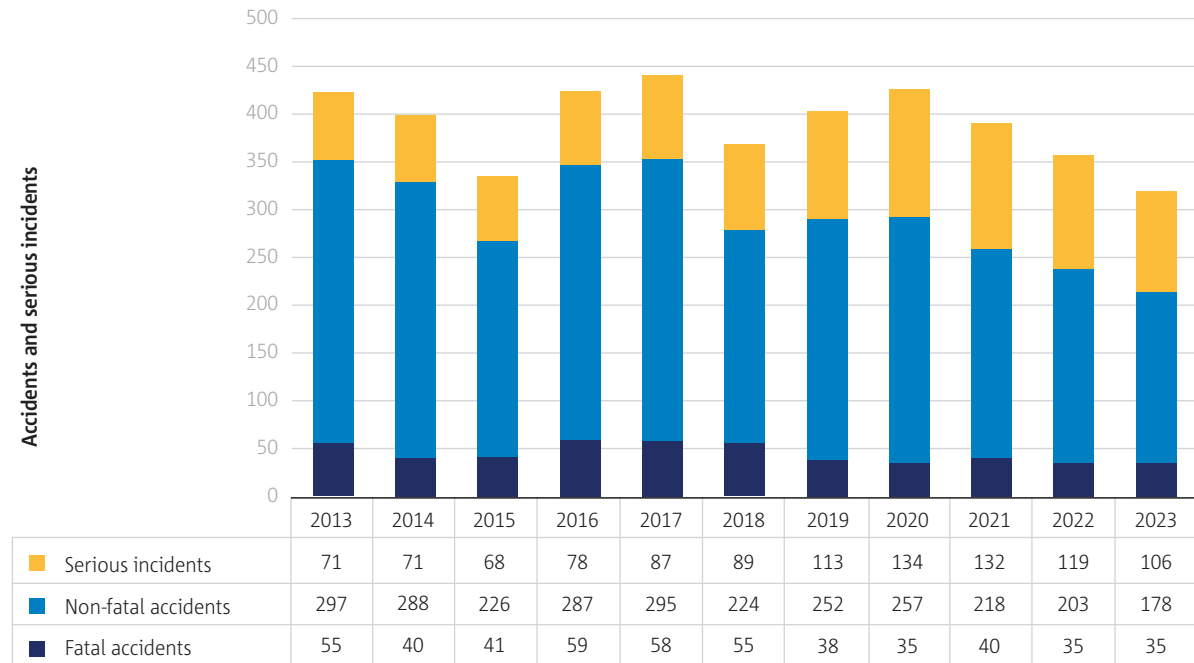
Table 2.10 presents the numbers of fatalities and serious injuries last year compared to the 10-year period. The table shows a 5% decrease in the number of fatalities in 2023 and there was a 46% decrease in serious injuries compared to the 10-year average.

	Number of fatalities	Number of serious injuries
Total number over 2013-2022	719	370
Yearly max number over 2013-2022	90	48
Yearly min number over 2013-2022	49	20
Total number in 2023	68	20

► **Table 2.10** Numbers of fatalities and serious injuries involving non-commercial other than complex aeroplanes

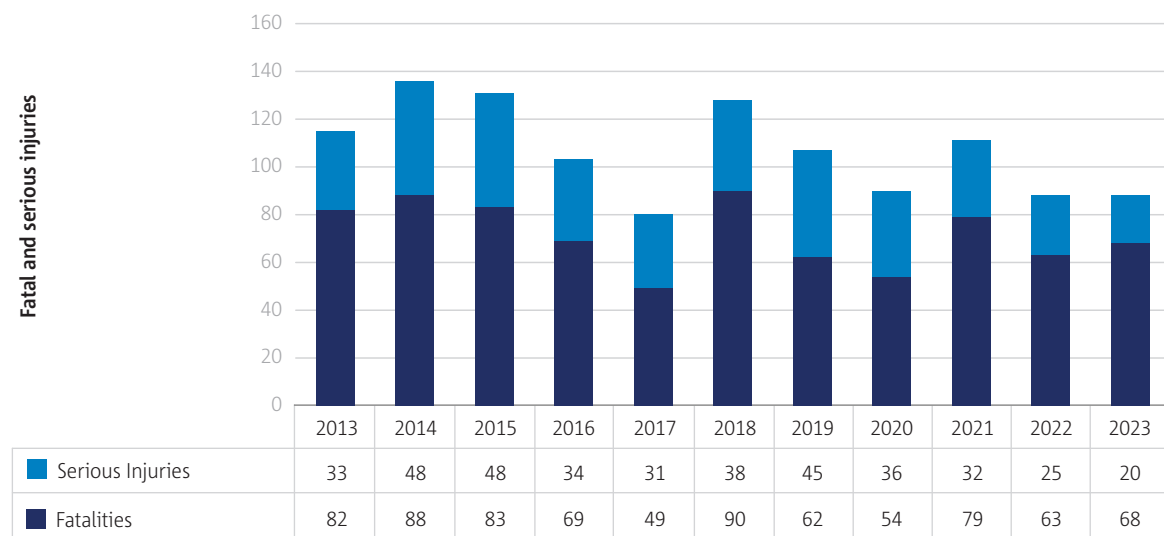


Figure 2.26 shows the numbers of fatal and non-fatal accidents and serious incidents per year. The figure shows an equal number of fatal accidents between 2022 and 2023 but a drop in non-fatal accidents. Given the fact that Regulation (EU) 376/2014 better established occurrence reporting, it is possible that serious incidents were under-reported in the period before the regulation entered into force in late 2015.



► **Figure 2.26** Fatal accidents, non-fatal accidents and serious incidents per year involving non-commercial other than complex aeroplanes

Figure 2.27 shows the total number of fatalities and serious injuries over time. The number of fatalities in 2023 was lower compared to the 10-year average. The number of serious injuries was close to half of the preceding decade.



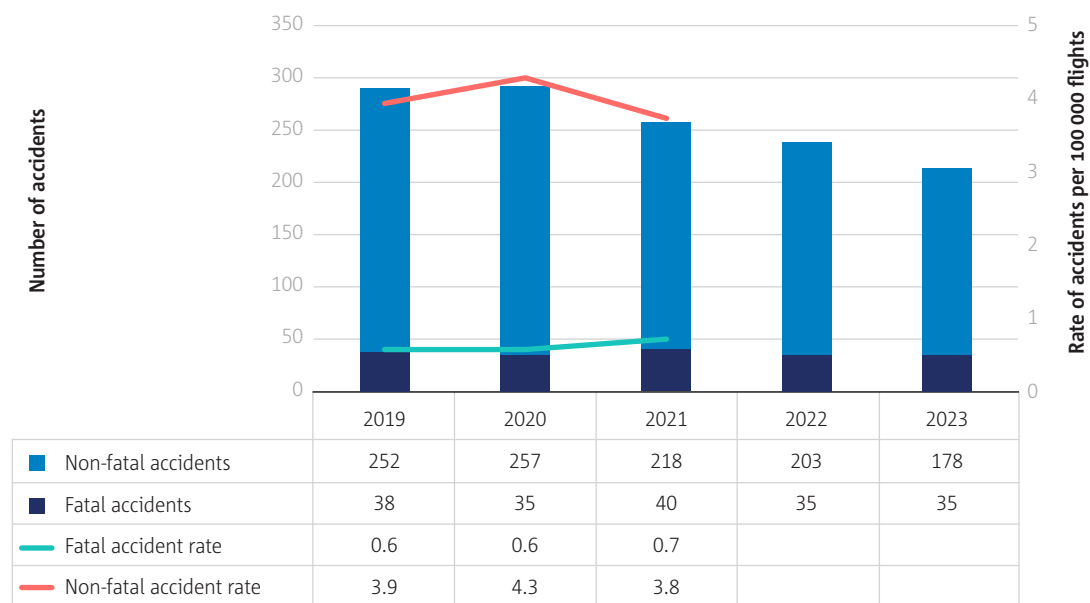
► **Figure 2.27** Fatal and serious injuries per year involving non-commercial other than complex aeroplanes



Rates of accidents

Six years ago, EASA published accident rates for non-commercially operated small aeroplanes for the first time, using the results of a joint effort of EASA and the Aircraft Owners and Pilots Association (AOPA) survey in 2014. These figures have been updated in recent years using an AOPA/GAMA ¹² survey. The utilisation data from the survey for 2022 and 2023 is not available at the time of this writing. However, it is EASA's assumption that the drop in number of accidents in 2023 can be attributed to less flying being performed due to the increased inflation rate in Europe.

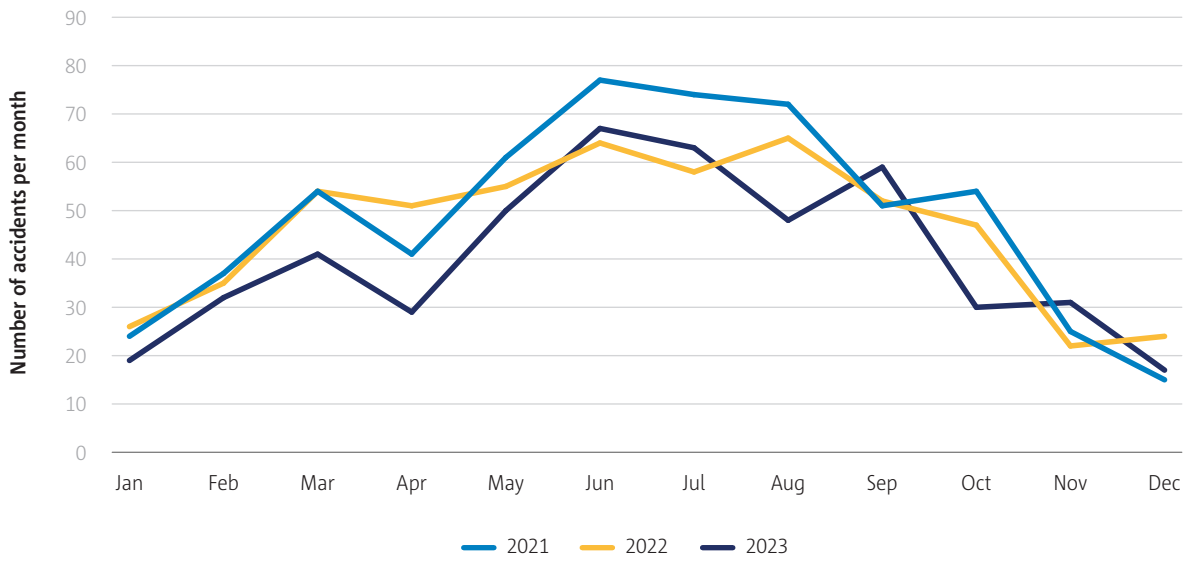
Figure 2.28 displays the number of fatal and non-fatal accidents for the past 5 years and the accident rates for 2019 to 2021 per 100 000 flights.



► **Figure 2.28** Numbers and rates of accidents involving non-commercial other than complex aeroplanes



Figure 2.29 compares the number of accidents per month for the past three years. It can be observed that the 2021 line is the highest line creating a peak from May to August. The figure shows the distribution of accidents per month and indicates clearly the season when small aeroplanes fly the most, for detailed information see the section on safety risks in Appendix 2.4. It is also worth noting the 2023 line and the peak in September. It coincides well with the key statistics and shows a similar distribution between months when compared with the line for 2021.



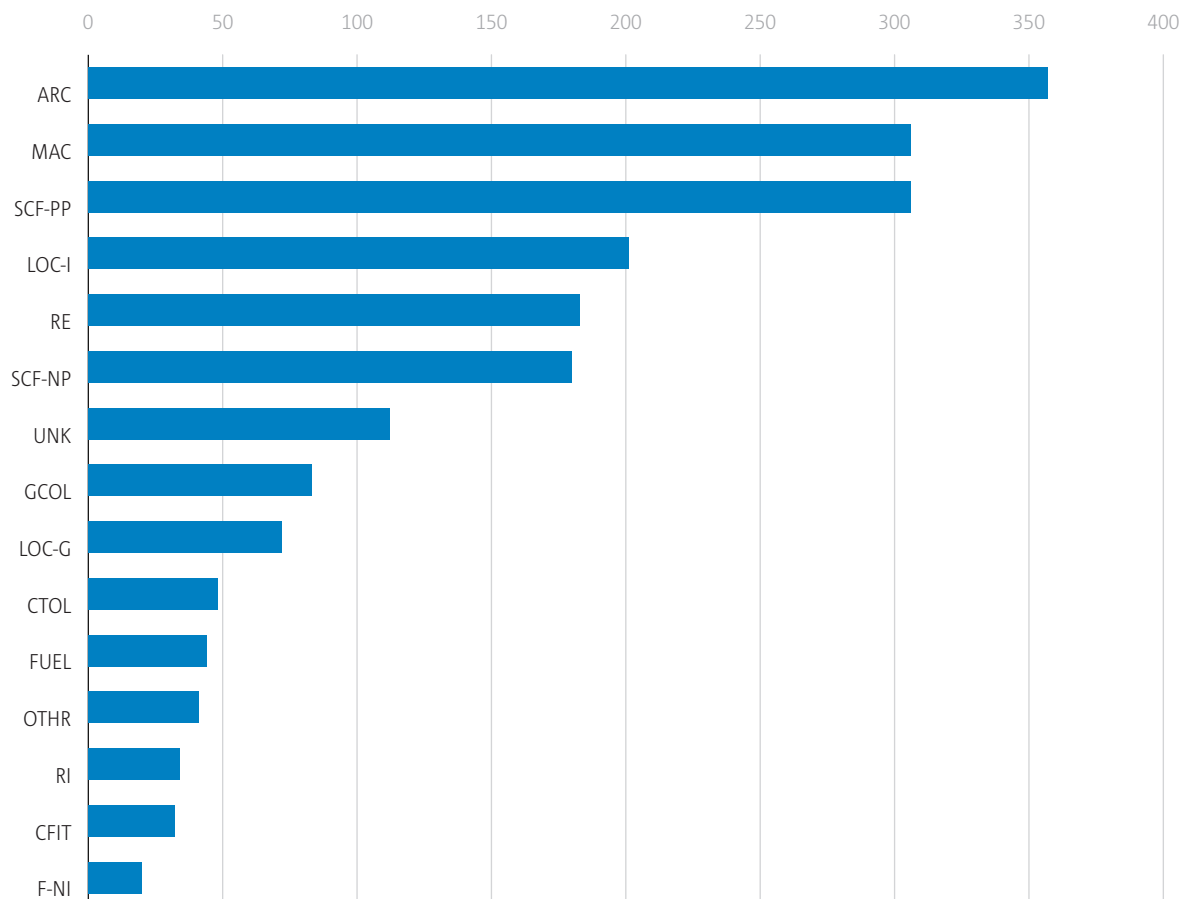
► **Figure 2.29** Comparison of number of accidents involving non-commercial other than complex aeroplanes per month

EASA encourages pilots to thoroughly plan their flights and mentally prepare themselves for various scenarios and what decisions they will make if these scenarios are realised. This enhances the pilot's comprehension of the problems and improves their decision making, their clear thinking, as well as their chances of landing the aircraft with minimal negative consequences.



Occurrence categories

Figure 2.30 outlines the top 15 categories assigned to the serious incidents and accidents in the past five years. Occurrences are categorised using the Commercial Aviation Safety Team (CAST)/ICAO Common Taxonomy Team (CICTT) taxonomy for occurrence categories, developed for supporting common coding of the main elements of an occurrence that should be investigated, recorded, and analysed. Categories are of different natures, e.g., operational such as low altitude operations (LALT), environmental such as turbulence encounter (TURB), technical such as system/ component failure or malfunction [non-powerplant] (SCF-NP), consequential such as fire/smoke resulting from impact (F-POST), etc. Multiple categories may therefore be assigned to a single occurrence. For example, if an engine failure occurred, and loss of control followed, the occurrence would be coded in both categories, i.e., SCF-PP: powerplant failure or malfunction and LOC-I: loss of control in flight. The sum of the number of occurrences per category may therefore be greater than the total number of occurrences that were realised in the period.



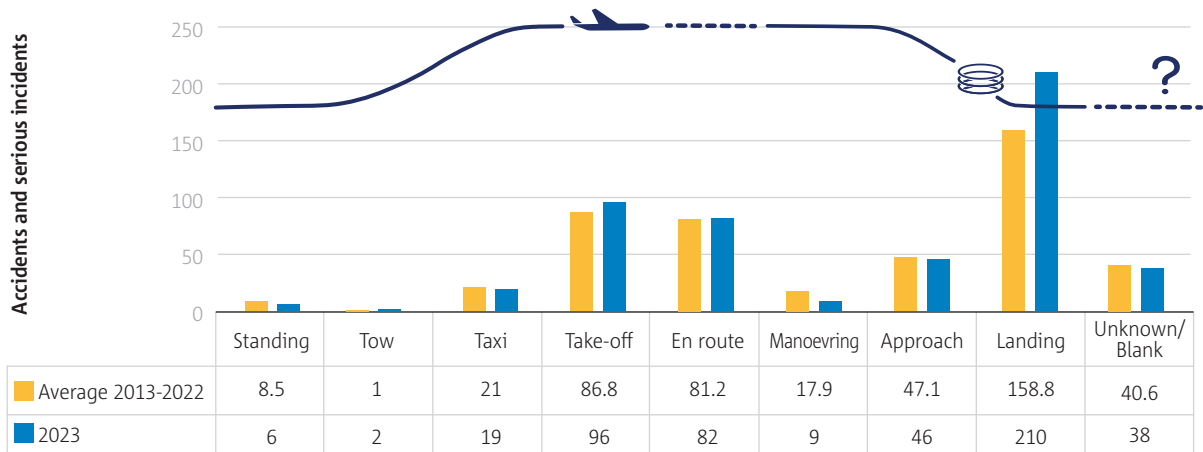
ARC: Abnormal runway contact; MAC: Airprox/ACAS alert/loss of separation/(near) mid-air collisions; SCF-PP: powerplant failure or malfunction; LOC-I: Loss of control - inflight; RE: Runway excursion; SCF-NP: System/component failure or malfunction [non-powerplant]; UNK: Unknown or undetermined; GCOL: Ground Collision; LOC-G: Loss of control - ground; CTOL: Collision with obstacle(s) during take-off and landing; FUEL: Fuel related; OTHR: Other; RI: Runway incursion - vehicle, aircraft or person; CFIT: Controlled flight into or toward terrain; F-NI: Fire/smoke (non-impact);

► **Figure 2.30** Numbers of occurrences by occurrence category involving non-commercial other than complex aeroplanes



Phase of flight

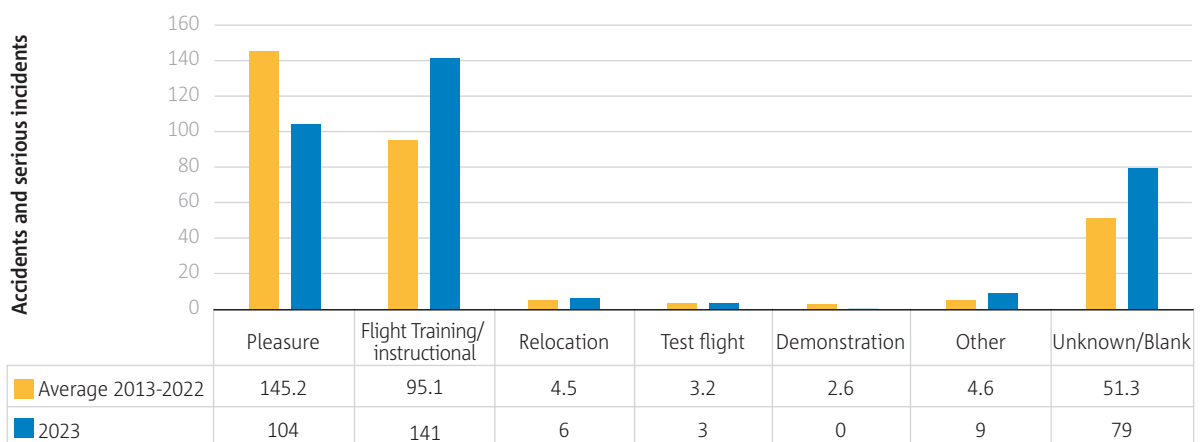
The accidents in NCO most commonly occur in the landing phase. The year 2023 was no exception and there was an increase in three flight phases (take-off, en-route and landing) compared to the 10-year average. An increase of 32% is reflected in the landing and 11% during take-off, with 2% fewer accidents occurring during approach and 50% during manoeuvring, compared to the 10-year average. The unknown/blank column showed a minor decrease. The amount of unknown phase of flight through the years is considered normal as investigations often take up to three years to complete and all relevant information is sometimes not immediately available.



► **Figure 2.31** Accidents and serious incidents by phase of flight involving non-commercial other than complex aeroplanes

Operation type

The two main operation types in NCO are pleasure/recreational flying and training flights. The number of accidents in pleasure flying is significantly fewer in 2023 compared to the 10-year average. However, flight training occurrences show a significant increase in 2023. This is proportionally comparable to the 10-year average.

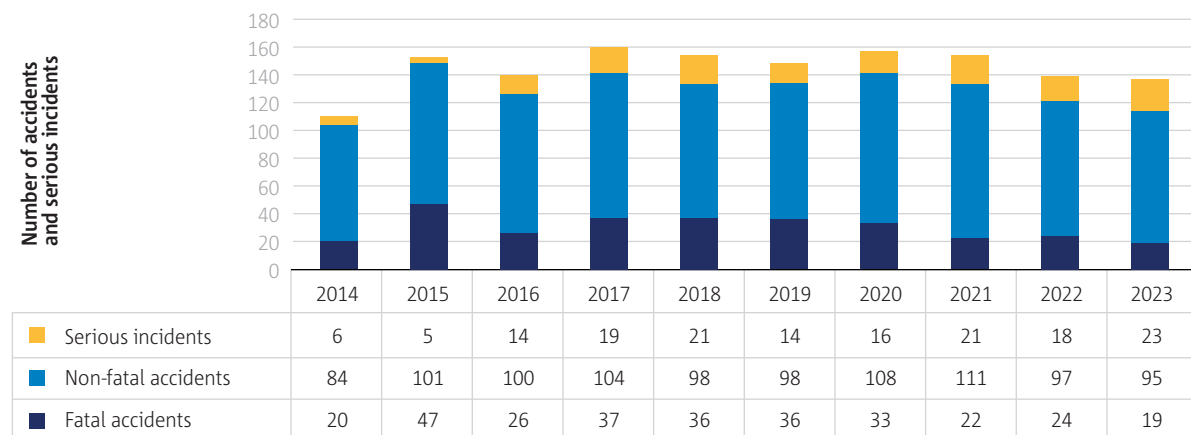


► **Figure 2.32** Accidents and serious incidents by operation type involving non-commercial other than complex aeroplanes



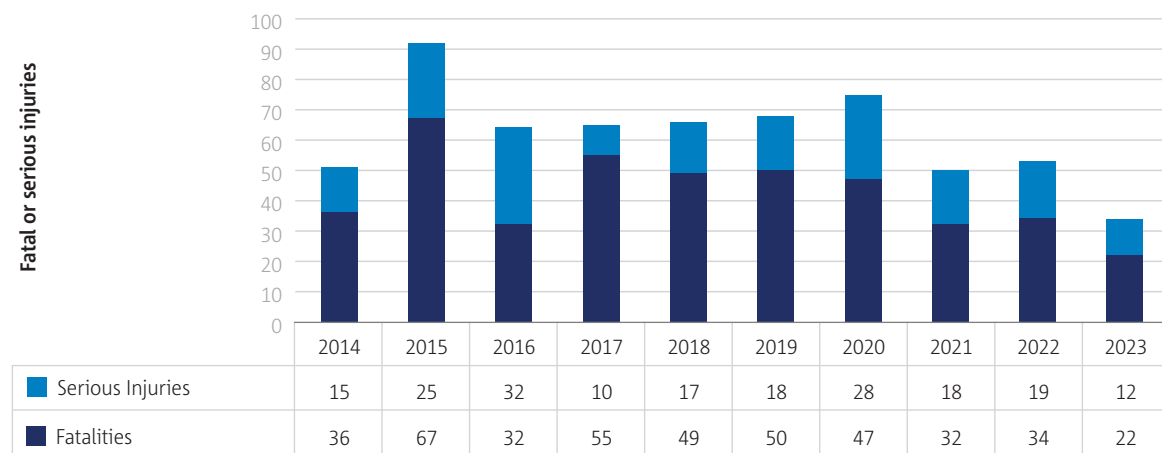
Microlights

The diversity of general aviation exceeds EASA’s regulatory remit. However, most accidents involving EASA Member State registered microlights and ultralights also occur in Europe, with some accidents also occurring outside Europe. Figure 2.33 shows accidents and serious incidents on EASA Member State registered microlights and ultralights from 2014 to 2023 that have been reported into the ECR and to EASA. The dataset used is the same consolidated dataset as used for non-commercial other than complex aeroplanes. The data for 2013 was excluded as ultralights do not specifically fall under EASA’s remit and were not within scope when the data was collected at the time. Therefore, such data were not always entered systematically into the databases. Regulation (EU) 376/2014 entered into force in 2015, since reporting rates have increased.



► **Figure 2.33** Numbers of fatal accidents, non-fatal accidents and serious incidents per year involving non-commercially operated microlights

Figure 2.34 provides an overview of the reported fatalities and injuries during the same period. The dataset used is the same consolidated dataset as used for non-commercial other than complex aeroplanes. Overall, the number of accidents, serious injuries and fatalities is slowly showing a downward trend over time. The number of fatalities and serious injuries shown Figure 2.34 largely coincides with the data on accidents and serious incidents shown in Figure 2.33. However, in 2023 the numbers of fatalities and serious injuries was significantly less than in 2022, contrary to similar number of accidents and serious incidents in 2022 and 2023.



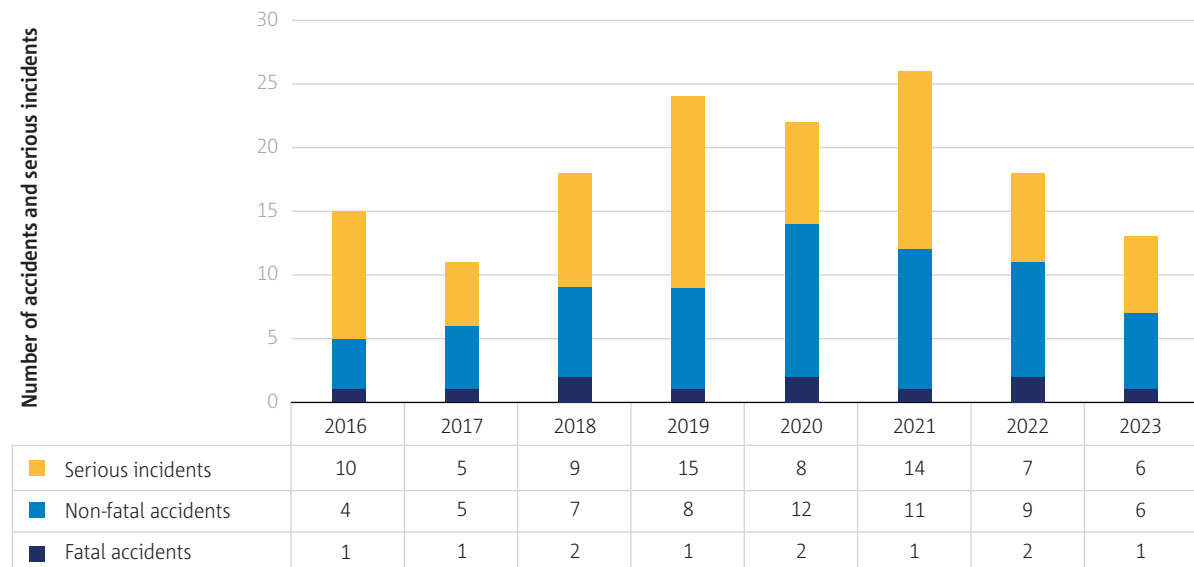
► **Figure 2.34** Numbers of fatal and serious injuries per year involving non-commercially operated microlights



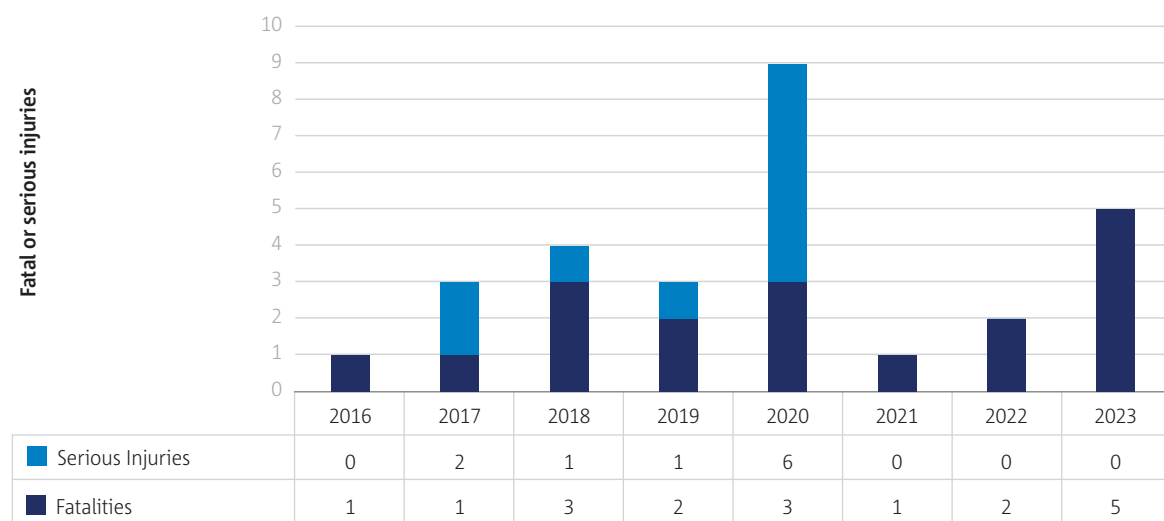
Aeroplanes registered outside the EASA Member States

Aeroplanes registered outside the EASA Member States but operated inside the union, fall outside of EASA’s remit. Most of these aeroplanes are registered in the United States of America (N-registered aeroplanes), and now also in the United Kingdom (G-registered aircraft). To provide an overview of this sector, EASA provides figures of accidents and serious incidents that have been reported to or collected by EASA. The dataset only includes certified VLA, LSA and small aeroplanes, the time period used is 2016-2023.

Figure 2.35 shows 62 non-fatal and 11 fatal accidents from 2016-2023. Figure 2.36 shows that these accidents resulted in 21 fatalities and 10 serious injuries.



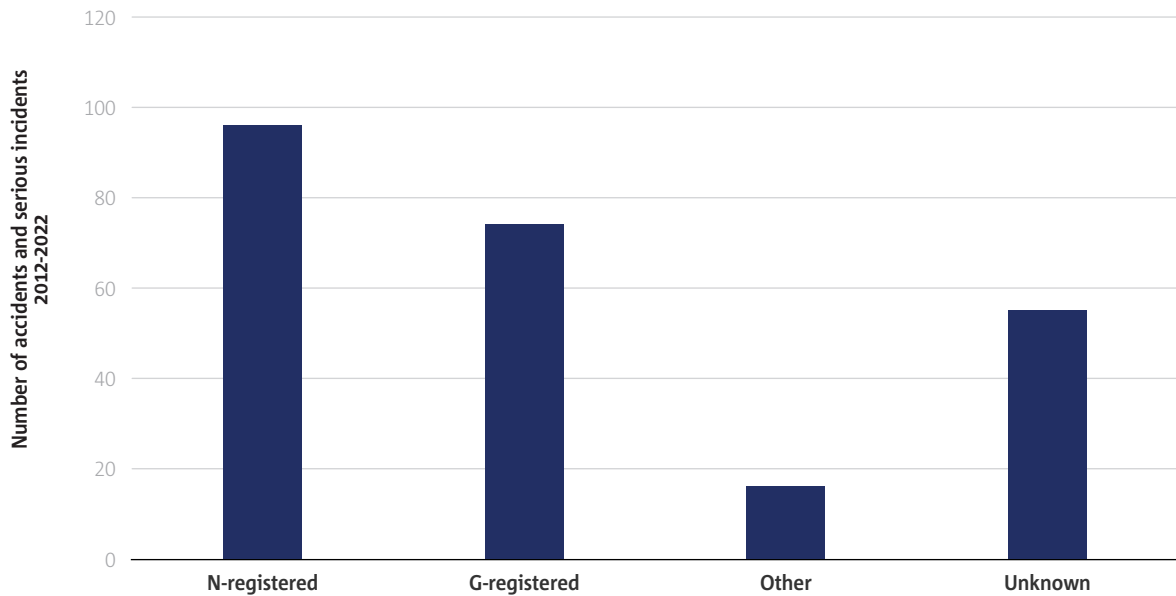
► **Figure 2.35** Numbers of fatal accidents, non-fatal accidents, and serious incidents in EU/EEA Member States per year involving non-commercially operated aircraft not registered in an EASA Member State.



► **Figure 2.36** Numbers of fatal and serious injuries per year involving non-commercially operated aircraft not registered in the EASA Member State



Figure 2.37 shows that over the 2016-2023 period that 96 N-registered aeroplanes, 74 G-registered aircraft, 16 non-EASA Member State registered aircraft and 55 aircraft of unknown registration were involved in fatal and non-fatal accidents in EU/EEA Member States. There were 11 fatal accidents in the period on these aeroplanes.



► **Figure 2.37** Numbers of fatal and non-fatal accidents on non-commercially operated aircraft not registered in the EASA Member State and occurring within the EASA Member State.

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Chapter 3
Helicopters





This chapter covers all operations involving EASA certified or validated helicopters. The chapter is divided in four main sections:

- **All helicopter operations** providing aggregated statistics on EASA certified or validated helicopters performing Commercial air transport (CAT), Specialised operations (SPO) or Non-commercial operations (NCO), and for which an EASA Member State is either state of operator, state of registry or state of occurrence;
- **CAT flights** conducted by EASA AOC holders and using certified or validated helicopters. This section brings together CAT helicopter operations for both onshore and offshore flights and includes HEMS, air ambulance, air taxi or sightseeing, and those flights to offshore oil, gas and renewable energy installations;
- **SPO** involving certified or validated helicopters, such as sling load, advertisement, and photography with an EASA Member State as the state of operator or state of registry;
- **NCO** involving certified or validated helicopters, with an EASA Member State as the state of operator or state of registry. This section includes, particularly training flights.

Helicopter operations in 2023 were the safest on record over the past decade by several measures. This report gives a consolidated picture of the safety performance of all operations involving EASA certified or validated helicopters. The results of the data show that whilst progress has been made, safety management requires constant focus. With the pandemic behind us, we need to sustain this positive trend today and reaffirm the safety actions that must be part of our policies and everyday procedures to deliver consistent improvements in safety performance.

The data presented are based on the accidents and serious incidents collected by the Agency under Regulation (EU) 996/2010 on accident and serious incident investigation and Regulation (EU) 376/2014 on occurrence reporting up to a cut-off date of May 2024. In order to gain a wider picture, data has been supplemented by usage data from the aircraft manufacturers or searching for those events in other official sources.

For each section, the key statistics and occurrence categories are presented in the core document. Advanced statistics are then provided in a domain-specific appendix, giving an overview of the safety risks for these types of operations at the European level. The advanced statistics are solely derived from occurrence data from the ECR. It is important to note that the fleet size data has been extracted from the Cirium¹³ database regarding the total EASA Member State fleet for the period between 2019-2023.

The list of fatal accidents associated with the scope of this chapter is provided in Appendix 1 of this document.

The advanced statistics associated with the scope of this chapter are provided in Appendix 3 of this document.

13 Source: Cirium Fleets Analyzer. Extraction date: May 2024. Includes all civil (i.e., non-military and non-state) CS-27 and CS-29 rotorcraft that are operated by EASA Member State operators. EASA Type I rotorcraft are excluded. Cirium makes no warranties, express or implied, as to the accuracy, adequacy, timeliness, or completeness of its data or its fitness for any particular purpose. Cirium disclaims all liability relating to or fully arising out of use of its data and other content or permissible by law. The total fleet is based on data for all EASA Member States, therefore excluding the United Kingdom.



3.1 All helicopter operations

The scope of this section covers the key safety statistics for certified or validated helicopters performing CAT, SPO or NCO, for which an EASA Member State is either the state of operator, the state of registry or the state of occurrence.

Since these figures are not normalised with traffic data, the number of occurrences should be interpreted cautiously, as there is variation in the figures for the helicopter flying activity at the European level and is difficult to estimate the corresponding mission types and hours flown. The Agency is currently taking action to address the recurrent challenge of assessing the level of helicopter flying activity in Europe by engaging with industry and National Competent Authorities (NCA) to collect and consolidate helicopter exposure data. We know that the information contained within this report can be improved: accuracy and fidelity can be enhanced; industry/NCAs intelligence can be expanded; further Information gathering, exchange and analysis can be performed to continuously develop this report.

Key statistics

The key statistics for this domain are in Table 3.1 and Table 3.2. It includes a comparison of the number of accidents (fatal and non-fatal) and serious incidents for the last year and the previous 10-year period. Similarly, a comparison of the fatalities and serious injuries sustained in those accidents during the same timeframe is also included.

In absolute numbers, 2023 marks an overall improvement compared to the average of the preceding decade applicable for all three types of occurrence class analysed: fatal accidents, non-fatal accidents, and serious incidents.

	Total number of occurrences per occurrence class over 2013-2022	Number of occurrences per occurrence class in 2023	Comparison 2023 vs yearly average of 2013-2022 per occurrence class
Fatal accidents	86	7	↓
Non-fatal accidents	375	29	↓
Serious incidents	150	3	↓

► **Table 3.1** Key statistics for all helicopter operations

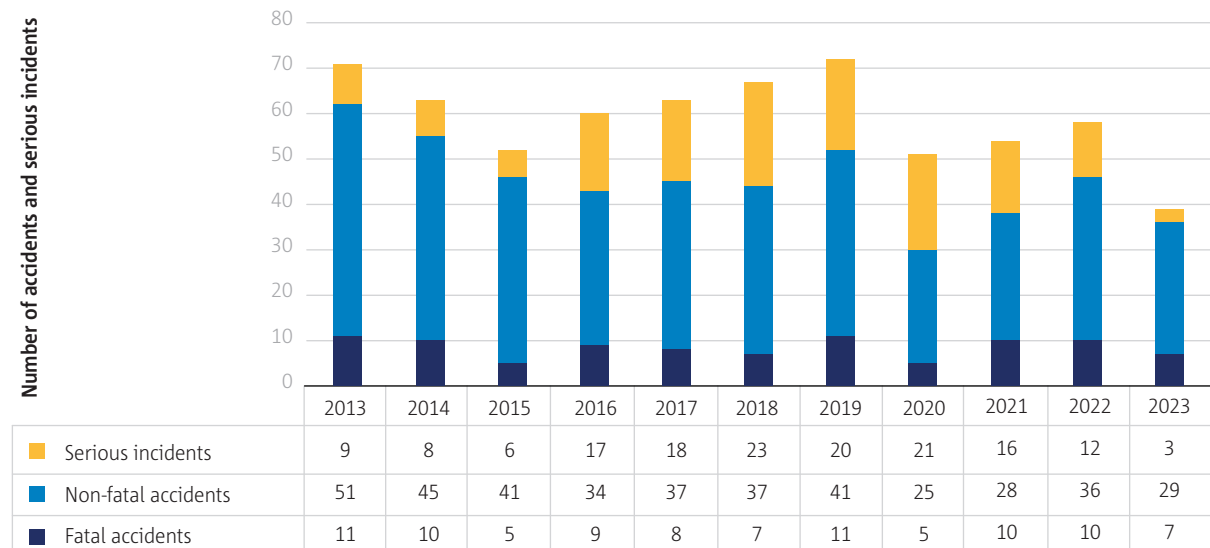
	Number of fatalities	Number of serious injuries
Total number over 2013-2022	208	118
Yearly max number over 2013-2022	37	19
Yearly min number over 2013-2022	9	5
Total number in 2023	11	5

► **Table 3.2** Fatalities and serious injuries involving all helicopter operations



The graph below shows the distribution of fatal and non-fatal accidents over the period (Figure 3.1). In absolute numbers, the total number of fatal accidents, non-fatal accidents and serious incidents reached its minimum in 2023.

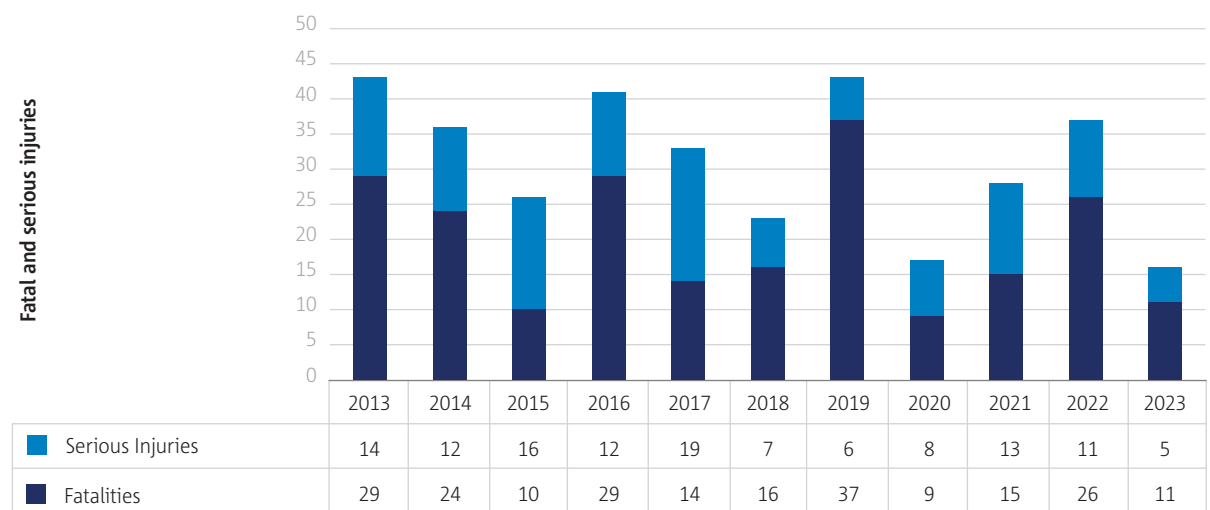
In the last 5-year period (2019-2023) covered by this report, there were 98 fatalities in the identified accidents. Considering all accidents (fatal and non-fatal) gives a mean fatality rate of 0.49 fatalities per accident. Considering only fatal accidents, the mean fatality rate becomes 2.3 fatalities per accident.



► **Figure 3.1** Fatal accidents, non-fatal accidents and serious incidents per year involving all helicopter operations

The Figure 3.2 shows the 5-year occurrence number totals, split between fatal and non-fatal and serious incidents.

2023 also saw the lowest fatality risk and reached its minimum (number totals) in the number of fatalities and serious injuries.

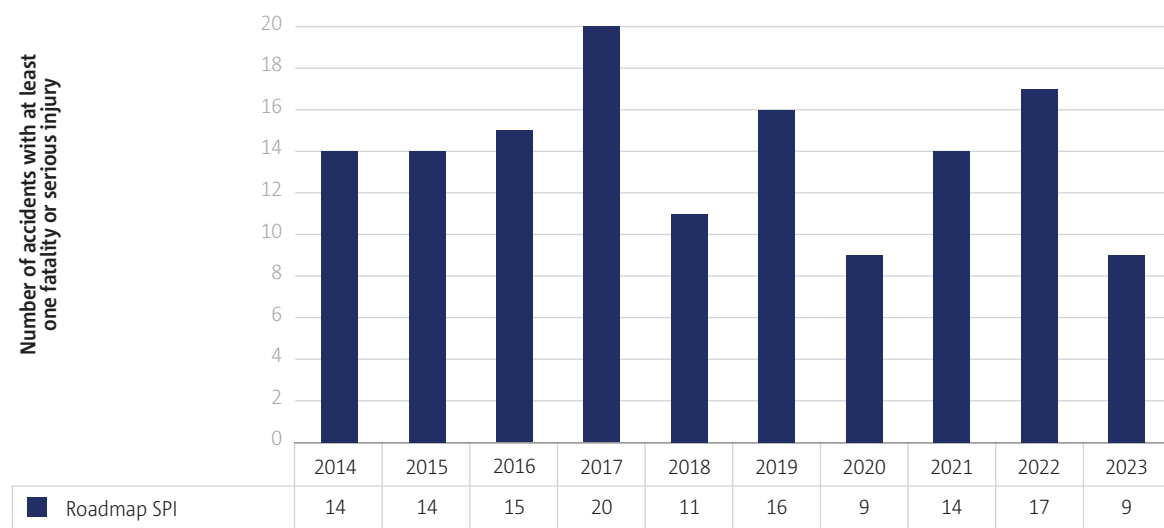


► **Figure 3.2** Fatal and serious injuries per year involving all helicopter operations



Rotorcraft safety roadmap Safety Performance Indicator (SPI)

Considering the number of accidents that have caused at least one fatality or serious injury, the Safety Performance Indicator (SPI) is used to monitor the effectiveness of the EASA Rotorcraft Safety RoadMap and understand the safety performance as we progress to sustain a positive trend. This indicator is shown in Figure 3.3 in absolute numbers, in 2023 as compared to the previous 10 years, is equally low as the observed number in 2020. This indicator has drastically improved from the year 2022 to the year 2023, by 47%. We continue to work within Rotorcraft Safety RoadMap to analyse with operators and manufacturers how to prioritise the detection of these risks within Safety Risk Management and identify the activities that need to be robustly supported in training and operations.



► **Figure 3.3** Number of accidents with a least one fatality or serious injury for all helicopter operations

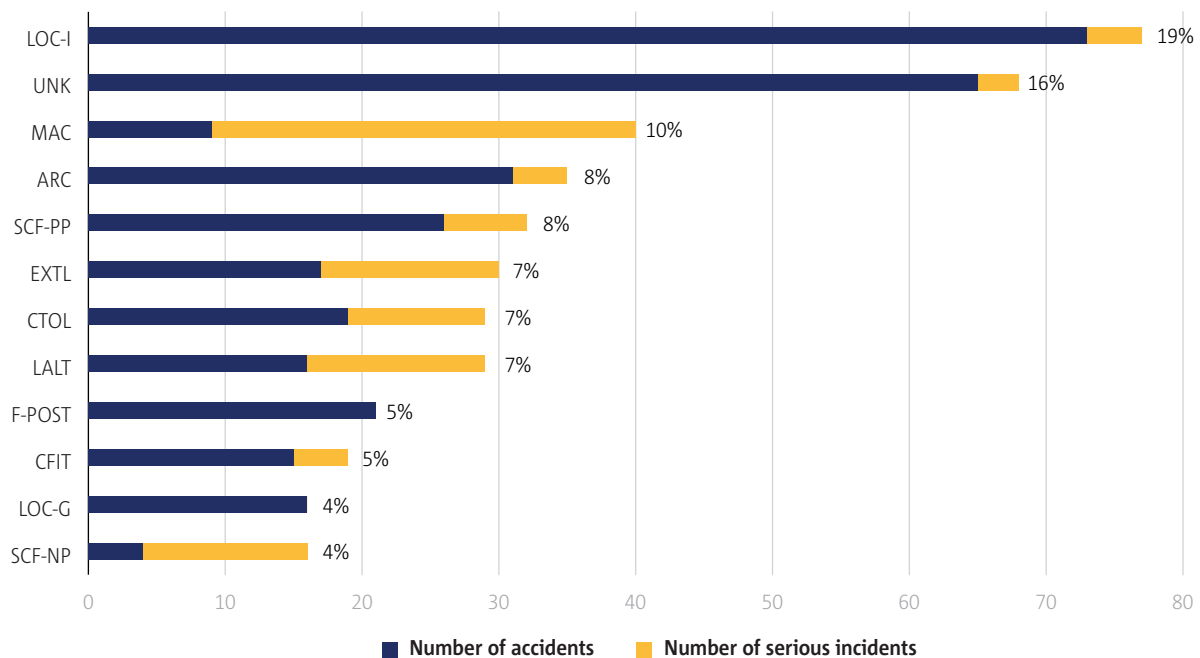




Occurrence categories

Figure 3.4 shows the breakdown of all accidents by ICAO ADREP taxonomy over the 5-year period by type of occurrence class.

The CAST/ICAO Common Taxonomy Team (CICCTT) provides definitions for aviation occurrence categories. For each of the accidents, where possible, one or more occurrence categories were allocated. In some cases, more than one occurrence category is applied to a single accident. Categories are of different natures, e.g., operational such as low altitude operations (LALT), environmental such as turbulence encounter (TURB), technical such as system/ component failure or malfunction [non-powerplant] (SCF-NP), consequential such as fire/smoke resulting from impact (F-POST), etc. The sum of the number of occurrences per category may therefore be greater than the total number of occurrences that were realised in the period.



LOC-I: Loss of control – inflight; UNK: Unknown or undetermined; MAC: Airprox/ACAS alert/loss of separation/(near) midair collisions; ARC: Abnormal runway contact; EXTL: External load related occurrences; CTOL: Collision with obstacle(s) during take-off and landing; SCF-PP: powerplant failure or malfunction; LALT: Low altitude operations; F-POST: Fire/smoke (post-impact); CFIT: Controlled flight into or toward terrain; LOC-G: Loss of control – ground; SCF-NP: System/component failure or malfunction [non-powerplant]

► **Figure 3.4** Numbers of occurrences by occurrence category and occurrence class for all helicopter operations

When it comes to the high-risk accident occurrence categories, the occurrence category LOC-I: loss of control inflight has been the most significant cause of fatal accidents over the 5-year period with 19%. LOC-I events being recognised again, the 2023 data, identifies a shift towards a predominance of occurrences in degraded visual environment conditions. Inland helicopter pilots primarily fly based on visual references to the terrain, according to visual flight rules (VFR).

The occurrence category UNK: unknown is the second high-risk accident occurrence category which appears in the figures. This may be the result of the investigation process and reporting where mapping occurrence categories can take a certain amount of time. The UNK category here contains 16%. The quality of reporting the safety occurrences is an important factor to understand the true safety performance of the industry and measure

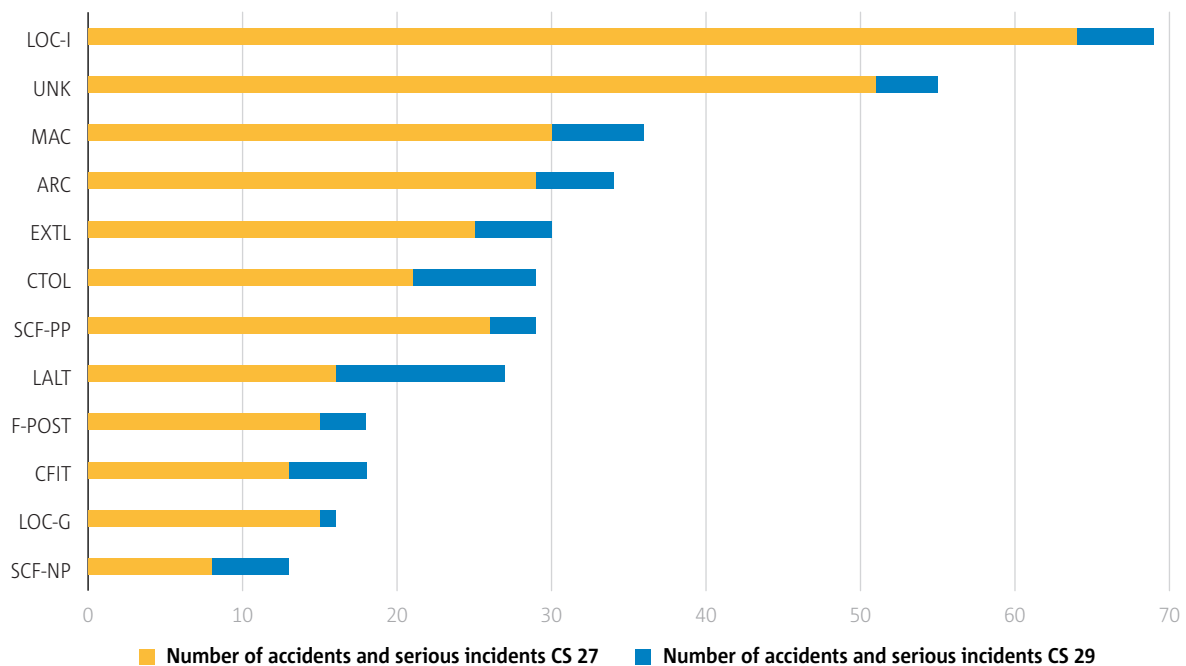


improvements as we progress towards our goal of zero fatal accidents and that reporting organisations and competent authorities continue their effort to improve the coding quality of occurrence records submitted under Regulation (EU) 376/2014.

The Data4Safety (D4S) programme currently in its development phase will augment the capacity to improve the ECR data quality. In particular, a workstream will focus on the development of automation algorithms based on NLP applied to the narrative text, to support the coding of ECR fields such as the Occurrence Category values and reduce the proportion of ‘Unknown’ values.

MAC: Airprox/ACAS alert/loss of separation/(near) midair collisions show vulnerability and remains the third key risk with a proportion of 10%. The statistics underscores how important it is for crewed and uncrewed aviation professionals to realize that we have entered a new era with a complex airspace serving the individual needs of commercial, military, specialised operations, general aviation and ‘new entrant’ airspace users. It is important that we recognise the more likely need for focussed intervention by all stakeholders, to ensure that the potential for midair collision does not increase.

The Figure 3.5 shows the breakdown of all accidents by ICAO ADREP taxonomy over the 5-year by type of certification specification, Certification Specifications for Small Rotorcraft (CS-27) and the Certification Specifications for Large Rotorcraft (CS-29).



LOC-I: Loss of control – inflight; UNK: Unknown or undetermined; MAC: Airprox/ACAS alert/loss of separation/(near) midair collisions; ARC: Abnormal runway contact; EXTL: External load-related occurrences; CTOL: Collision with obstacle(s) during take-off and landing; SCF-PP: powerplant failure or malfunction; LALT: Low altitude operations; F-POST: Fire/smoke (post-impact); CFIT: Controlled flight into or toward terrain; LOC-G: Loss of control – ground; SCF-NP: System/component failure or malfunction [non-powerplant];

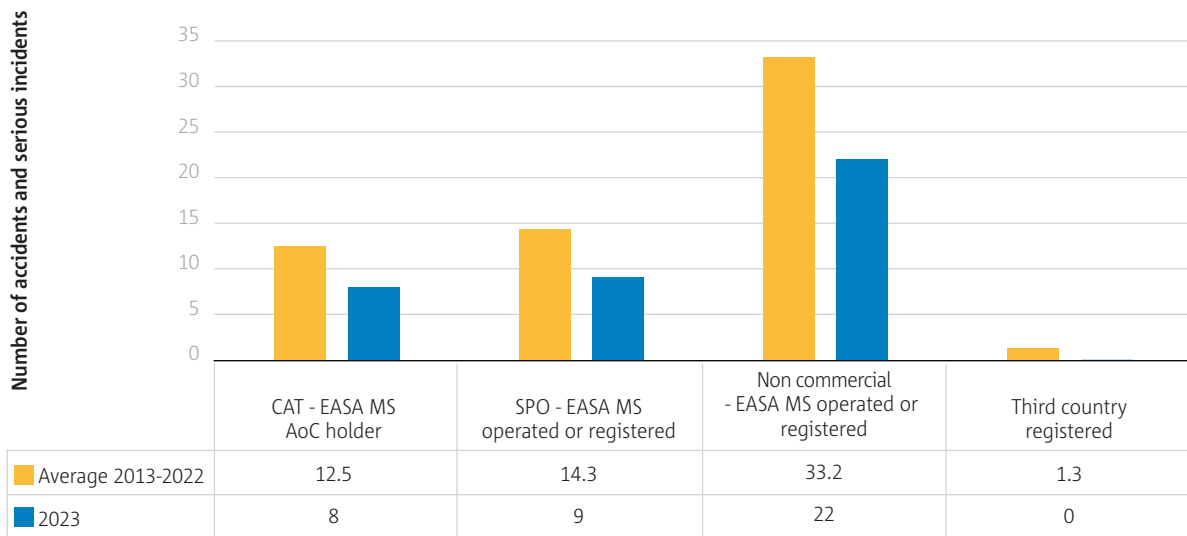
► **Figure 3.5** Numbers of occurrences by occurrence category and aircraft certification type for all helicopter operations



Helicopter operations sub-domains

Figure 3.5 shows the numbers of accidents and serious incidents for the 4 main sub-domains of operations involving certified and validated helicopters. Over the decade 2013-2022, the proportions of each domain are the following:

- 54% of all accidents and serious incidents involved certified and validated helicopters performing non-commercial operations and for which an EASA Member State was either the state of operator or state of registry;
- 23% of all accidents and serious incidents involved certified and validated helicopters performing SPO and for which an EASA Member State was either the state of operator or state of registry;
- 20% of all accidents and serious incidents involved certified and validated helicopters performing CAT conducted by EASA Member State AOC holders;
- 2% of all accidents and serious incidents involved certified helicopters whose state of operator and state of registry were a third country but for which the state of occurrence was an EASA Member State;
- 1% with unknow operation type.



► **Figure 3.6** Accidents and serious incidents by helicopter operation sub-domains



Type of certified helicopter (CS27/CS29)

Figure 3.6 shows the distribution over the 5-year period of the EASA Member State rotorcraft fleets in total by type of certification specification, Certification Specifications for Small Rotorcraft (CS-27) and the Certification Specifications for Large Rotorcraft (CS-29), with a trendline of accidents and serious incidents in the given period. The total fleet in service is shown in the primary vertical axis of the graph, whereas the total number of accidents and serious incidents in each period is shown in the secondary vertical axis.



► **Figure 3.7** Accidents and serious incidents by certification specification for all helicopter operations with the breakdown of aircraft certification type for the reported fleet

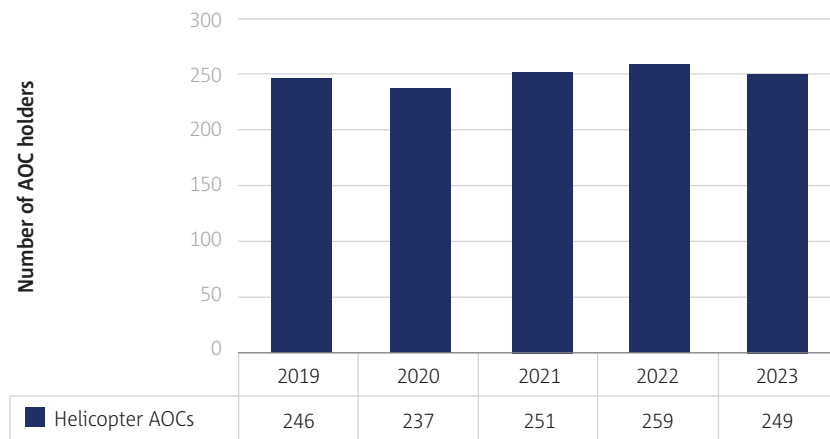


3.2 Commercial air transport (CAT) helicopters

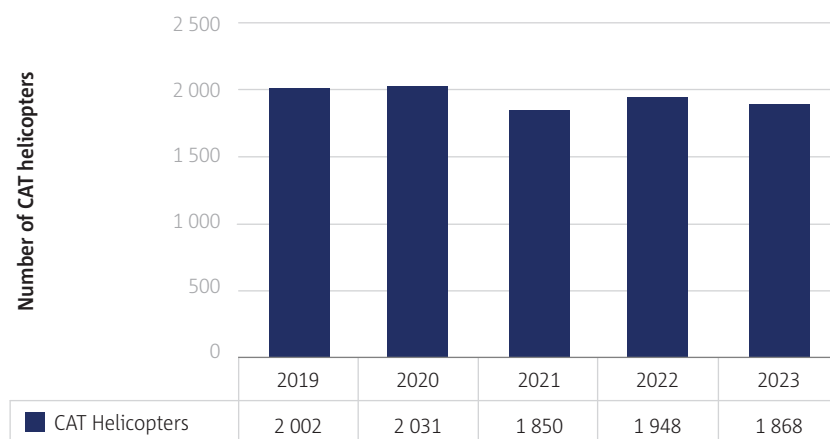
This section presents the key safety statistics for EASA certified or validated helicopters performing CAT and operated by an EASA Member State AOC holder. This includes offshore flights, as well as onshore HEMS, air ambulance, sightseeing tours, air taxis or any other operation to transport passengers, cargo or mail for remuneration or other valuable consideration.

European CAT helicopter fleet

Figure 3.7 and Figure 3.8 show the size of the helicopter CAT sector in the EASA Member State and its evolution over the period 2019-2023.



► **Figure 3.8** Number of helicopter AOC holders in the EASA Member States



► **Figure 3.9** Number of helicopters performing CAT in the EASA Member States

The number of helicopter AOC holders had a small decrease in 2023 compared to the preceding year. The same trend was observed in the number of helicopters performing CAT. The average number of helicopters per AOC holders in 2023 was between 8 and 9.



Key statistics

The key statistics for this domain are in Table 3.3 and Table 3.4, which includes a comparison of the number of accidents (fatal and non-fatal) and serious incidents for the last year and the previous 10-year period. It also includes a comparison of the fatalities and serious injuries sustained in those accidents during the same timeframe.

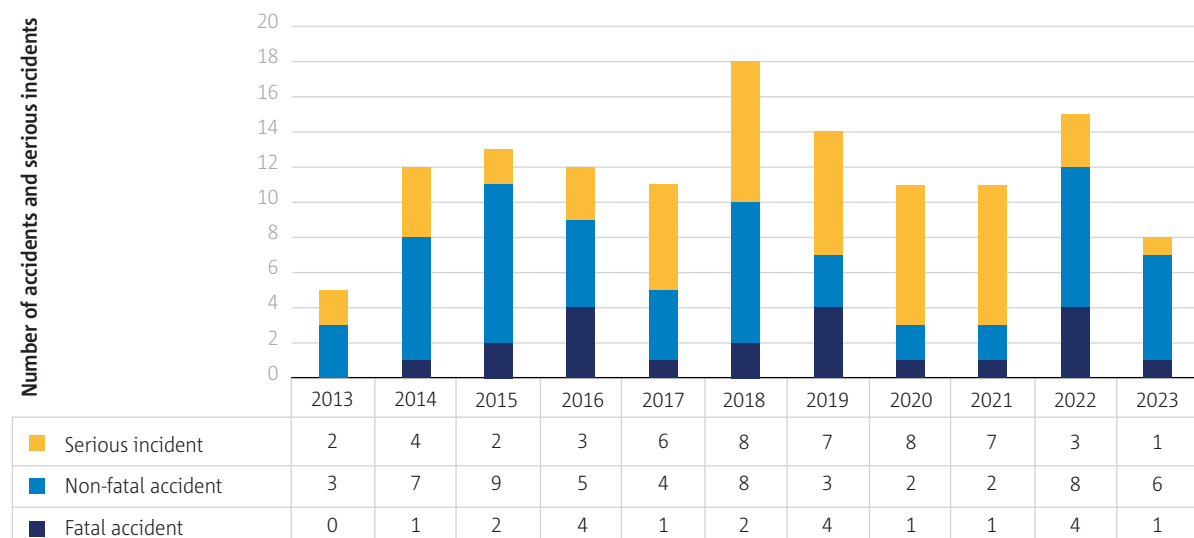
	Total number of occurrences per occurrence class over 2013-2022	Number of occurrences per occurrence class in 2023	Comparison 2023 vs yearly average of 2013-2022 per occurrence class
Fatal accidents	20	1	↓
Non-fatal accidents	51	6	↑
Serious incidents	51	1	↓

► **Table 3.3** Key Statistics for CAT helicopters

	Number of fatalities	Number of serious injuries
Total number over 2013-2022	89	22
Yearly max number over 2013-2022	27	7
Yearly min number over 2013-2022	1	0
Total number in 2023	4	0

► **Table 3.4** Fatalities and serious injuries involving CAT helicopters

The number of fatal accidents, and serious incidents in 2023 are on a downward trend compared to the average of the previous decade whilst a increase is observed for non-fatal accidents, more than 2020 and 2021 and twice more than 2019.

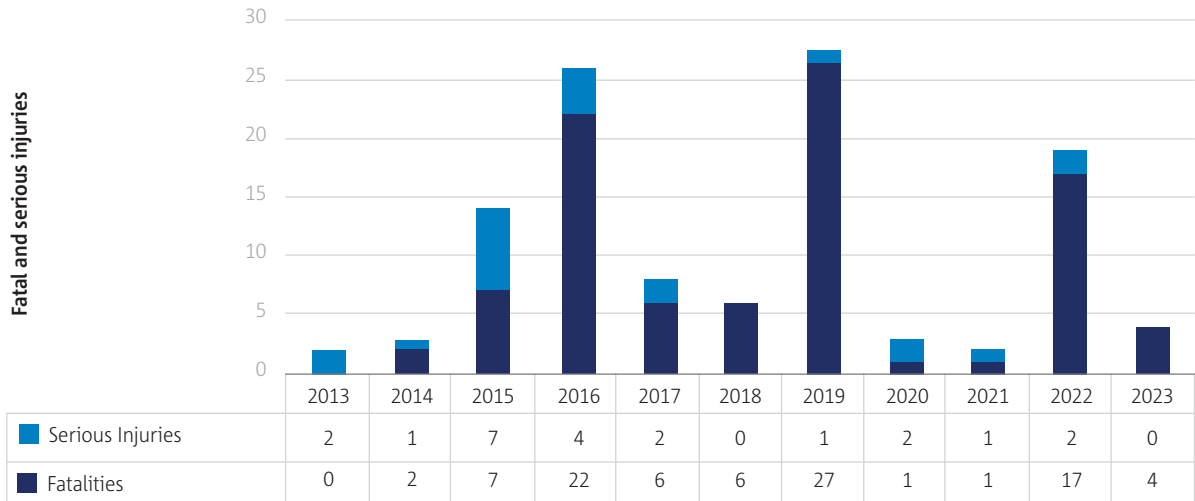


► **Figure 3.10** Fatal accidents, non-fatal accidents and serious incidents per year involving CAT helicopters



The numbers of accidents and serious incidents per year are shown in Figure 3.11. With no serious injury and only one fatal accident with four fatalities, the year 2023 was one of the lowest over the last decade.

The figure below shows the 10-year occurrence number totals, split between fatal fatalities and serious injuries.



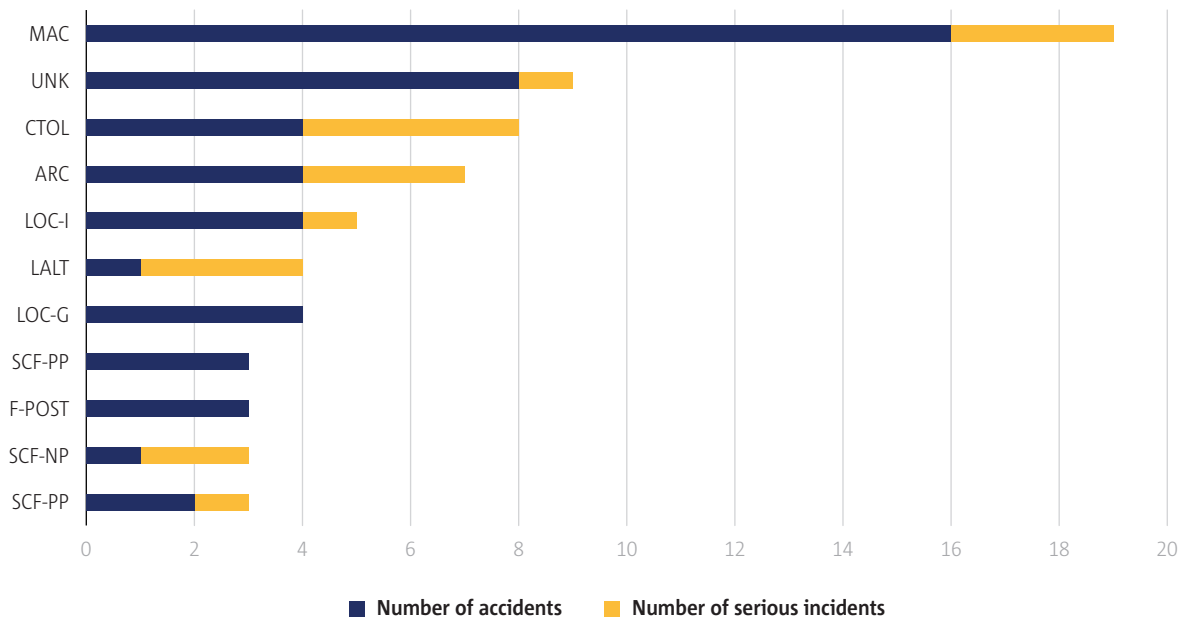
► **Figure 3.11** Fatal and serious injuries per year involving CAT helicopters





Occurrence categories

Figure 3.12 outlines the top occurrence categories assigned to the serious incidents and accidents in the past five years.



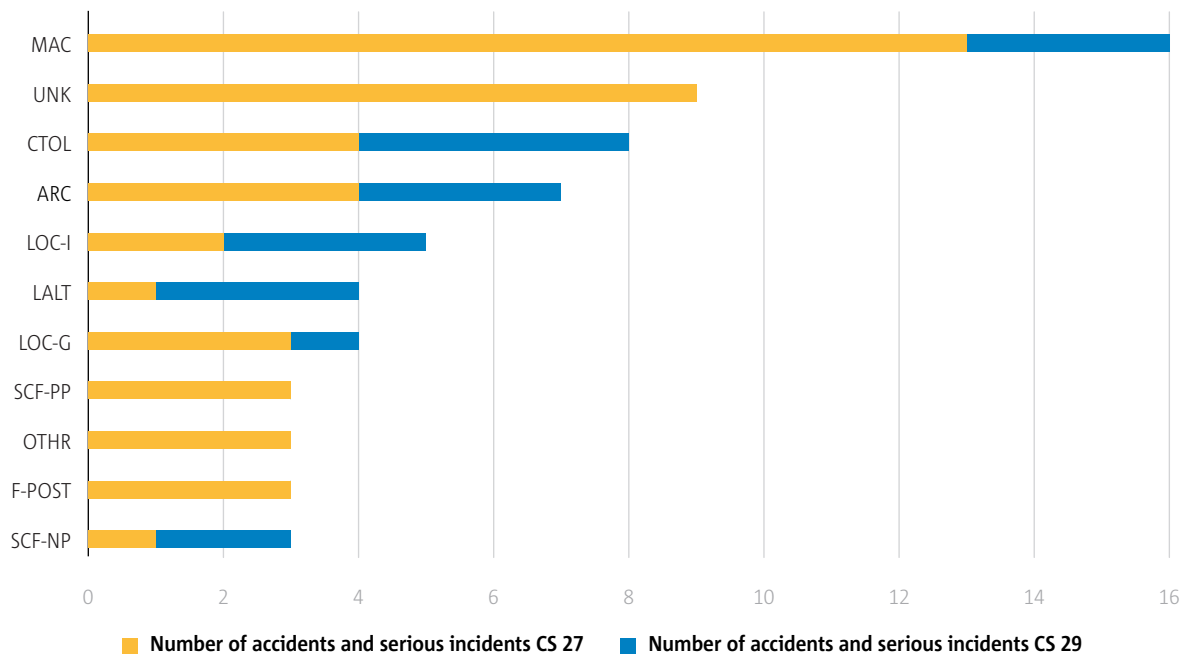
MAC: Airprox/ACAS alert/loss of separation/(near) midair collisions; UNK: Unknown or undetermined; CTOL: Collision with obstacle(s) during take-off and landing; ARC: Abnormal runway contact; LOC-I: Loss of control – inflight; LALT: Low altitude operations; LOC-G: Loss of control – ground; SCF-PP: powerplant failure or malfunction; OTHR: Other; F-POST: Fire/smoke (post-impact); SCF-NP: System/component failure or malfunction [non-powerplant]

► **Figure 3.12** Numbers of occurrences by occurrence category and occurrence class involving CAT helicopters

Occurrences are categorised using the ICAO ADREP taxonomy for occurrence categories, developed for supporting common coding of the main elements of an occurrence that should be investigated, recorded, and analysed.

The three most common causes of accidents involving CAT helicopters from 2018-2023 remain; MAC: Airprox/ACAS alert/loss of separation/(near) midair collisions with three fatal accidents over the 5-year period, followed by CFIT: Controlled flight into or toward terrain with one fatal accident and CTOL: Collision with obstacle(s) during take-off and landing. The occurrence category UNK: unknown remains of the high-risk accident occurrence category as seen on the overall operations.

The Figure 3.13 shows the breakdown of all accidents by ICAO ADREP taxonomy over the 5-year by type of certification specification, Certification Specifications for Small Rotorcraft (CS-27) and the Certification Specifications for Large Rotorcraft (CS-29).



MAC: Airprox/ACAS alert/loss of separation/(near) midair collisions; UNK: Unknown or undetermined; CTOL: Collision with obstacle(s) during take-off and landing; ARC: Abnormal runway contact; LOC-I: Loss of control – inflight; LALT: Low altitude operations; LOC-G: Loss of control – ground; SCF-PP: powerplant failure or malfunction; OTHR: Other; F-POST: Fire/smoke (post-impact); SCF-NP: System/component failure or malfunction [non-powerplant];

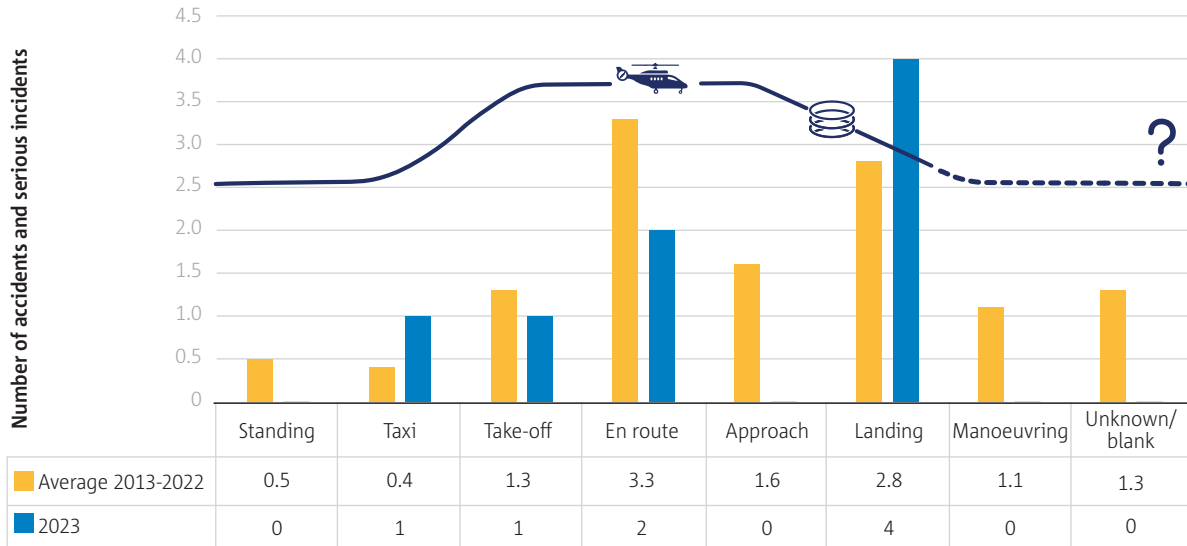
► **Figure 3.13** Numbers of occurrences by occurrence category and aircraft certification type involving CAT helicopters





Phase of flight

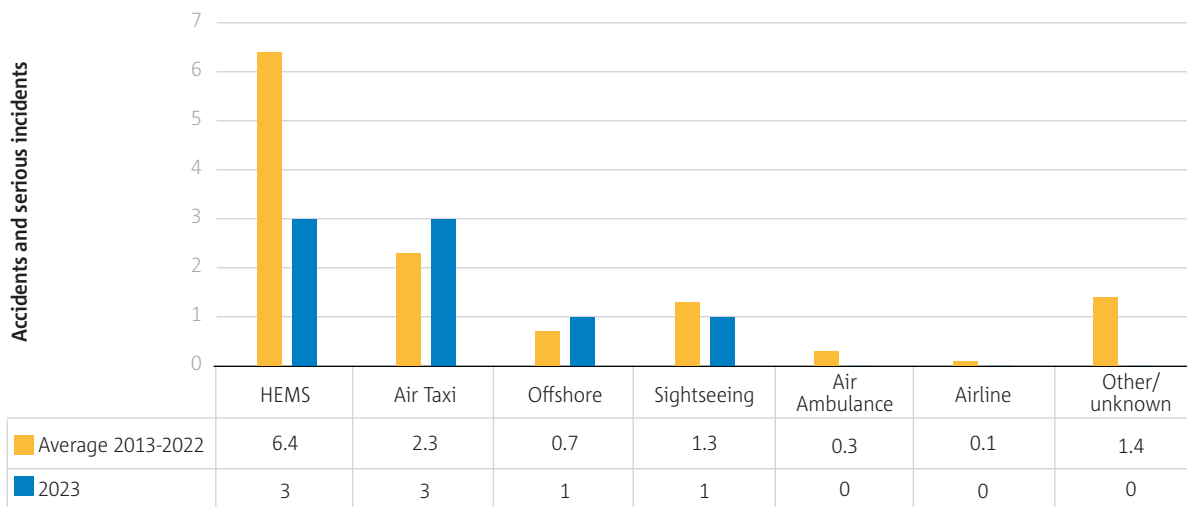
Figure 3.14 shows the distribution of accidents and serious incidents by flight phase. Over the decade 2013-2022, the en-route phase and landing phase are the most involved in accidents. The same applies in 2023, where six occurrences out of eight have their flight phase being en-route or landing.



► **Figure 3.14** Accidents and serious incidents by phase of flight involving CAT helicopters

Operation type

Figure 3.15 shows the number of accidents and serious incidents per sub-type of operations. With a total of eight occurrences for this operational type, seven accidents and one serious incident in 2023, the figures involving HEMS operations showed a significant drop of more than half compared to the average figures of the preceding decade for this type of operation, whereas Air Taxi operations had three occurrences compared to the average in the last decade, with 2.3.

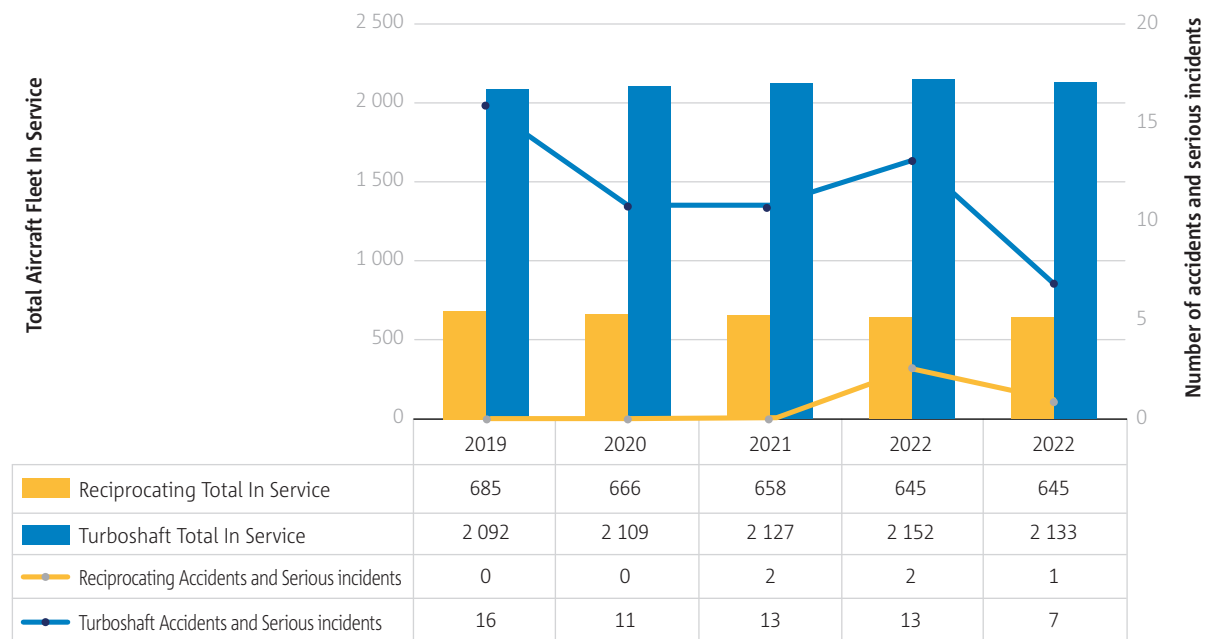


► **Figure 3.15** Accidents and serious incidents by operation type involving CAT helicopters



Propulsion type

Figure 3.16 shows the distribution over the 5-year period of the EASA Member State rotorcraft fleets in total by type of propulsion and with a trendline of accidents and serious incidents in the given period. The total fleet in service is shown in the primary vertical axis of the graph, whereas the total number of accidents and serious incidents in each period is shown in the secondary vertical axis. In 2023 one fatal accident involved reciprocating engine helicopter and the rest of non-fatal accidents and serious incidents in CAT helicopter operations involved turboshaft helicopters.



► **Figure 3.16** Accidents and serious incidents by propulsion type involving CAT helicopters with the breakdown of propulsion type for the reported fleet



Helicopter certification specification (CS27/ CS29)

Figure 3.17 shows the distribution over the 5-year period of the EASA Member State rotorcraft fleets in total by type of certification specification and with a trendline of accidents and serious incidents in the given period. The total fleet in service is shown in the primary vertical axis of the graph, whereas the total number of accidents and serious incidents in each period is shown in the secondary vertical axis. The relationship between certification and CAT operation requirements for transport category rotorcraft is acknowledged to be convoluted due to the diversity of mission types and their applicability to commercial operations. Through this analysis, it becomes evident that the large rotorcraft fleet based on CS 29 certification standards is more exposed compared to the fleet of small rotorcraft based on CS 27 standards.



► **Figure 3.17** Accidents and serious incidents by certification specification (CS27/CS29) for CAT operations with the breakdown of aircraft certification type for the reported fleet



3.3 Specialised Operations (SPO) helicopters

This section presents the main safety statistics for EASA certified or validated helicopters performing SPO with an EASA Member State as state of operator or state of registry. SPO are defined as any operation other than CAT where the aircraft is used for specialised activities such as: agriculture, construction, photography, surveying, observation and patrol, aerial advertisement.

Key statistics

The key statistics for this domain are in Table 3.5 and Table 3.6, which include a comparison of the number of fatal and non-fatal accidents and serious incidents for the last year and the previous 10-year period. It also includes a comparison of the fatalities and serious injuries sustained in those accidents during the same timeframe.

In 2023, there was a slight increase in the number of non-fatal accidents compared to the previous year, while the occurrences of serious incidents and fatal accidents remained at their lowest levels. Moreover, the numbers of fatalities and serious injuries remained below the average figures of the preceding decade, marking an overall minimum in safety incidents.

	Total number of occurrences per occurrence class over 2013-2022	Number of occurrences per occurrence class in 2023	Comparison 2023 vs yearly average of 2013-2022 per occurrence class
Fatal accidents	14	1	↓
Non-fatal accidents	95	7	↓
Serious incidents	34	1	↓

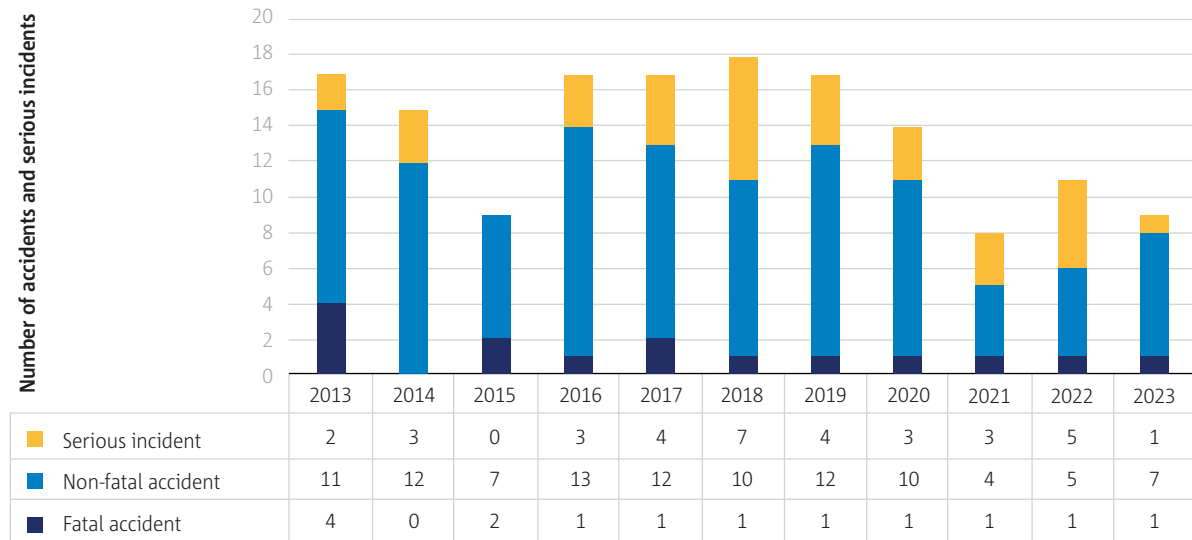
► **Table 3.5** Key statistics for SPO helicopters

	Number of fatalities	Number of serious injuries
Total number over 2013-2022	22	39
Yearly max number over 2013-2022	11	8
Yearly min number over 2013-2022	0	1
Total number in 2023	1	3

► **Table 3.6** Fatalities and serious injuries involving SPO helicopters

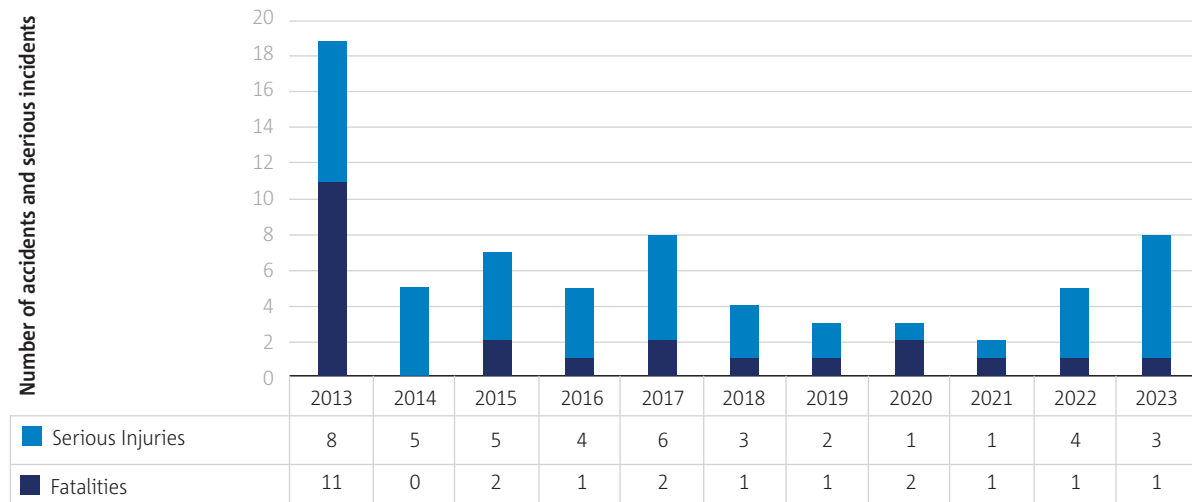


The number of accidents and serious incidents per year is shown in Figure 3.18. The total number of occurrences in 2023 had a slight downward trend in comparison to 2022, below the average for the same period. However, one fatal accident still occurred in 2023 during an agriculture operation under unknown circumstances.



► **Figure 3.18** Fatal accidents, non-fatal accidents and serious incidents per year involving SPO helicopters

The numbers of fatalities and serious injuries per year are shown in Figure 3.19. With one fatality and three serious injuries, the figures for 2023 are below the average of the preceding 10-year period.

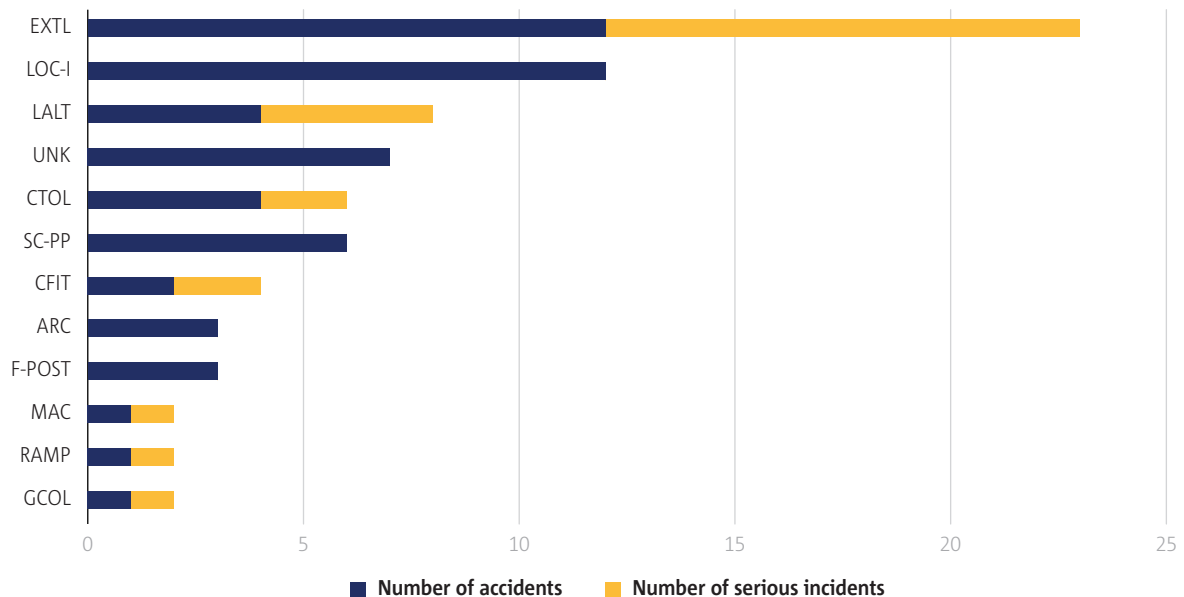


► **Figure 3.19** Fatal and serious injuries per year involving SPO helicopters



Occurrence categories

Figure 3.20 outlines the top occurrence categories assigned to the serious incidents and accidents in the past five years.



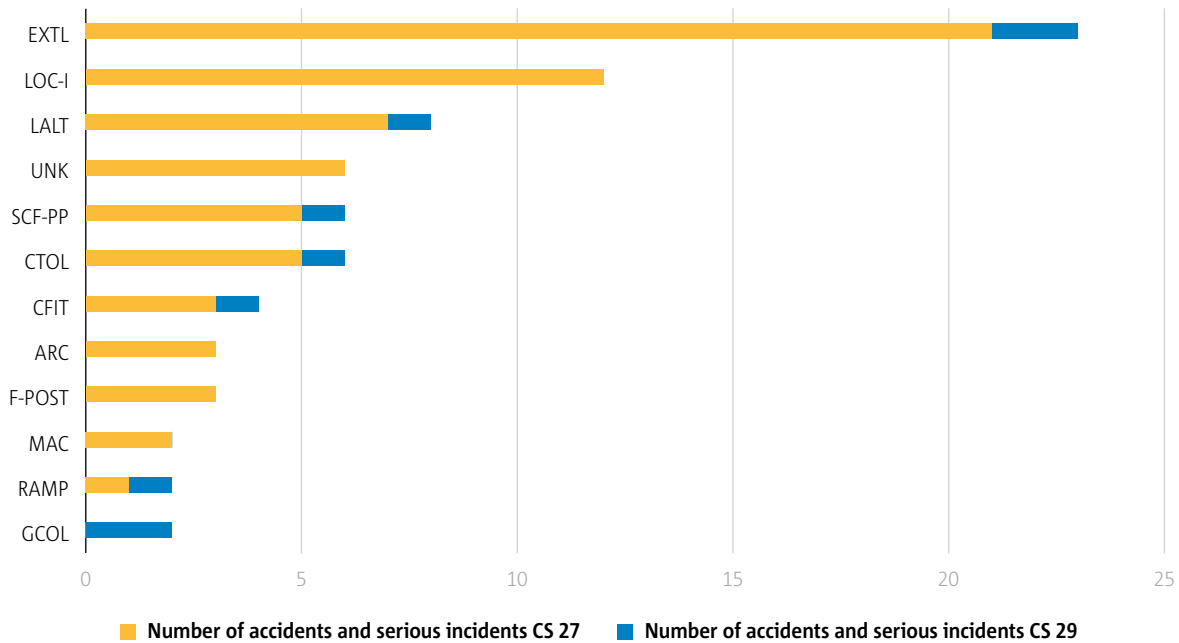
EXTL: External load related occurrences; LOC-I: Loss of control – inflight; LALT: Low altitude operations; UNK: Unknown or undetermined; SC-PP: powerplant failure or malfunction; CTOL: Collision with obstacle(s) during take-off and landing; CFIT: Controlled flight into or toward terrain; ARC: Abnormal runway contact; F-POST: Fire/smoke (post-impact); MAC: Airprox/ACAS alert/loss of separation/(near) midair collisions; RAMP: Ground Handling; GCOL: Ground Collision

► Figure 3.20 Numbers of occurrences by occurrence category and occurrence class involving SPO helicopters

Specific to this type of operation, helicopters carry external loads for a variety of missions, hence the most frequent occurrence category associated with all accidents and serious incidents is EXTL: External load-related occurrences. It is followed by LOC-I: Loss of control – inflight being as well specific hazards for SPO and Low-altitude operations.



The Figure 3.21 shows the breakdown of all accidents by ICAO ADREP taxonomy over the 5-year by type of certification specification, Certification Specifications for Small Rotorcraft (CS-27) and the Certification Specifications for Large Rotorcraft (CS-29).



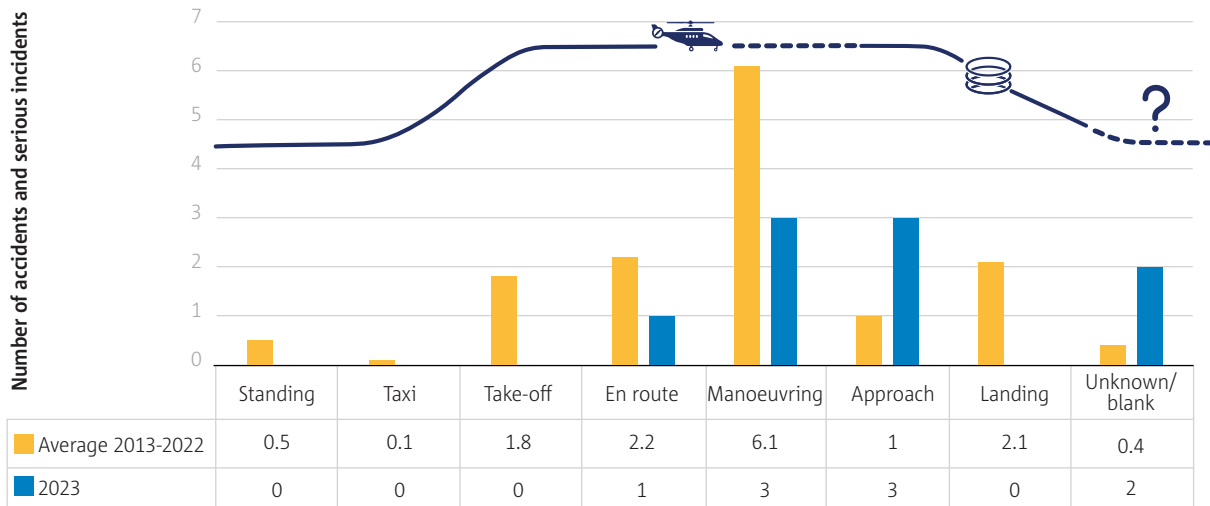
EXTL: External load related occurrences; LOC-I: Loss of control – inflight; LALT: Low altitude operations; UNK: Unknown or undetermined; SCF-PP: powerplant failure or malfunction; CTOL: Collision with obstacle(s) during take-off and landing; CFIT: Controlled flight into or toward terrain; ARC: Abnormal runway contact; F-POST: Fire/smoke (post-impact); MAC: Airprox/ACAS alert/loss of separation/(near) midair collisions; RAMP: Ground Handling; GCOL: Ground Collision

► **Figure 3.21** Numbers of occurrences by occurrence category and aircraft certification type involving SPO helicopters



Phase of flight

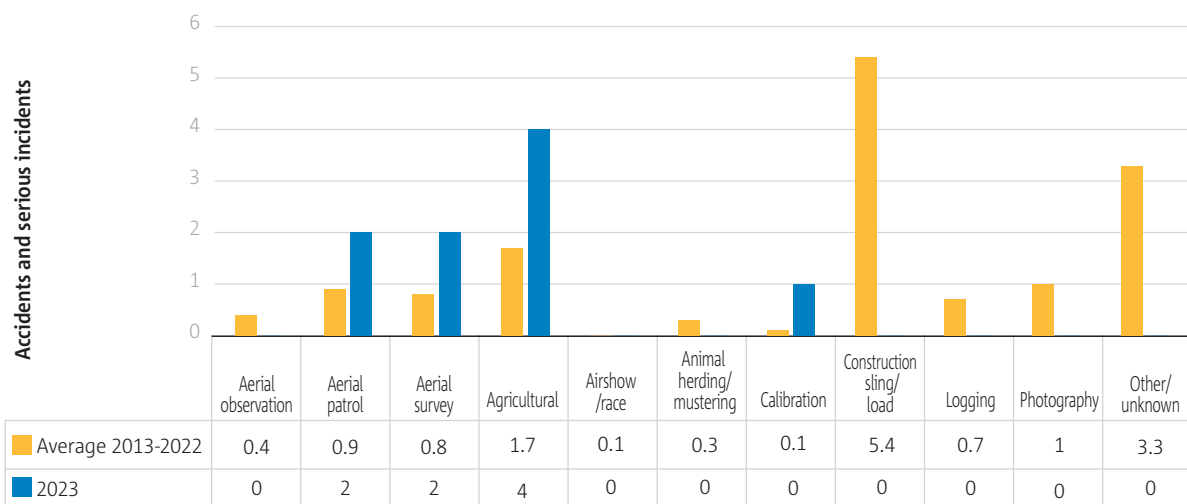
Figure 3.22 shows the breakdown of accidents and serious incidents by flight phase for SPO. As was the case with the average of the preceding 10-year period, the highest number of accidents and serious incidents in 2023 happened during the manoeuvring phase, which is expected for helicopters performing SPO, as the risk undertaken is the highest when performing the activities, such as high-dimension lifting devices, power line operations or constructing a large mast.



► **Figure 3.22** Accidents and serious incidents by phase of flight involving SPO helicopters

Operation type

Figure 3.23 shows the number of accidents and serious incidents per sub-type of SPO operations. In 2023, agricultural missions were by far the most affected. The other identified operation types involved in an occurrence in 2023 were aerial patrol and survey.

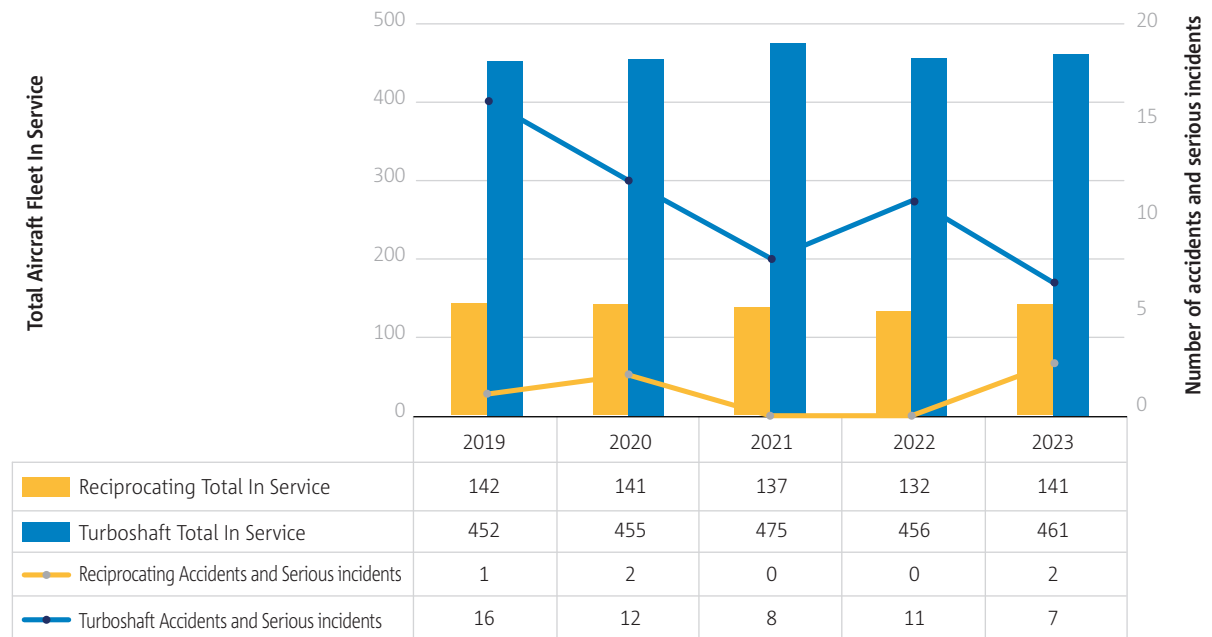


► **Figure 3.23** Accidents and serious incidents by operation type involving SPO helicopters



Propulsion type

Figure 3.24 shows the distribution over the 5-year period of the EASA Member State rotorcraft fleets in total by type of propulsion and with a trendline of accidents and serious incidents in the given period. The total fleet in service is shown in the primary vertical axis of the graph, whereas total number of accidents and serious incidents in each period is shown in the secondary vertical axis.

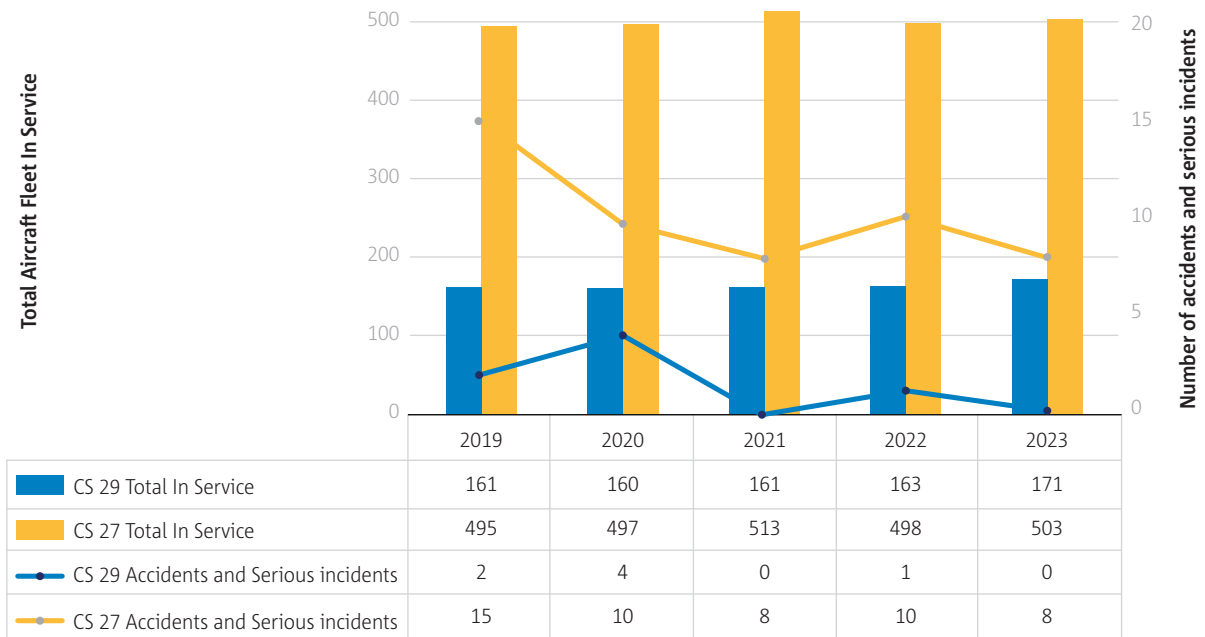


► **Figure 3.24** Accidents and serious incidents by propulsion type involving SPO helicopters with the breakdown of propulsion type for the reported fleet



Helicopter certification specification (CS27/CS29)

Figure 3.25 shows the distribution over the 5-year period of the EASA Member State rotorcraft fleets in total by type of certification specification, Certification Specifications for Small Rotorcraft (CS-27) and the Certification Specifications for Large Rotorcraft (CS-29), with a trendline of accidents and serious incidents in the given period. The total fleet in service is shown in the primary vertical axis of the graph, whereas the total number of accidents and serious incidents in each period is shown in the secondary vertical axis.



► **Figure 3.25** Accidents and serious incidents by certification specification (CS27/CS29) for SPO with the breakdown of aircraft certification type for the reported fleet



3.4 Non-commercial operations (NCO) helicopters

This section presents the main safety statistics for EASA certified or validated helicopters performing NCO with an EASA Member State as state of operator or state of registry. The type of flying included in this section are mainly flight training, test flights, leisure flights and ferry flights.

Key statistics

The key statistics for this domain are in Table 3.7 and Table 3.8, which includes a comparison of the number of fatal and non-fatal accidents and serious incidents for the last year and the previous 10-year period. It also includes a comparison of the fatalities and serious injuries sustained in those accidents during the same timeframe.

In 2023, the number of accidents, both fatal and non-fatal, along with serious incidents, were lower compared to the average of the preceding decade, marking them as among the lowest in the analysed period. Despite this decrease, the fatality risk in 2023 remained close to that of 2022, maintaining its position among the top three lowest numbers of fatalities and serious injuries.

	Total number of occurrences per occurrence class over 2013-2022	Number of occurrences per occurrence class in 2023	Comparison 2023 vs yearly average of 2013-2022 per occurrence class
Fatal accidents	45	5	=
Non-fatal accidents	219	16	↓
Serious incidents	58	1	↓

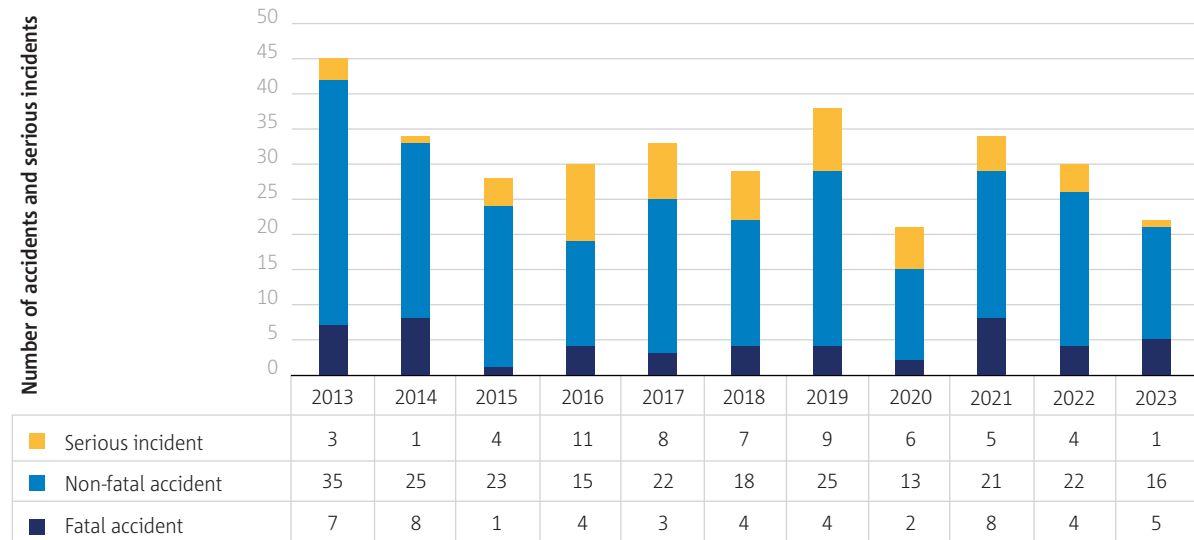
► **Table 3.7** Key statistics for NCO helicopters

	Number of fatalities	Number of serious injuries
Total number over 2013-2022	71	49
Yearly max number over 2013-2022	20	11
Yearly min number over 2013-2022	1	2
Total number in 2023	2	2

► **Table 3.8** Fatalities and serious injuries involving NCO helicopters

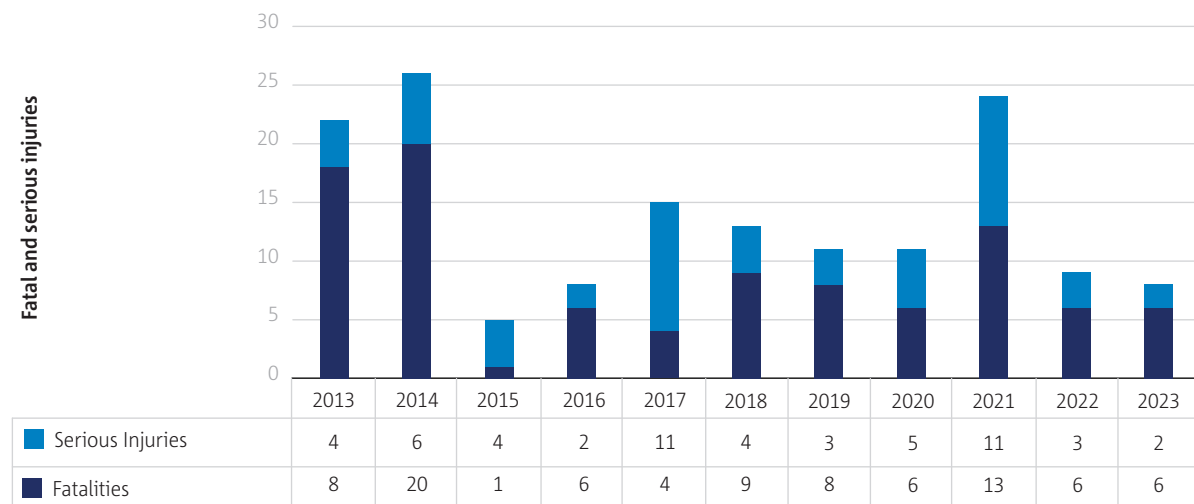


Figure 3.26 illustrates the numbers of accidents and serious incidents per year. Following the year 2020, which yielded the lowest figures observed since 2011, 2023 stands out as the next lowest year in terms of occurrence numbers.



► **Figure 3.26** Fatal accidents, non-fatal accidents and serious incidents per year involving NCO helicopters

The numbers of fatalities and serious injuries per year are shown in Figure 3.27.

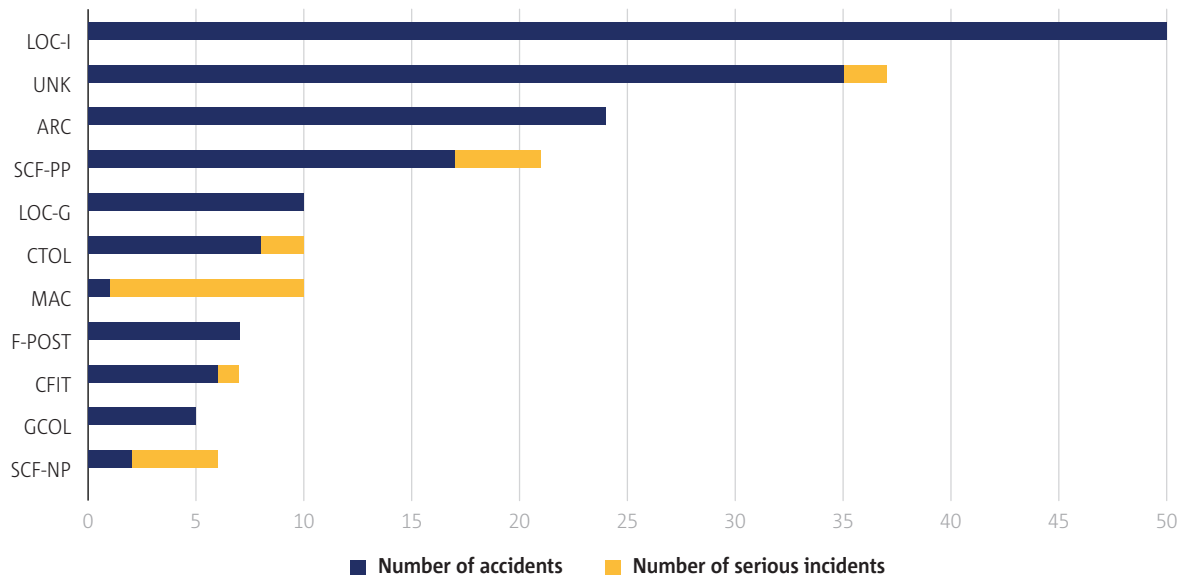


► **Figure 3.27** Fatal and serious injuries per year involving NCO helicopters



Occurrence categories

Figure 3.28 outlines the top occurrence categories assigned to the serious incidents and accidents in the past five years.



LOC-I: Loss of control – inflight; UNK: Unknown or undetermined; ARC: Abnormal runway contact; SCF-PP: powerplant failure or malfunction; LOC-G: Loss of control – ground; CTOL: Collision with obstacle(s) during take-off and landing; MAC: Airprox/ACAS alert/loss of separation/ (near) midair collisions; F-POST: Fire/smoke (post-impact); CFIT: Controlled flight into or toward terrain; GCOL: Ground Collision; SCF-NP: System/ component failure or malfunction [non-powerplant]

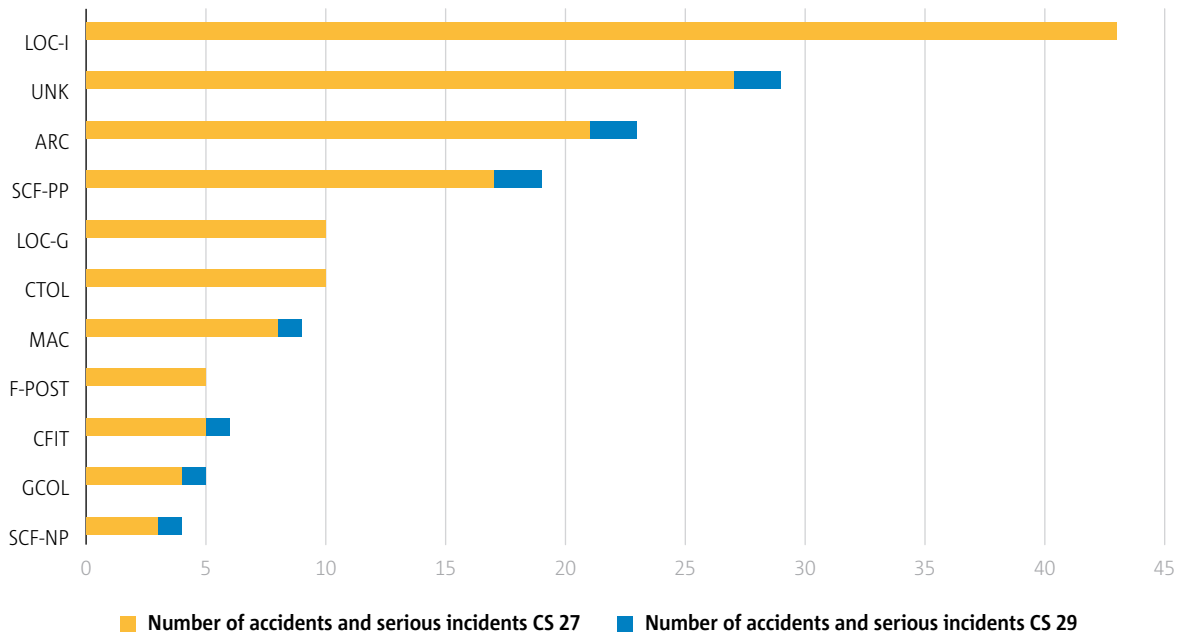
► **Figure 3.28** Numbers of occurrences by occurrence category and occurrence class involving NCO helicopters

Occurrences are categorised using the ICAO ADREP taxonomy for occurrence categories, developed for supporting common coding of the main elements of an occurrence that should be investigated, recorded, and analysed.

Loss of control in flight (LOC-I) emerges as the primary occurrence category for non-commercial operations, with flight training missions being notably susceptible. Notably, all occurrences categorized under LOC-I have resulted in accidents, highlighting their high-risk nature.

Abnormal ground contact with the runway (ARC) is the third key risk area, after UNK: Unknown or undetermined. Similarly, this scenario is one of the main ones appearing in flight training and excursion from/overshooting of the helipad. Events such as hard/heavy landings, off centre landings are included in this category. Includes any rotor striking the intended landing surface during take-off and landing. However, if loss of control or collision occurred, the event is also coded under the appropriate categories: LOC-I: Loss of control – inflight; LOC-G: Loss of control – ground; GCOL: Ground Collision; CTOL: Collision with obstacle(s) during take-off and landing.

The Figure 3.29 shows the breakdown of all accidents by ICAO ADREP taxonomy over the 5-year by type of certification specification, Certification Specifications for Small Rotorcraft (CS-27) and the Certification Specifications for Large Rotorcraft (CS-29).

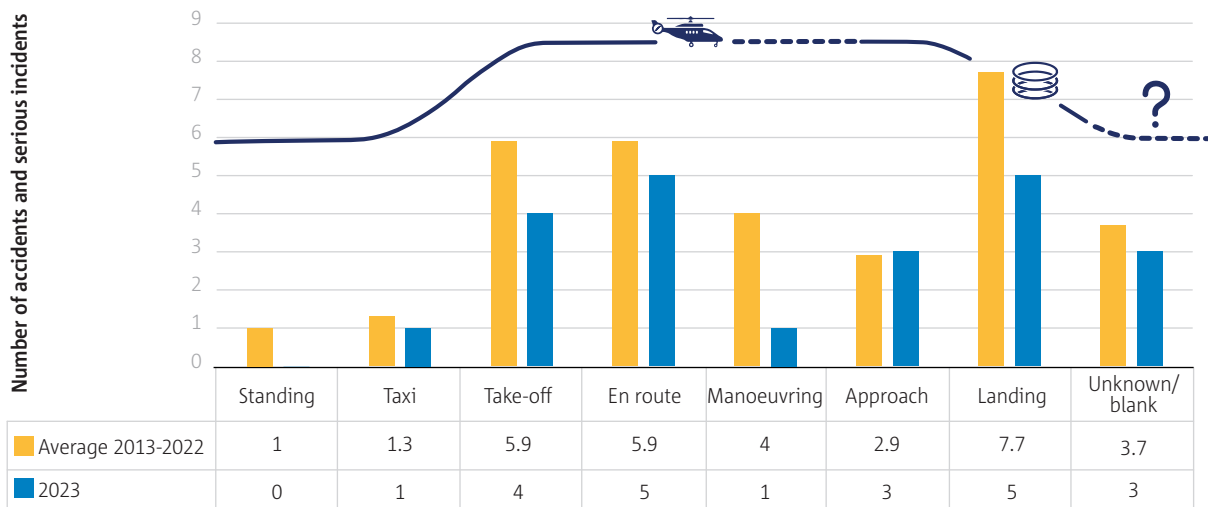


LOC-I: Loss of control – inflight; UNK: Unknown or undetermined; ARC: Abnormal runway contact; SCF-PP: powerplant failure or malfunction; LOC-G: Loss of control – ground; CTOL: Collision with obstacle(s) during take-off and landing; MAC: Airprox/ACAS alert/loss of separation/ (near) midair collisions; F-POST: Fire/smoke (post-impact); CFIT: Controlled flight into or toward terrain; GCOL: Ground Collision; SCF-NP: System/ component failure or malfunction [non-powerplant]

► **Figure 3.29** Numbers of occurrences by occurrence category and aircraft certification type involving NCO helicopters

Phase of flight

Figure 3.30 shows the distribution of accidents and serious incidents by flight phase. Among the occurrences in 2023 for which the flight phase was identified, take-off, landing and en route phases were the most frequent, which is also the case for the 10-year average figures.

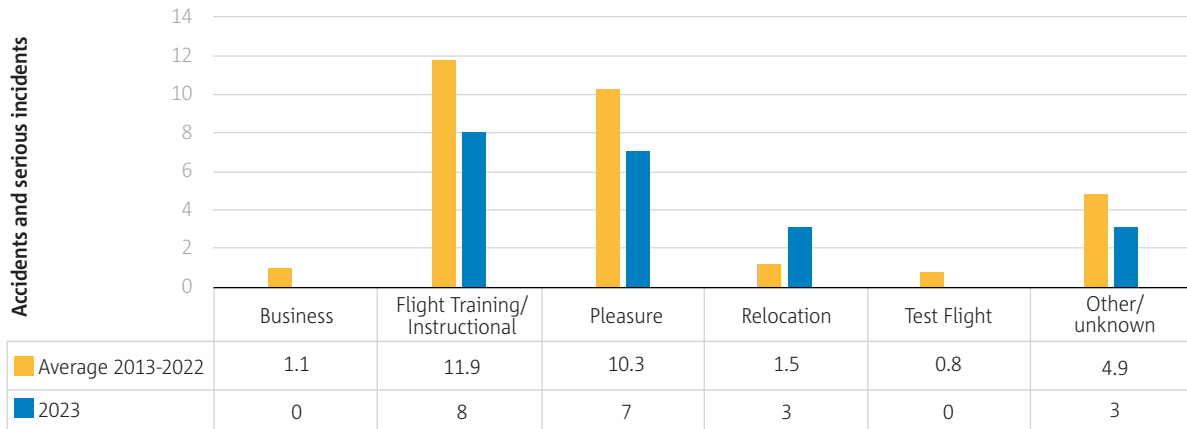


► **Figure 3.30** Accidents and serious incidents by phase of flight involving NCO helicopters



Operation type

Figure 3.31 shows the number of accidents and serious incidents per type of operation. In 2023, as in the previous decade, the highest number of occurrences for which the type of operation was identified were in pleasure flights and flight training/instructional operations. This is to be expected that flight instruction is still one of the riskiest environments. Most of the helicopters used in this sector are small and equipped with one engine. It should be highlighted that the exact nature of the operation is unknown at this stage for five occurrences.



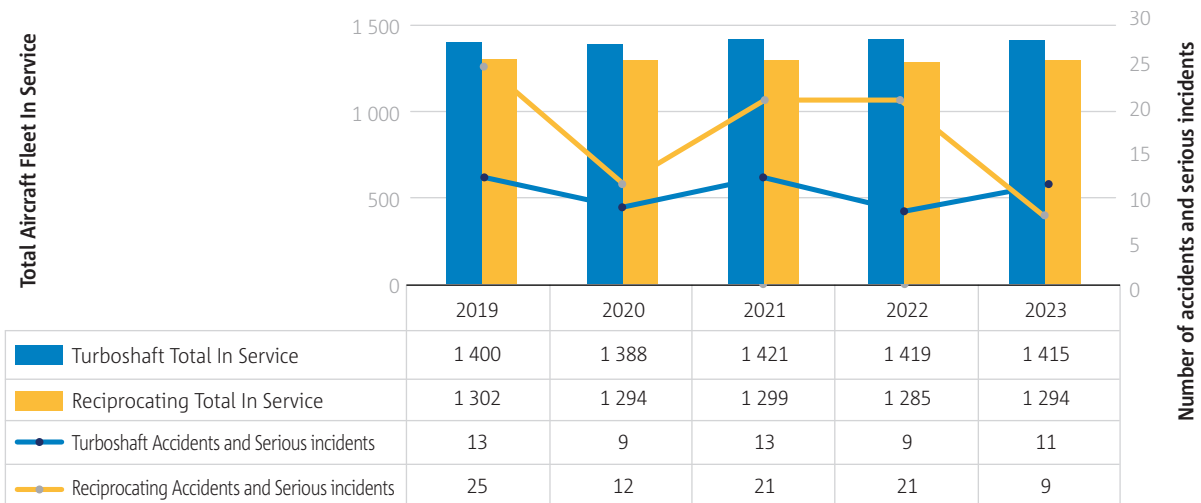
► **Figure 3.31** Accidents and serious incidents by operation type involving NCO helicopters

Propulsion type

Figure 3.32 shows the distribution over the 5-year period of the EASA Member State rotorcraft fleets in total by type of propulsion and with a trendline of accidents and serious incidents in the given period.

The total fleet in service is shown in the primary vertical axis of the graph, whereas the total number of accidents and serious incidents in each period is shown in the secondary vertical axis.

In 2023, the figures for reciprocating helicopters decreased in absolute numbers reaching its minimum over the 5-year period, whereas a small increase was observed in turboshaft helicopters.



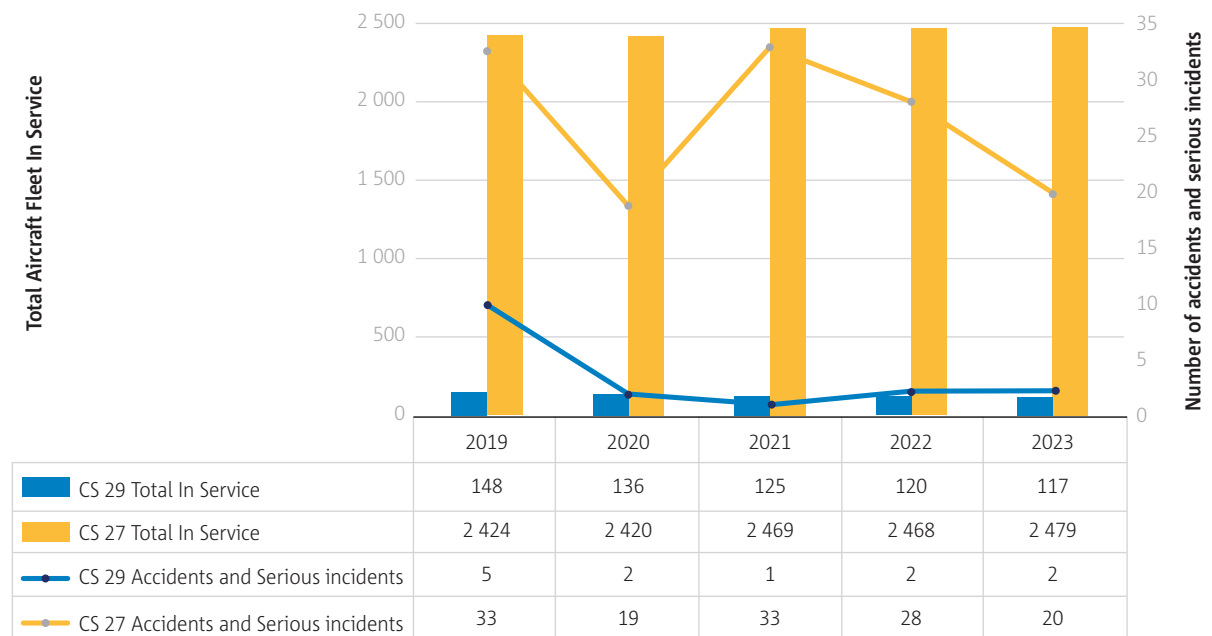
► **Figure 3.32** Accidents and serious incidents by propulsion type involving NCO helicopters with the breakdown of propulsion type for the reported fleet



Helicopter certification specification (CS27/CS29)

Figure 3.33 shows the distribution over the 5-year period of the EASA Member State rotorcraft fleets in total by type of certification specification, Certification Specifications for Small Rotorcraft (CS-27) and the Certification Specifications for Large Rotorcraft (CS-29), with a trendline of accidents and serious incidents in the given period. The total fleet in service is shown in the primary vertical axis of the graph, whereas total number of accidents and serious incidents in each period is shown in the secondary vertical axis.

A downward trend is observed for the number of occurrences in Small Rotorcraft (CS-27), whereas no increase for Large Rotorcraft (CS-29), remaining close to minimum.



► **Figure 3.33** Accidents and serious incidents by certification specification (CS27/CS29) for NCO with the breakdown of aircraft certification type for the reported fleet

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Chapter 4
Balloons





The scope of this chapter covers hot air balloon operations where the state of the registry or the state of operator is an EASA Member State. The data presented is based on the accidents and serious incidents collected by the Agency under Regulation (EU) 996/2010 on accident and serious incident investigation and Regulation (EU) 376/2014 on occurrence reporting, and through actively searching for those events from other official sources.

The chapter provides in the core document the key statistics and occurrence categories for balloon operations. Advanced statistics are then provided in a domain-specific appendix, giving an overview of the safety risks for these operations at the European level. These advanced statistics are solely derived from occurrence data from the European Common Repository (ECR).

The list of fatal accidents associated with the scope of this chapter is provided in Appendix 1 of this document.

The advanced statistics associated with the scope of this chapter are provided in Appendix 4 of this document.





Key statistics

The key statistics for this domain are in Table 4.1 and Table 4.2 and include a comparison of the number of accidents (fatal and non-fatal) and serious incidents for the last year and the previous 10-year period. It also includes a comparison of the fatalities and serious injuries sustained in those accidents during the same timeframe.

Table 4.1 shows a comparison between the 10-year average vs. 2023. This indicates that the number of fatal accidents and the number of serious incidents is decreasing compared to the 10-year average. Non-fatal accidents, however, continue to show a small increase compared to the 10-year average.

Table 4.2 presents the number of fatalities and serious injuries for 2023 vs. the 10-year average.

The number of fatalities is at the minimum and has decreased in 2023 compared to the 10-year average, with the number of serious injuries in 2023 close to even when compared to the 10-year average, with an indication of slight increase.

A better understanding of the level of balloon safety in EASA Member States could be achieved if exposure data showing the number of flights was collected at regulatory level. EASA encourages all national authorities to collect, aggregate and share such data for the benefit of all.

	Total number of occurrences per occurrence class over 2013-2022	Number of occurrences per occurrence class in 2023	Comparison 2023 vs yearly average of 2013-2022 per occurrence class
Fatal accidents	12	0	↓
Non-fatal accidents	161	20	↑
Serious incidents	56	4	↓

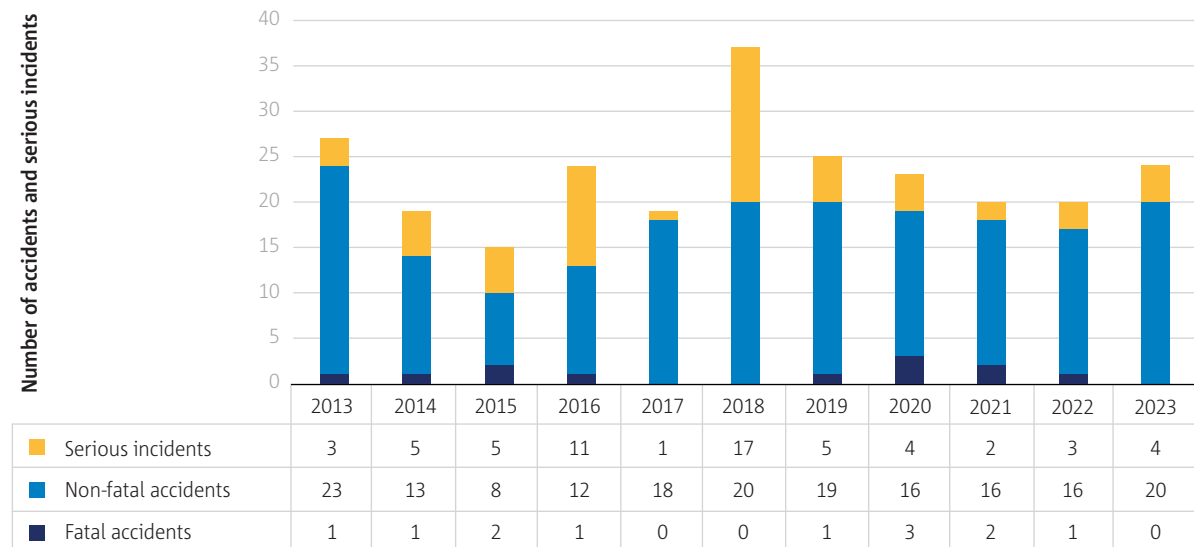
► **Table 4.1** Key statistics for balloons

	Number of fatalities	Number of serious injuries
Total number over 2013-2022	12	176
Yearly max number over 2013-2022	3	24
Yearly min number over 2013-2022	0	10
Total number in 2023	0	18

► **Table 4.2** Fatalities and serious injuries involving balloons

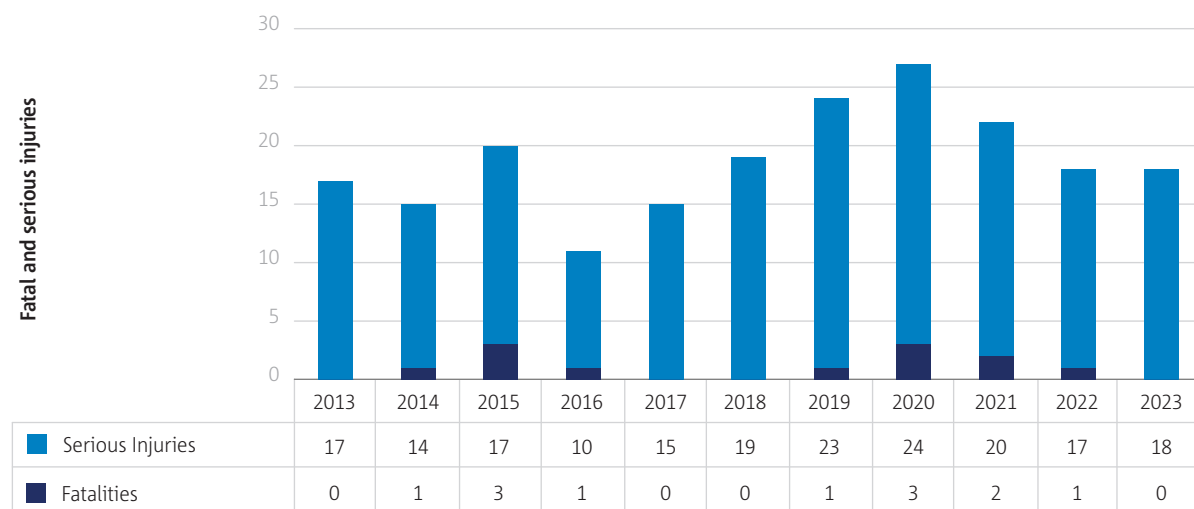


Figure 4.1 illustrates the trend in fatal accidents, non-fatal accidents, and serious incidents from 2013 to 2023. Notably, last year's data closely resembled that of 2019. Additionally, a slight upward trend in the overall figures can be observed in the year 2023 in comparison with 2022.



► **Figure 4.1** Fatal accidents, non-fatal accidents and serious incidents per year involving balloons

Figure 4.2 shows the number of fatalities and serious injuries in a similar upward trend as Figure 4.1. Last year 2023 can be compared to the year before and to 2018 in terms of serious injuries. Number of fatalities is zero in 2023, marking four years out of the previous 10 without loss of life in this domain.



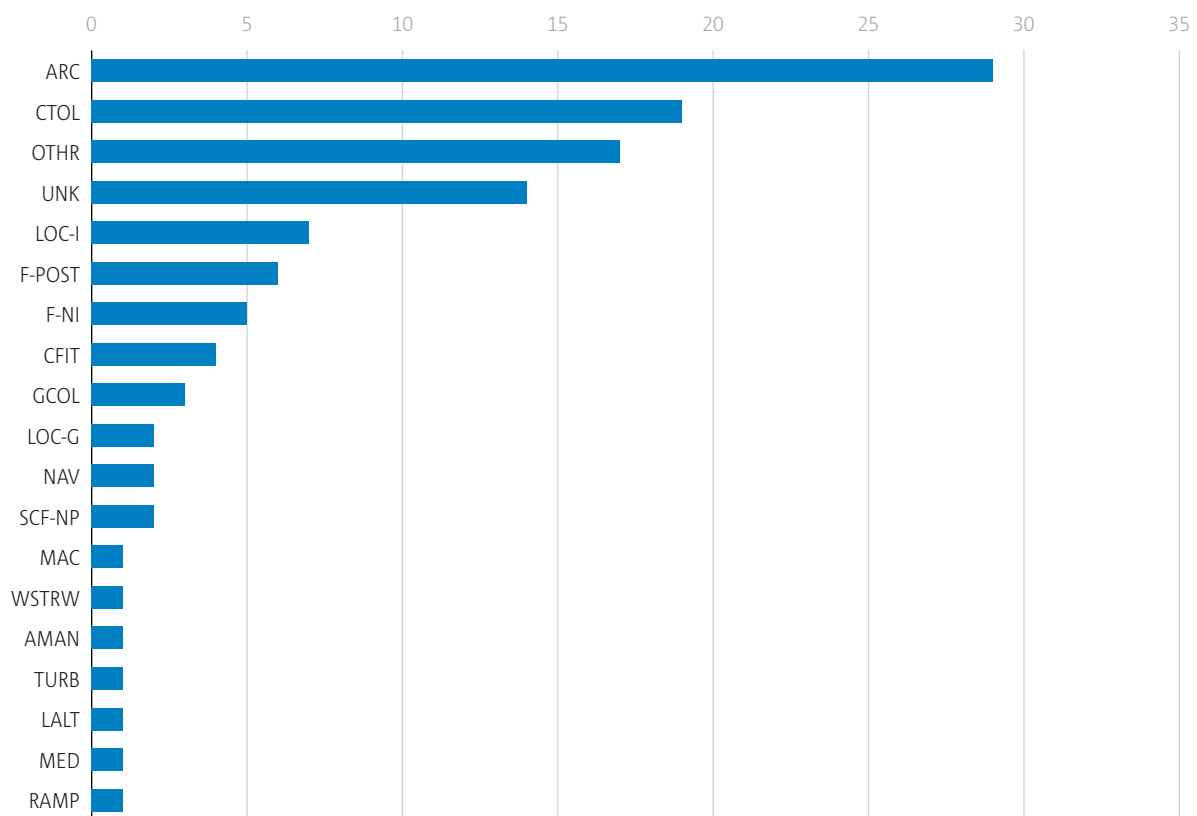
► **Figure 4.2** Fatalities and serious injuries involving balloons



Occurrence categories

Figure 4.3 outlines the top 19 categories assigned to the serious incidents and accidents in the past five years. Occurrences are categorised using the ICAO Accident Incident Data Reporting (ADREP) taxonomy for occurrence categories, developed for supporting common coding of the main elements of an occurrence that should be investigated, recorded, and analysed. Categories are of different nature, e.g., operational such as abrupt manoeuvre (AMAN), environmental such as windshear or thunderstorm (WSTRW), technical such as system/component failure or malfunction [non-powerplant] (SCF-NP), consequential such as fire/smoke resulting from impact (F-POST), etc. Multiple categories may therefore be assigned to a single occurrence. For example, if an engine failure occurred and loss of control followed, the occurrence would be coded in both categories, i.e., SCF-PP: powerplant failure or malfunction and LOC-I: loss of control in flight. The sum of the number of occurrences per category may therefore be greater than the total number of occurrences realised in the period.

For the period 2019-2023 figures show that abnormal runway contact is the most common cause of injuries. This remains the same as in the previous ASR edition and means that hard landings are causing injuries, mostly to passengers, resulting in bone fractures or torn ligaments. The collision with obstacles during take-off or landing occurrence category includes collisions with powerlines, buildings, or other structures.



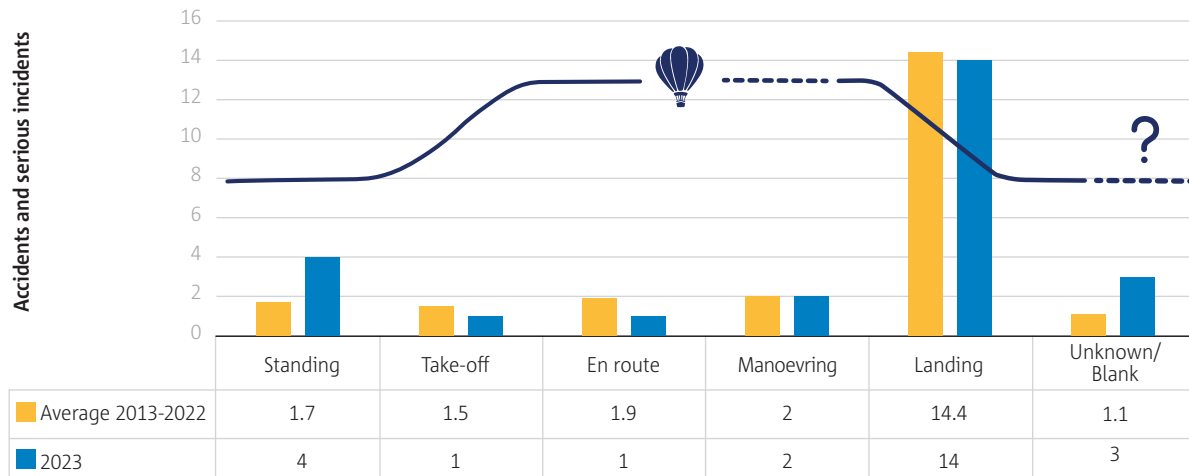
ARC: Abnormal runway contact; OTHR: Other; CTOL: Collision with obstacle(s) during take-off and landing; UNK: Unknown or undetermined; F-POST: Fire/smoke (post-impact); LOC-I: Loss of control - inflight; GCOL: Ground Collision; WSTRW: Windshear or thunderstorm; AMAN: Abrupt manoeuvre; F-NI: Fire/smoke (non-impact); CFIT: Controlled flight into or toward terrain; GCOL: Ground Collision; LOC-G: Loss of control - ground; NAV: Navigation error; SCF-NP: System/component failure or malfunction [non-powerplant]; TURB: Turbulence encounter; CABIN: Cabin safety events; LALT: Low altitude operations; MAC: Airprox/ACAS alert/loss of separation/(near) midair collisions; MED: Medical; RAMP: Ground Handling

► **Figure 4.3** Numbers of occurrences by occurrence category involving balloons



Phase of flight

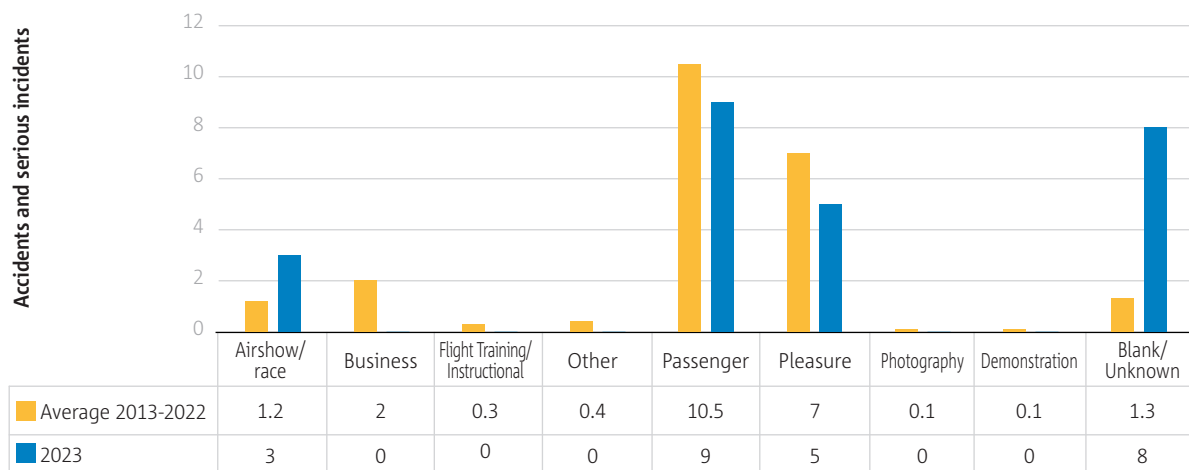
Vast majority of balloon accidents and serious incidents remain occurring during the landing phase of the flight, as shown in Figure 4.4. It can also be observed that the number of recorded landing accidents and serious incidents is very slightly lower than the 10-year average. There is an increase in accidents and serious incidents during the standing flight phase, whilst for take-off and manoeuvring phases these numbers are decreasing. For balloons, the flight phase standing covers the period where the balloon is filled with hot air, but the basket is still heavy.



► **Figure 4.4** Accidents and serious incidents involving balloons, by phase of flight

Operation type

Most balloon accidents and serious incidents are related to passenger and pleasure flights, as shown in Figure 4.5 with a decrease in 2023 compared with the 10-year average. Note that activities such as competitions and record flights are considered to be part of the airshow/race category and in the year 2023 there were more accidents and serious incidents in this category than in the 10-year average. There is a fairly stable and low number of accidents and serious incidents in all other categories. In 2023 no accidents and serious incidents were recorded in five out of nine categories as shown in the Figure 4.5, possibly at the expense of the notable increase in the number of blank/unknown operation type category.



► **Figure 4.5** Accidents and serious incidents involving balloons, by operation type

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Chapter 5
Sailplanes





This chapter covers sailplane operations where the state of registry of the aircraft is an EASA Member State. The data presented are based on the accidents and serious incidents collected by the Agency under Regulation (EU) 996/2010 on accident and serious incident investigation and Regulation (EU) 376/2014 on occurrence reporting, and through actively searching for those events from other official sources.

The chapter provides in the core document the key statistics and the occurrence categories for sailplanes. The European Common Repository (ECR) and the EASA database are used as the data sources for this part. Advanced statistics are then provided in a domain-specific appendix, giving an overview of the safety risks for these operations at the European level. These advanced statistics are solely derived from occurrence data from the ECR. Updated accident rates for sailplanes are not available this year due to missing utilisation data. It is therefore worth stressing the importance of collecting exposure data to provide proper oversight visibility on the domain.

Sailplane operations are a unique aviation domain, largely due to how gliding is performed. Unlike other domains where aircraft are powered by engines, most sailplane operations depend on teamwork and safe towing into the air, using an aircraft or a winch, 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 dataset used in this chapter contains both non-powered and powered sailplanes but excludes ultralight sailplanes. The gliding community, with the leadership of the European Gliding Union (EGU), has been actively involved in shaping the EU rules on Sailplane Air Operations (OPS) and Flight Crew Licensing (FCL) rules, and in providing EASA with valuable input and insight into sailplane operations.

The list of fatal accidents associated with the scope of this chapter is provided in Appendix 1 of this document.

The advanced statistics associated with the scope of this chapter are provided in Appendix 5 of this document.





Key statistics

The key statistics for this domain are in Table 5.1 and Table 5.2 and include a comparison of the number of accidents (fatal and non-fatal) and serious incidents for the last year and the previous 10-year period. It also includes a comparison of the fatalities and serious injuries sustained in those accidents during the same timeframe. Table 5.1 shows a downward trend in the number of fatal and non-fatal accidents but a slight upward trend in the number of serious incidents, compared to the 10-year average. Table 5.2 lays out the figures on the number of fatalities and serious injuries. In 2023 there were 7 fatalities which is significantly lower than the minimum value for the preceding 10 years. Compared to the 10-year average, the number of fatalities decreased by 67% and the number of serious injuries was close to 55% fewer.

	Total number of occurrences per occurrence class over 2013-2022	Number of occurrences per occurrence class in 2023	Comparison 2023 vs yearly average of 2013-2022 per occurrence class
Fatal accidents	193	11	↓
Non-fatal accidents	1 372	100	↓
Serious incidents	274	28	↑

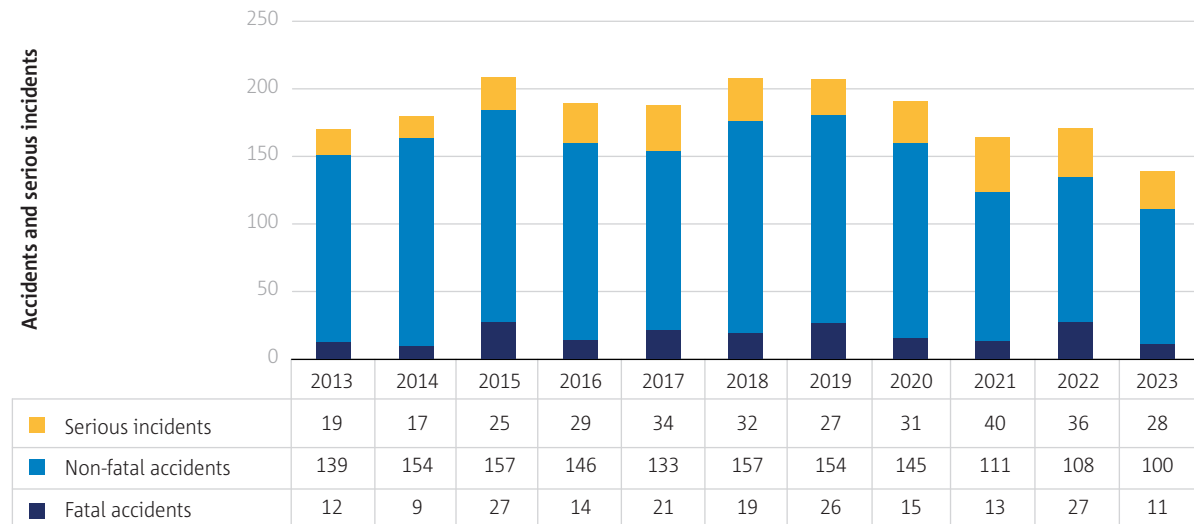
► **Table 5.1** Key statistics for sailplanes

	Number of fatalities	Number of serious injuries
Total number over 2013-2022	211	290
Yearly max number over 2013-2022	31	45
Yearly min number over 2013-2022	15	17
Total number in 2023	7	13

► **Table 5.2** Fatalities and serious injuries involving sailplanes

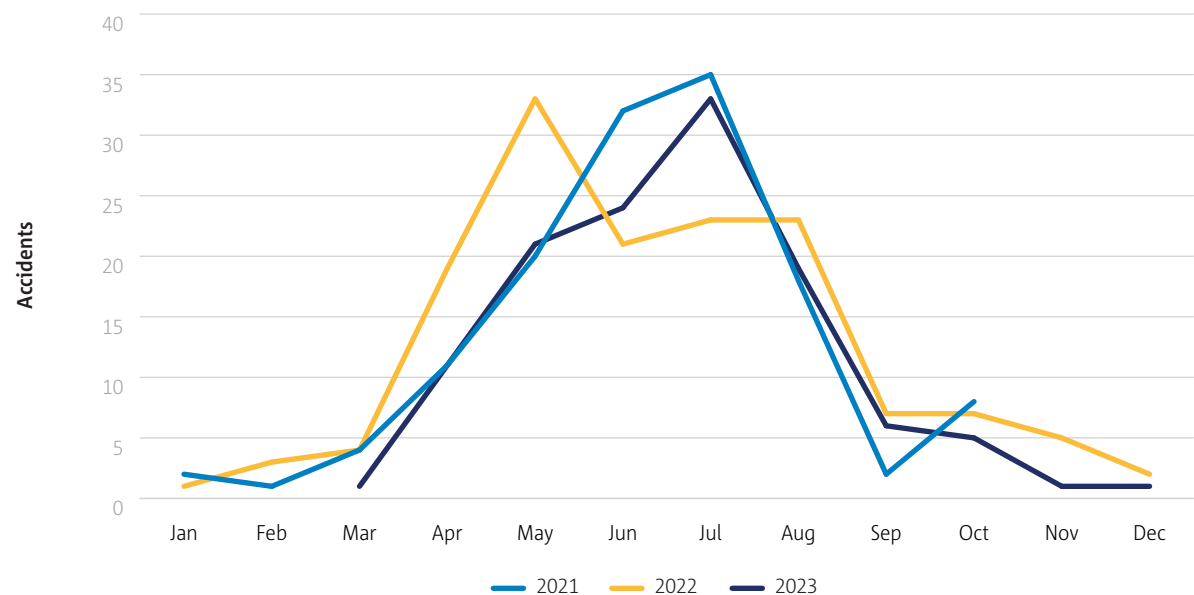


Figure 5.1 provides an overview of both fatal and non-fatal accidents and serious incidents from 2013 to 2023. The figure shows a stable and slightly downward trend over the period. However, in 2022 the number of fatal accidents increased to a similar figure as in 2019.



► **Figure 5.1** Fatal and non-fatal accidents and serious incidents per year involving sailplanes

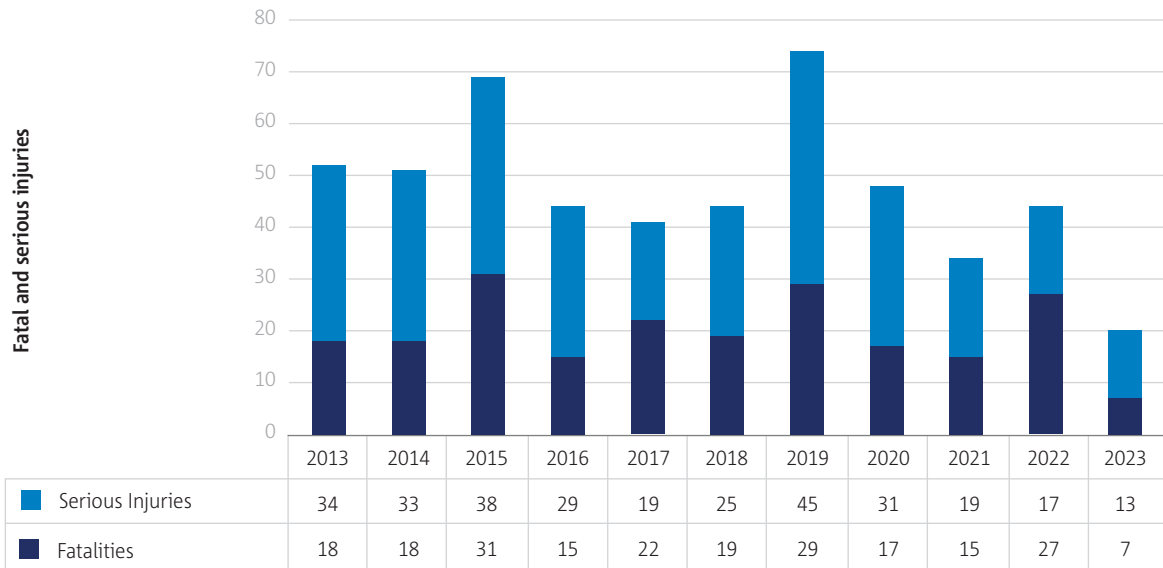
Figure 5.2 shows a monthly comparison between the years 2021 to 2023. The figure clearly shows a jump in the number of accidents in May 2021. 2022 and 2023 show a similar trend with a spike in accidents in June and July. In comparison to 2022, the number of accidents is more evenly spread between months while in 2021 the main spike is in May, then drops to an even phase until the end of August.



► **Figure 5.2** Comparison of number of accidents involving sailplanes per month from 2021-2023



Figure 5.3 shows an even trend in number of fatalities and serious injuries over the period. Last year, however, records the far lowest number of fatalities compared to the previous 10 years and from 2019 until 2023 the trend is showing a downward trend. Serious injuries in 2019 were significantly more frequent than in 2023. The figure also shows that the number of reported serious injuries are the lowest since 2013.



► **Figure 5.3** Fatal and serious injuries per year involving sailplanes

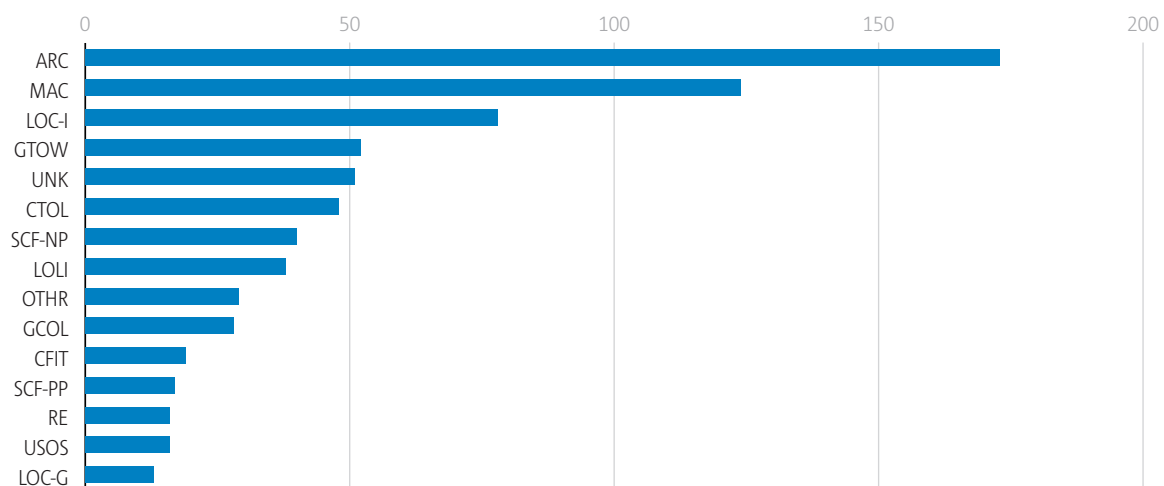




Occurrence categories

Figure 5.4 outlines the top 15 categories assigned to the serious incidents and accidents in the past five years. Occurrences are categorised using the Commercial Aviation Safety Team (CAST)/ICAO Common Taxonomy Team (CICTT) taxonomy for occurrence categories, developed for supporting common coding of the main elements of an occurrence that should be investigated, recorded, and analysed. Categories are of different natures, e.g., operational such as low altitude operations (LALT), environmental such as turbulence encounter (TURB), technical such as system/component failure or malfunction [non-powerplant] (SCF-NP), consequential such as fire/smoke resulting from impact (F-POST), etc. Multiple categories may therefore be assigned to a single occurrence, pointing towards the root cause of the accident. For example, if an engine failure occurred, and loss of control followed, the occurrence would be coded in both categories, i.e., SCF-PP: powerplant failure or malfunction and LOC-I: loss of control in flight. The sum of the number of occurrences per category may therefore be greater than the total number of occurrences that occurred in the period.

For the period 2019-2023, the main occurrence categories are abnormal runway contact – which in many cases leads to damage due to collision with objects in the outfield landing area. The second in line are mid-air collisions, that show actual collisions or near-misses, and the third category shows loss of control occurrences.



ARC: Abnormal runway contact; MAC: Airprox/ ACAS alert/ loss of separation/ (near) mid-air collisions; LOC-I: Loss of control - inflight; GTOW: Glider towing related events; UNK: Unknown or undetermined; CTOL: Collision with obstacle(s) during take-off and landing; SCF-NP: System/component failure or malfunction [non-powerplant]; LOLI: Loss of lifting conditions en-route; OTHR: Other; GCOL: Ground Collision, CFIT: Controlled flight into or toward terrain, SCF-PP: powerplant failure or malfunction; RE: Runway excursion; USOS: Undershoot/ overshoot; LOC-G: Loss of control – ground.

► **Figure 5.4** Numbers of occurrences by occurrence category involving sailplanes

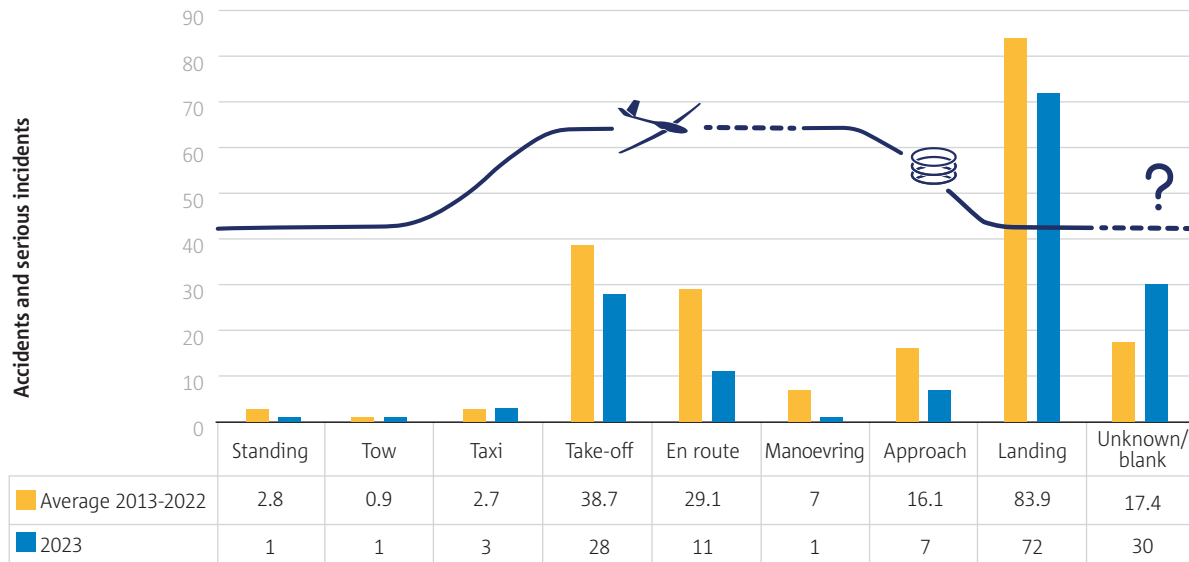
Phase of flight

The nature of gliding creates a different set of challenges for sailplane pilots compared to flights using motorised aircraft. This includes both a different means of take-off and the need for the sailplane pilot to frequently plan for possible landing areas during the flight. Figure 5.5 provides an overview of the accidents and serious incidents per phase of flight.

Most sailplane accidents occur during the landing phase of the flight. The landings occur both as airfield landings and off-field landings. The off-field landings rely on a good eye for the landscape topography in order to select a landing spot that is flat and clear of obstacles for a successful landing. It is during these landings where the sailplanes suffer damage, but the risk of injuries is low. Airfield landing accidents are mostly caused by under and



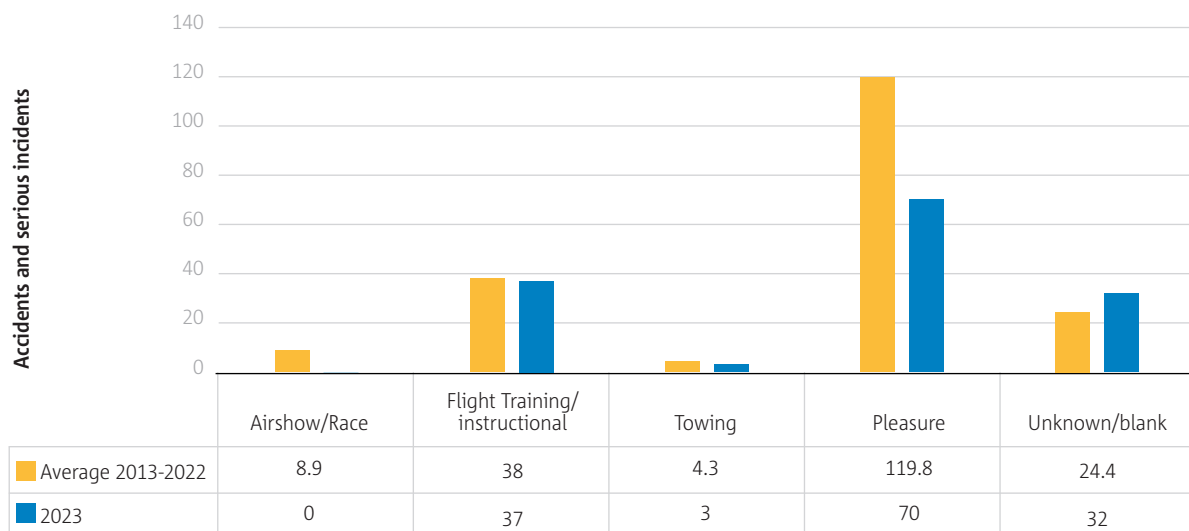
overshoot landings where wind strength and direction play a big role. Most common accidents during take-off are due to various mishaps while using a winch. The dataset includes towing occurrences where the occurrence involves a glider. Sailplane towing is addressed in the SPO Aeroplanes chapter.



► **Figure 5.5** Accidents and serious incidents by phase of flight involving sailplanes

Operation type

Most sailplane accidents and serious incidents occurred during leisure/private flights. Accidents during flight training come next but in 2023 there was a significant reduction of leisure/private flight accidents compared to the 10-year average. Flight training accidents were almost on par with the 10-year average. It should be noted that many of the unknown/blank phases of flight have not been categorised due to a lack of information as these accidents are still being investigated by the national safety investigation authorities.



► **Figure 5.6** Accidents and serious incidents by operation type involving sailplanes

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Chapter 6

**Unmanned
aircraft systems (UAS)**





For the first time, this edition of the Annual Safety Review (ASR) covers the new domain of unmanned aircraft systems (UAS) and their operations. The chapter is based on accidents and serious incidents involving UAS where the state of occurrence is an EASA Member State.

The data presented are based on the accidents and serious incidents collected by the Agency under Regulation (EU) 996/2010 on accident and serious incident investigation and Regulation (EU) 376/2014 on occurrence reporting and that were found in the European Central Repository (ECR). Additionally, other official sources were actively searched for those events.

Generally, it has to be kept in mind that when it comes to occurrences and other safety-related information involving UAS, the European legislator limited mandatory reporting to UAS for which a certificate or declaration is required unless the occurrence or other safety-related information involving such unmanned aircraft resulted in a fatal or serious injury to a person or it involved aircraft other than unmanned aircraft¹⁴.

Because of the current limitations of the taxonomy¹⁵ used by the European Co-ordination Centre for Accident and Incident Reporting System (ECCAIRS) it is not possible to query in which operational category (open, specific or certified¹⁶) the UAS were operated in. This can only be individually derived from the narrative of an occurrence report if it contains enough information. Furthermore, it is also not possible to query the state of the registry when it comes to UAS, and this will not change in the future because the European UAS rule does not require a registration of UAS unless it is certified¹⁷.

For the above reasons, this chapter focuses on the state of occurrence being the EASA Member States. Consequently, accidents and serious incidents involving EU-registered manned aircraft and involving UAS but occurring outside the EASA Member States are not included here. Such occurrences would be found among the accidents and serious incidents covered in other chapters of this ASR, namely chapter 2 – Aeroplanes and chapter 3 – Helicopters. Furthermore, due to the focus on civil aviation, this chapter also excludes accidents and serious incidents involving UAS operated by the state, i.e., the military, police or other governmental agencies. Finally, accidents and serious incidents by experimental UAS during test flights are also excluded from the dataset underlying this chapter.

14 Article 3.2 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, as amended by Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency.

15 The reader should be informed that based on recommendations prepared by the UAS Working Group of the Network of Analysts, the ECCAIRS taxonomy will in the next few months be amended to allow for a more appropriate occurrence reporting for this aircraft category and its complex operations. Other adjustment to the taxonomy will follow as needed.

16 Please note, that at this moment UAS operations in the certified category are not yet enabled; the rules for such operations are under preparation.

17 UAS operations in the 'certified' category shall require the certification of the UAS but also the registration of the aircraft based on the SARPs found in Annex 7 to the Convention on International Civil aviation on Aircraft Nationality and Registration Marks. UAS operated in the 'open' and 'specific' operational category are not registered themselves but are linked to a registration number of the UAS operator for their identification, see Article 14 - Registration of UAS operators and certified UAS of Regulation (EU) 2019/947.



On the other hand, this chapter covers accidents and serious incidents caused by model aircraft, because such aircraft are also considered UAS based on the definition of ‘unmanned aircraft’ found in the EASA Basic Regulation¹⁸, the definition of ‘unmanned aircraft system’ in the European rules for UAS¹⁹, as well as the specific rule found therein addressing operations of UAS in the framework of model aircraft clubs and associations²⁰.

Notwithstanding the above limitations, exclusions and considerations, this chapter presents the key statistics and occurrence categories for UAS operations,

The list of fatal accidents associated with the scope of this chapter is provided in Appendix 1 of this document.

Key statistics

The key statistics for this domain are in Table 6.1 and Table 6.2. The first table depicts the number of accidents (fatal and non-fatal) and serious incidents for the year 2023. The next table shows the number of fatalities and serious injuries sustained in those accidents during 2023.

The year 2023 was chosen as a starting point for the first domain-related chapter in the ASR because it is the year by which according to the European rules for UAS operations conducted in the framework of model aircraft clubs and associations were no longer allowed to continue without an authorisation in accordance with the European rules for UAS operations or based on national regulation²¹.

Number of occurrences per occurrence class in 2023	
Fatal accidents	1
Non-fatal accidents	9
Serious incidents	2

► **Table 6.1** Key statistics for unmanned aircraft systems (UAS)

Figure 6.1 plots the total number of fatal accidents, non-fatal accidents, and serious incidents in 2023 for the UAS domain. These are all recorded accidents and serious incidents by UAS, but only some of them involved persons on the ground being seriously harmed or manned aviation being endangered. However, in most of the recorded accidents involving UAS (80%) found in the ECR neither a person on the ground was injured nor was manned aviation affected.

However, two accidents listed in Table 6.1 resulted in one fatal and one serious injury to persons on the ground, see Table 6.2 below²².

18 Article 3 - Definitions, (30) ‘unmanned aircraft’ means any aircraft operating or designed to operate autonomously or to be piloted remotely without a pilot on board, see Regulation (EU) 2018/1139 of the European Parliament and of the Council on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency.

19 Article 2 – Definitions under (1) ‘Unmanned aircraft system’ (‘UAS’) means an unmanned aircraft and the equipment to control it remotely’ in Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures for the operation of unmanned aircraft, as well as article 16 - UAS operations in the framework of model aircraft clubs and associations in of the same regulation.

20 When such operations take place in areas managed by nationally recognised model aircraft clubs and associations, they fall in the ‘specific’ category of UAS operations. Model aircraft can also be operated in the ‘open’ category, if all the limitations of that category are respected.

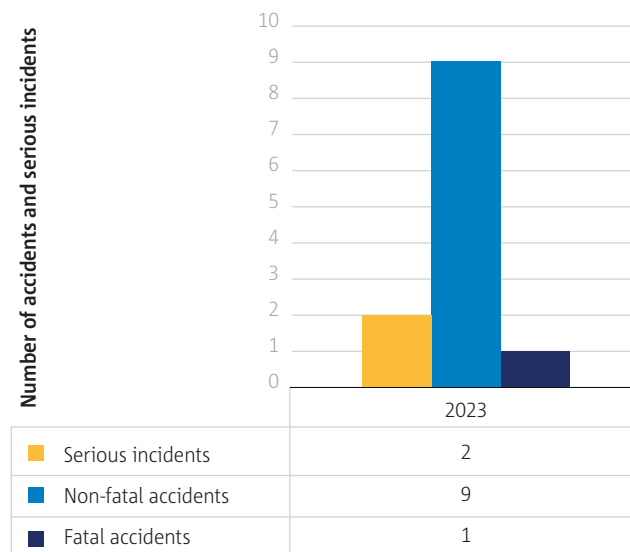
21 Article 16 of Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures for the operation of unmanned aircraft. Article 21 of the same regulation states the sunset clause.

22 In yet another accident involving a UAS one person on the ground was slightly but not seriously injured, therefore not being accounted for in the table 6.2 and Figure 6.2.



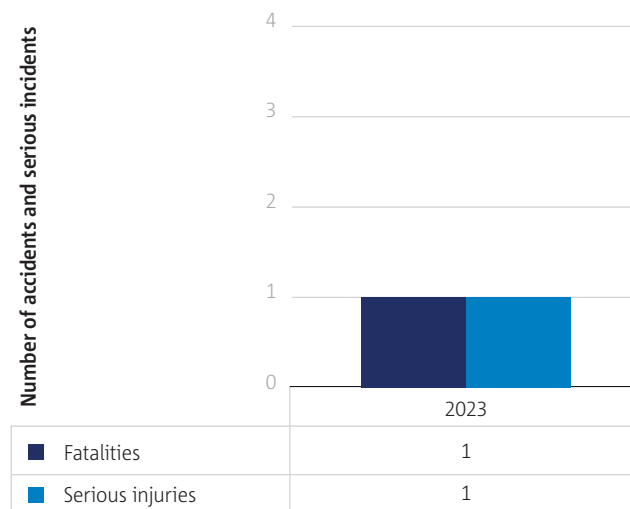
The fatal accident in this domain occurred on	Number of fatalities - ground	Number of serious injuries - ground
Total number in 2023	1	1

► **Table 6.2** Fatalities and serious injuries involving UAS



► **Figure 6.1** Fatal accidents, non-fatal accidents and serious incidents per year involving UAS

Figure 6.2 shows the number of fatalities and serious injuries in 2023 for the UAS domain. In this year these fatalities and serious injuries were sustained by persons on the ground.



► **Figure 6.2** Fatal and serious injuries per year involving UAS



Involvement of persons on the ground in accidents with UAS

Due to the special characteristics of the UAS domain it is important to monitor the risk of persons on the ground being injured by a UAS. Table 6.2 and Figure 6.2 above include one fatality and one case of a serious injury caused by UAS in the year 2023. These accidents were separate events and occurred on terrains for model aircraft aviation that are managed by model aircraft clubs and associations. In the fatal accident, an 8 kg model aircraft in full flight struck an uninvolved remote pilot. In the non-fatal accident, a 31 kg model sail plane diverted from its path during the towing phase and hit the ground before seriously injuring an uninvolved remote pilot of another UAS with one of its wings. Only one of the described accidents was investigated by an organisation on behalf of the national aviation accident investigation bodies²³.

Involvement of manned aviation in accidents and serious incidents with UAS

Due to the special characteristics of the UAS domain, it is equally important to monitor the number of occurrences by UAS in which manned aviation was involved. In the year 2023 the domain recorded two such occurrences. These were two serious incidents of Airprox²⁴ events between UAS and manned aircraft. The manned aircraft involved in these occurrences were large aircraft that encountered UAS during approach and departure from a Member State aerodrome. The aircraft affected were Bombardier BD500 and Airbus A320. In both cases the size of the UAS encountered remained unknown or was not coded in the occurrence report. As regards their safety risks, these occurrences were given high ERCS scores²⁵.

In summary, Table 6.3 shows that in summary 17% (two serious incidents) of the total number of 12 occurrences in the UAS domain involved a manned aircraft.

	Total number of accidents and serious incidents	Number of accidents and serious incidents in which manned aircraft were involved
2023	12	2

► **Table 6.3** Number of occurrences by UAS in which manned aircraft were involved

23 When it comes to accidents involving UAS and resulting in fatal or serious injuries a safety investigation by the responsible safety investigation authority is required based on Article 5 of Regulation (EU) No 996/2010 as amended by Regulation (EU) 2018/1139 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency.

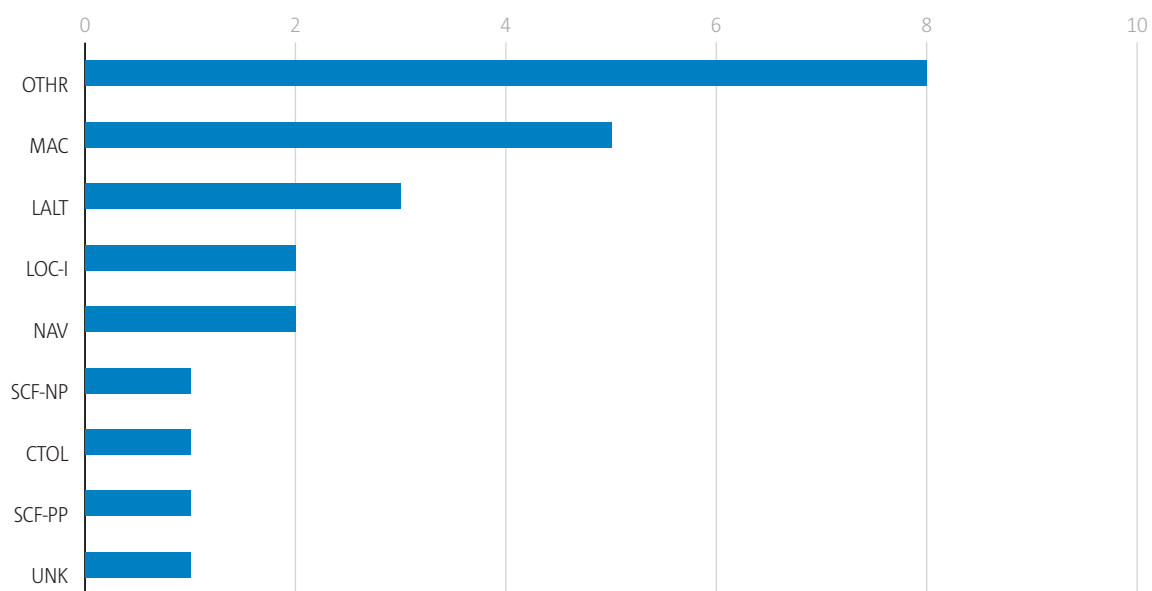
24 An Airprox is a situation in which, in the opinion of a pilot or air traffic services personnel, the distance between aircraft as well as their relative positions and speed have been such that the safety of the aircraft involved may have been compromised. (ICAO Doc 4444: PANS-ATM).

25 'European risk classification scheme' or 'ERCS' means the methodology applied for the assessment of the risk posed by an occurrence to civil aviation in the form of a safety risk score; see Commission Delegated Regulation (EU) 2020/2034 of 6 October 2020 supplementing Regulation (EU) No 376/2014 of the European Parliament and of the Council as regards the common European risk classification scheme.



Occurrence categories

Figure 6.3 below depicts the occurrence categories assigned to the serious incidents and accidents for the UAS domain in the year 2023. Occurrences are categorised using the ICAO Accident Incident Data Reporting (ADREP) taxonomy for occurrence categories, developed to support the common coding of the main elements of an occurrence that should be investigated, recorded, and analysed. Categories are of different nature, e.g., operational such as an abrupt manoeuvre (AMAN), or environmental such as windshear or thunderstorm (WSTRW), technical such as system/ component failure or malfunction [non-powerplant] (SCF-NP), but they may also be consequential such as fire/ smoke resulting from impact (F-POST). Therefore, multiple categories may be assigned to a single occurrence. For example, if an engine failure occurred, and loss of control followed, the occurrence would be coded in both categories, i.e., SCF-PP: powerplant failure or malfunction and LOC-I: loss of control in flight. The sum of the number of occurrences per category may therefore be greater than the total number of occurrences realised in the period.



OTHR: Other; CTOL: MAC: Airprox/ACAS alert/loss of separation/(near) midair collisions; LALT: Low altitude operations; LOC-I: Loss of control - inflight; NAV: Navigation error; CTOL: Collision with obstacle(s) during take-off and landing; SCF-NP: System/component failure or malfunction [non-powerplant]; CTOL: SCF-PP: powerplant failure or malfunction; and UNK: Unknown or undetermined.

► **Figure 6.3** Numbers of occurrences by occurrence category involving UAS

In the year 2023, there were 12 accidents and serious incidents involving UAS. The occurrence category 'OTHR: Other' was assigned to eight serious incidents and accidents, of which one resulted in the fatality involving the model aircraft/UAS on a model aircraft terrain. The occurrence category 'MAC: Airprox/ACAS alert/loss of separation/(near) mid-air collisions' was assigned to four serious incidents and accidents. The occurrence category 'LALT: Low altitude operations' was assigned to three non-fatal accidents, one of which resulted in the serious injury recorded in Table 6.2 and Figure 6.2. The occurrence categories 'NAV: Navigation error' and 'LOC-I: Loss of control – inflight' were each assigned twice to the serious incidents and non-fatal accidents of 2023. Finally, 'CTOL: Collision with obstacle(s) during take-off and landing'; 'SCF-NP: System/component failure or malfunction [non-powerplant]'; 'SCF-PP: powerplant failure or malfunction'; 'UNK: Unknown or undetermined', were assigned once each to the serious incidents and accidents of 2023.



The category 'OTHR' is meant for 'any occurrence not covered under another category'²⁶. The high usage of this category, also in combination with other categories, could mean that the reporters wanted to express the unusual character of the occurrence involving UAS or, when used alone, that the occurrence was so unique that they would not fit another category. For example, the occurrence category 'OTHR' was used for the accident that caused a fatality on the ground, and for two occurrences where the UAS were presumably operated in the 'specific' category for UAS operations. On the other hand, the use of the category 'OTHR' correlates also with the operational type 1 non-commercial or unknown and the operational type 2 was either unknown or not filled in.

The occurrence category 'MAC: Airprox/ACAS alert/loss of separation/(near) mid-air collisions' was used for occurrences that were Airprox events. The occurrence category 'LALT: Low altitude operations' was used three times and notably in the two accidents that resulted in one serious and one minor injury to persons on the ground. While this occurrence category officially excludes the take-off or landing phase it was nevertheless used for the non-fatal accident that occurred in the towing phase (take-off phase) of a model aircraft that resulted in the serious injury.

In conclusion, the use of the occurrence categories for different types of occurrences with UAS of different sizes should be studied and clarified, as there appears to be some hesitancy about assigning 'MAC: Airprox/ACAS alert/loss of separation/(near) mid-air collisions' to occurrences with very small UAS.

26 Aviation Occurrence Categories, Definitions and Usage, ICAO Common Taxonomy Team, May 2021.

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Chapter 7
**Aerodromes and
groundhandling**





This chapter covers aerodrome and groundhandling operations in the EASA Member States. The data presented is based on accidents and serious incidents collected by the Agency under Regulation (EU) 996/2010 on the investigation and prevention of accidents and incidents in civil aviation and Regulation (EU) 376/2014 on the reporting, analysis and follow-up of occurrences in civil aviation, and through the active search of those events from other official sources.

The accidents and serious incidents considered in this chapter are the following:

- Runway excursions and runway incursions related to aerodrome operations and the aerodrome infrastructure;
- Occurrences happening on the apron and on the taxiway, including occurrences related to groundhandling operations;
- Occurrences with the aircraft being airborne, in the case where the aerodrome operations, infrastructure or groundhandling operations may have been contributors to these occurrences.

Accidents relating to occupational health and safety, with no element of aviation safety, are not included.

The accidents and serious incidents considered in this chapter are the ones which occurred at aerodromes that are in the EASA Member States. This means that the data includes not only aerodromes that fall under the scope of the EASA Basic Regulation due to the infrastructure provided at the aerodrome or due to the number of passengers and number of movements, but also includes aerodromes that fall under the scope of national regulations. Moreover, it is important to keep in mind that the occurrences shown here are those where the analysis concluded that the aerodrome design, aerodrome or groundhandling operations contributed to the event. Conversely, events of runway excursions and incursions where the aircraft and its operation caused the occurrence would be found in the chapters covering the respective products (e.g. Chapter 2 – Aeroplanes).

The key statistics and occurrence categories for the aerodromes and groundhandling domain are presented in this document. Advanced statistics are then provided in a domain-specific appendix, giving an overview of the safety risks at the European level. The advanced statistics are solely derived from occurrence data taken from the ECR.

The list of fatal accidents associated with the scope of this domain is provided in Appendix 1 of this document.

The advanced statistics associated with the scope of this chapter are provided in Appendix 7 of this document.



Key statistics

The key statistics for the domain of aerodromes and groundhandling are shown in Table 7.1 and Table 7.2. The number of accidents and serious incidents in 2023 was lower than the average of the preceding decade. In 2023, there were no fatal accidents related to aerodrome and groundhandling in EASA Member States. However, one accident causing a serious injury still occurred in 2023, but this is well below the average of the preceding decade.

	Total number of occurrences per occurrence class over 2013-2022	Number of occurrences per occurrence class in 2023	Comparison 2023 vs yearly average of 2013-2022 per occurrence class
Fatal accidents	0	0	=
Non-fatal accidents	207	12	↓
Serious incidents	100	5	↓

► [Table 7.1 Key statistics for aerodromes and groundhandling](#)

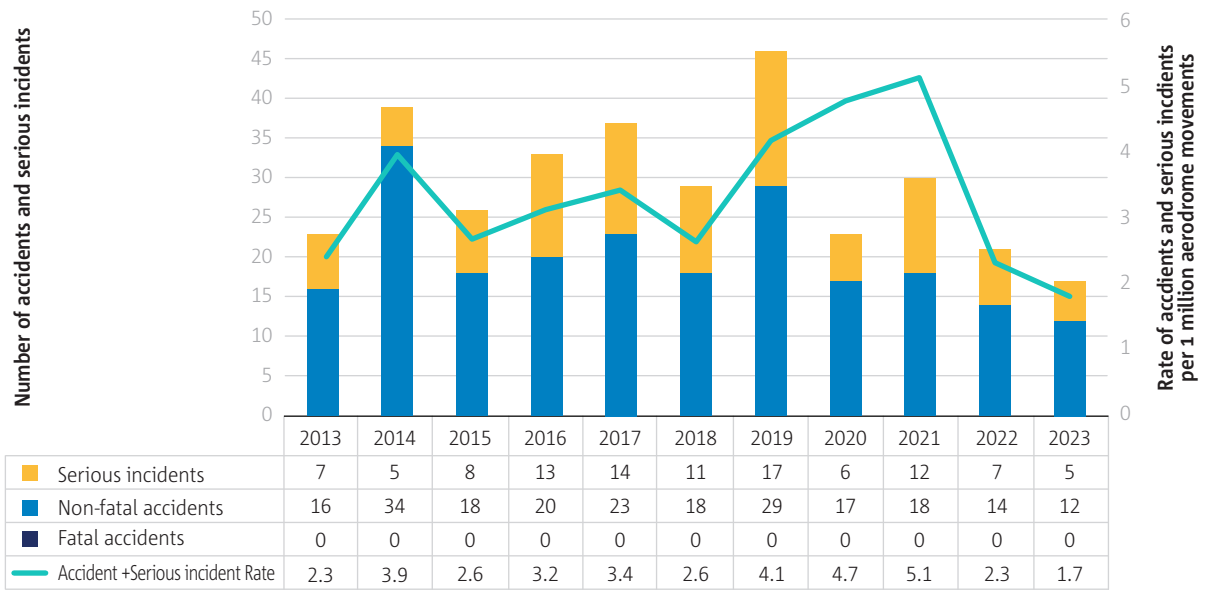
	Number of fatalities	Number of serious injuries
Total number over 2013-2022	0	23
Yearly max number over 2013-2022	0	5
Yearly min number over 2013-2022	0	0
Total number in 2023	0	1

► [Table 7.2 Fatalities and serious injuries for aerodromes and groundhandling](#)



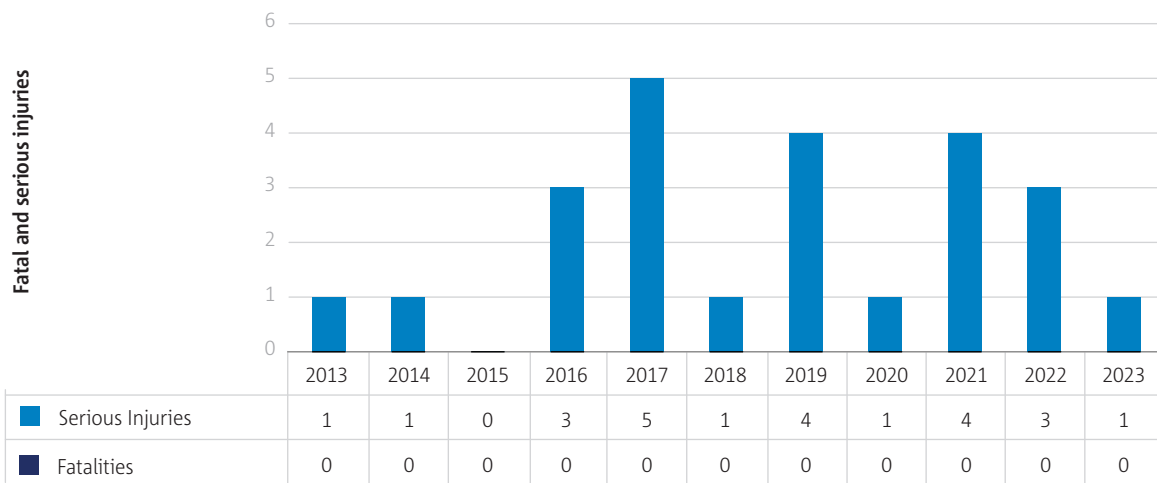


Figure 7.1 shows the number of accidents and serious incidents per year, as well as the rate of these occurrences per 1 million aerodrome flight movements in the EASA Member States. Whereas the aerodrome traffic in EASA Member States significantly recovered in 2023 after two years of low activity, the number of accidents and serious incidents for that year is one of the lowest observed over the time scope analysed. After three years of increase with a peak in 2021, the rate of such occurrences has decreased in 2023 down to 1.7 accidents and serious incidents per million aerodrome flight movements. While this trend confirms last year's downward trend, EASA will continue to monitor the rate over the next few years to determine if this is a sustainable trend.



► **Figure 7.1** Numbers of fatal accidents, non-fatal accidents and serious incidents involving aerodromes and groundhandling, and rates per million aerodrome movements

The number of fatalities and serious injuries per year is shown in Figure 7.2. There was only one case of a serious injury in 2023. The accident causing the serious injury was related to a student pilot under instruction being struck by the rotating propeller of a small aeroplane (Dimond) in the parking lot area of an aeroclub.



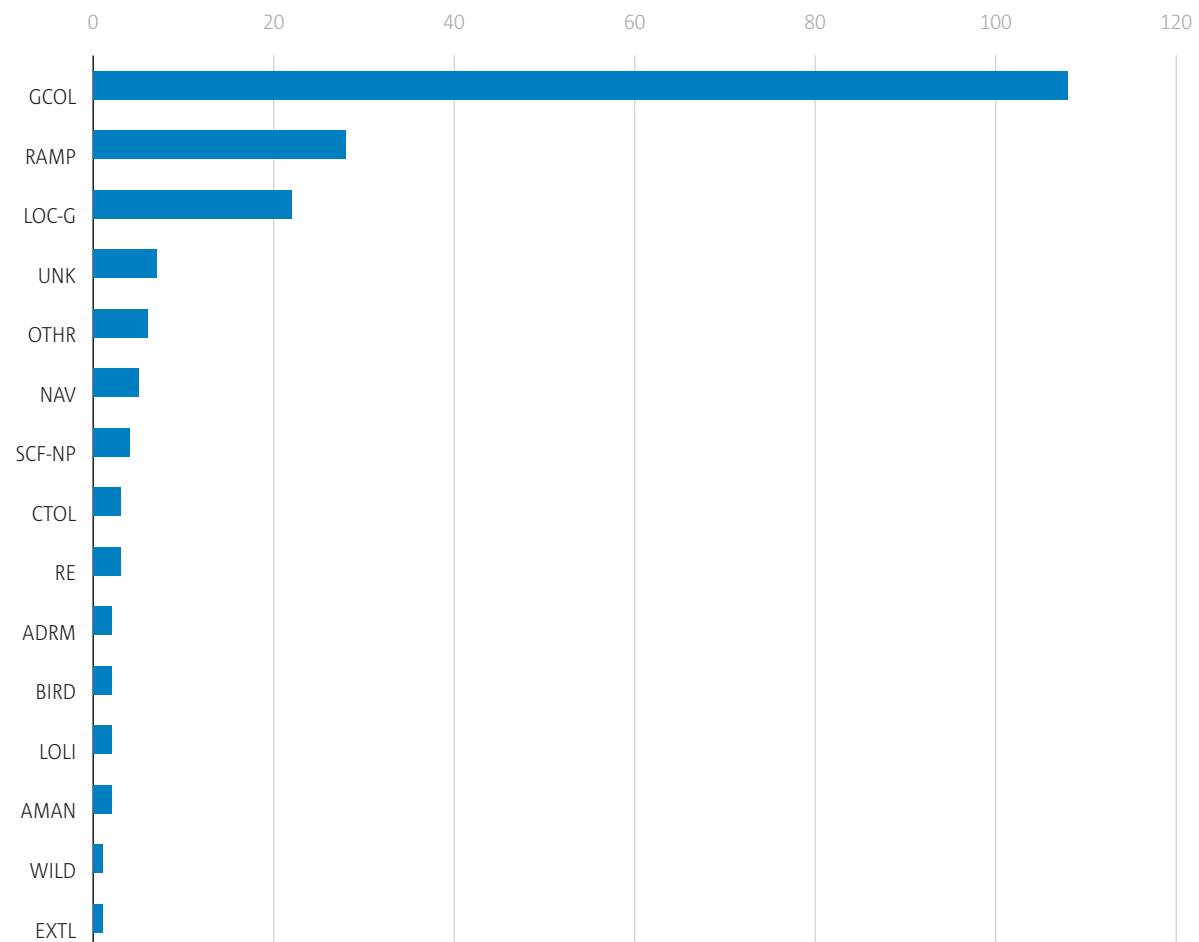
► **Figure 7.2** Fatal and serious injuries per year involving aerodromes and groundhandling.



Occurrence categories

Figure 7.3 outlines the occurrence categories assigned to the serious incidents and accidents in the past five years. Occurrences are categorised using the ICAO Accident Incident Data Reporting (ADREP) taxonomy for occurrence categories, developed for supporting common coding of the main elements of an occurrence that should be investigated, recorded, and analysed. Categories are of different natures, e.g., operational such as low altitude operations (LALT), environmental such as turbulence encounter (TURB), technical such as system/component failure or malfunction [non-powerplant] (SCF-NP), consequential such as fire/smoke resulting from impact (F-POST), etc. Multiple categories may therefore be assigned to a single occurrence. For example, if an engine failure occurred, and loss of control followed, the occurrence would be coded in both categories, i.e., SCF-PP: powerplant failure or malfunction and LOC-I: loss of control in flight. The sum of the number of occurrences per category may therefore be greater than the total number of occurrences that were realised in the period.

For the period 2019-2023, ground collisions are by far the most frequent type of accident or serious incident, followed by ramp/groundhandling occurrences. A more detailed categorisation of the type of event is depicted in Appendix 7 of this document.



GCOL: Ground Collision; RAMP: Ground Handling; LOC-G: Loss of control – ground; UNK: Unknown or undetermined; OTHR: Other; NAV: Navigation error; SCF-NP: System/component failure or malfunction [non-powerplant] RE: Runway excursion; CTOL: Collision with obstacle(s) during take-off and landing; RE: Runway excursion - vehicle, aircraft or person; ADRM: Aerodrome; BIRD: Birdstrike; LOLI: Loss of lifting conditions en-route; AMAN: Abrupt manoeuvre; WILD: Collision Wildlife; EXTL: External load related occurrences.

► **Figure 7.3** Numbers of occurrences by occurrence category involving aerodromes and groundhandling



Number of certified aerodromes in the EASA Member States

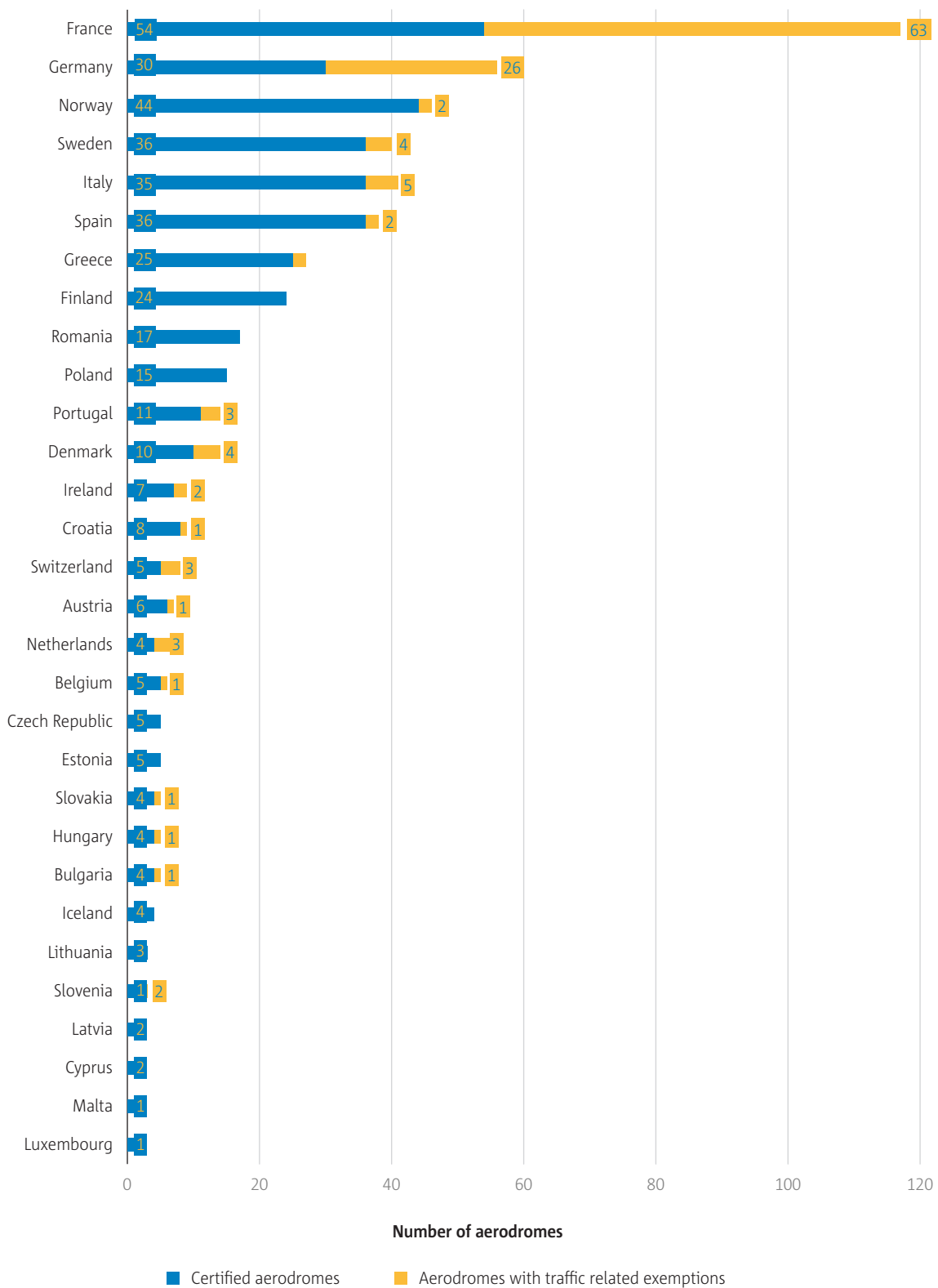
Regulation (EU) 2018/1139 (the EASA Basic Regulation), in its Article 2(1)(e) establishes which aerodromes fall under the scope of the European aviation safety rules and must therefore be certified for the safety of their design and operations. Regulation (EU) 139/2014, the Aerodromes Regulation (EASA ADR), lays down the detailed requirements for the certification and operation of those aerodromes located in the EASA Member States.

As of 31 December 2023, 536 aerodromes are within the scope of the EASA Basic Regulation, 409 of which are certified and 127 are granted an exemption in accordance with Article 2(7) of the EASA Basic Regulation, due to low traffic volumes. At the end of the year 2023 and for the first time since the full applicability to the aerodrome safety rules in the year 2018, no aerodrome remained uncertified, when it should have been certified. Figure 7.4 shows the number of aerodromes per EASA Member State as either certified in accordance with the European aviation safety rules or exempted due to low traffic volumes²⁷.

It should be noted that although groundhandling services are also in the scope of the EASA Basic Regulation, the delegated acts laying down the detailed rules for the operation and oversight of groundhandling services are yet to be adopted. These acts are being developed within EASA rulemaking task RMT.0728 and the related opinion 01/2024 was published in January 2024 and the ground handling Regulation is expected to be published in early 2025.



27 A detailed list of aerodromes falling under EU rules can be accessed via the EASA website under the following link: <https://www.easa.europa.eu/en/datasets/aerodromes-falling-scope-regulation-eu-20181139>



► **Figure 7.4** Aerodromes by EASA Member State in the scope of the EASA Basic Regulation to which the Aerodrome rules in Regulation (EU) 139/2014 (EASA ADR) are applicable.

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Chapter 8
**Air Traffic Management
or Air Navigation Services**
(ATM/ANS)





This chapter covers accidents and serious incidents related to the provision of Air Traffic Management or Air Navigation Services (ATM/ANS) in EASA Member States. The data are based on the accidents and serious incidents collected by EASA under ICAO Annex 13 and Regulation (EU) 996/2010 on accident and serious incident investigation and Regulation (EU) 376/2014 on occurrence reporting, analysis and follow-up.

Accidents and serious incidents in this chapter involve at least one Commercial air transport (CAT) aircraft, either fixed-wing aeroplanes with a maximum take-off mass of at least 2250 kg, or small (CS-27) or large (CS-29) helicopters, which occurred in an EASA Member State.

Accidents and serious incidents reviewed in this chapter comprise occurrences where the provision of services by the ATM/ANS was, directly or indirectly, a contributing factor in the occurrence or played a role in aggravating the occurrence encountered by the aircraft.

This chapter introduces the key statistics and occurrence categories on ATM/ANS occurrences. Advanced statistics are then provided in a domain-specific appendix, giving an overview of the safety risks. The advanced statistics are solely derived from occurrence data from the European Central Repository (ECR).

The list of fatal accidents associated with the scope of this chapter is provided in Appendix 1 of this document.

The advanced statistics associated with ATM/ANS are provided in Appendix 8 of this report.





Key statistics

The key statistics for this domain are in Table 8.1. They include a comparison of the number of fatal and non-fatal accidents and serious incidents for the last year and the previous 10-year period.

No fatal accidents in 2023 and the preceding period 2013-2022, where ATM/ANS was a contributing factor (ATM involved or ATM indirectly involved) were recorded. As in 2020 and 2021 also no non-fatal accidents were reported in the year 2023. In the last decade, six non-fatal accidents with ATM contribution were recorded.

	Total number of occurrences per occurrence class over 2013-2022	Number of occurrences per occurrence class in 2023	Comparison 2023 vs yearly average of 2013-2022 per occurrence class
Fatal accidents	0	0	=
Non-fatal accidents	6	0	↓
Serious incidents	108	4	↓

► **Table 8.1** Key statistics for ATM/ANS contribution accidents and serious incidents

Table 8.2 includes a comparison of the fatalities and serious injuries sustained in those accidents during the same timeframe.

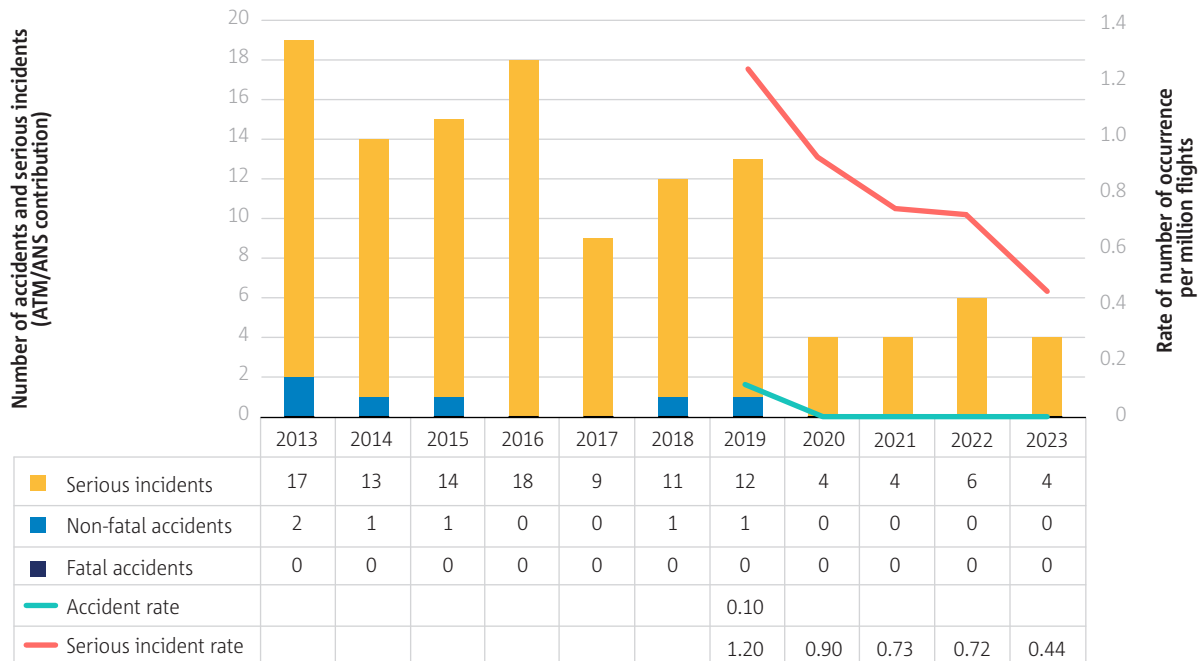
As shown in Table 8.2, no fatalities with ATM/ANS contributions were recorded in 2023. Only three serious injuries with ATM contribution (directly or indirectly involved) were recorded during the last decade.

	Number of fatalities	Number of serious injuries
Total number over 2013-2022	0	3
Yearly max number over 2013-2022	0	2
Yearly min number over 2013-2022	0	0
Total number in 2023	0	0

► **Table 8.2** Number of fatalities and serious injuries involving ATM/ANS contribution

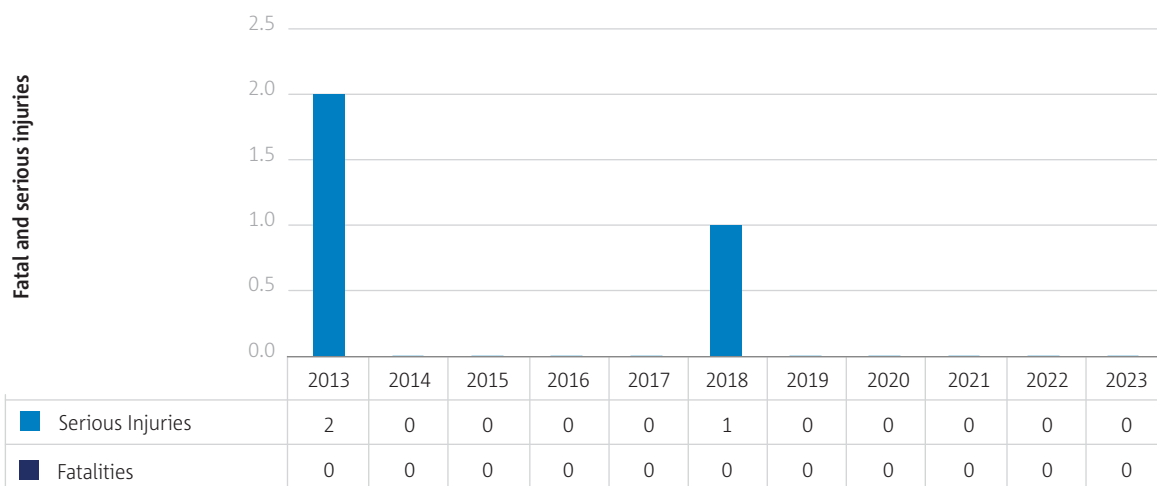


Figure 8.1 shows the number of accidents and serious incidents for 2013-2023 and the number of accidents and serious incident rates per one million flights for 2019-2023. The reference data chosen for the rate calculation are traffic data (IFR flights) without UK, therefore only 2019-2023 are considered for the accident and incident rate calculation. In the past decade, no fatal accidents with ATM contributions were recorded. The rate of serious incidents with ATM/ANS contribution, as seen in Figure 8.1, decreased in 2020 compared to 2019 with a further decrease in 2021 and plateaued in 2022 on the same level before it decreased again in 2023. During the last four years, fewer serious incidents were recorded than in the years before (2013-2019). The accident rate declined since 2019 with no accidents with ATM direct or indirect involvement since 2019.



► **Figure 8.1** Number of accidents and serious incidents per year and serious incidents and accidents rate per one million flights

The number of fatalities and serious injuries per year are shown in Figure 8.2. In 2023, there were no occurrences with ATM/ANS contributions that resulted in fatalities. In 2018 there was one occurrence and in 2013 there were two occurrences where serious injuries were reported.



► **Figure 8.2** Fatalities and serious injuries per year involving ATM/ANS contribution

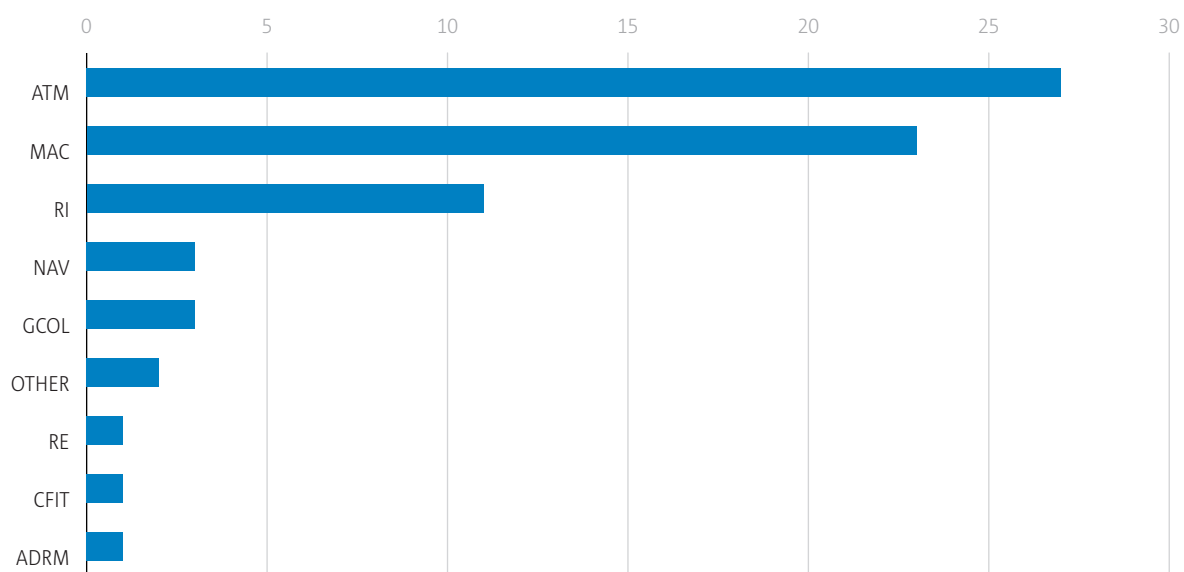


Occurrence categories

Figure 8.3 outlines the occurrence categories assigned to the serious incidents and accidents with ATM contribution in the past five years.

Occurrences are categorised using the ICAO ADREP taxonomy for occurrence categories, developed for supporting common coding of the main elements of an occurrence that should be investigated, recorded, and analysed. Categories are of different natures, e.g., operational such as low altitude operations (LALT), environmental such as turbulence encounter (TURB), technical such as system/component failure or malfunction [non-powerplant] (SCF-NP), consequential such as fire/smoke resulting from impact (F-POST), etc. Multiple categories may therefore be assigned to a single occurrence. For example, if an engine failure occurred, and loss of control followed, the occurrence would be coded in both categories, i.e., SCF-PP: powerplant failure or malfunction and LOC-I: loss of control in flight.

For the period 2019-2023, there were 31 serious incidents and accidents with ATM/ANS contributions. The occurrence category ATM: ATM/CNS was assigned to 27 serious incidents and accidents. The occurrence categories MAC: Airprox/ACAS alert/loss of separation/(near) mid-air collisions was assigned to 23 serious incidents and accidents and RI: runway incursion – vehicle, aircraft or person was assigned to 11 serious incidents and accidents. The occurrence categories NAV: Navigation error and GCOL: Ground collision were assigned to three occurrences each. The occurrence categories, RE: Runway Excursion, CFIT: Controlled flight into or toward terrain and ADRM: Aerodrome were assigned to one occurrence each. The occurrence category OTHER was compiled of two occurrences that had also other occurrence categories like runway incursion listed.



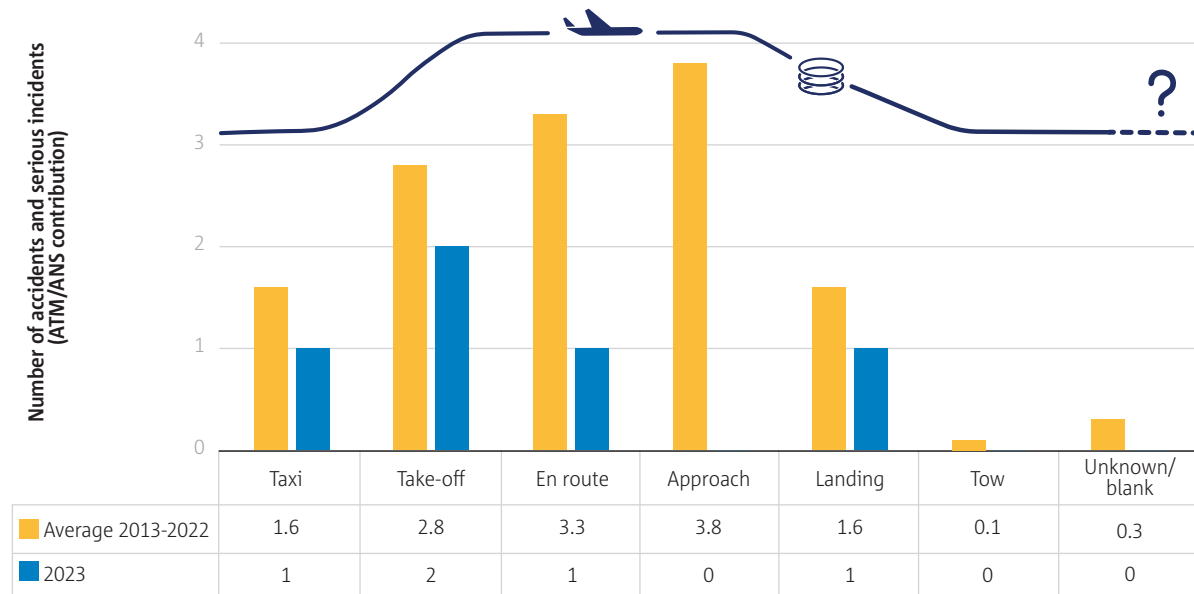
ATM: ATM/CNS; MAC: Airprox/ACAS alert/loss of separation/(near) mid-air collisions; RI: Runway incursion – vehicle, aircraft or person; ADRM: Aerodrome; NAV: Navigation error; CFIT: Controlled flight into or toward terrain; RE: Runway excursion; GCOL: Ground Collision

► **Figure 8.3** Numbers of occurrences by occurrence categories involving ATM/ANS contribution



Phase of flight

The majority of accidents and serious incidents in 2023 with ATM/ANS contribution took place during the take-off phase, as shown in Figure 8.4. While for 2013-2022, looking at the average of occurrences, approach was the most affected flight phase, no occurrences were recorded in 2023 for this flight phase. Both occurrences in 2023 in the take-off phase referred to the occurrence category runway incursion.



► **Figure 8.4** Accidents and serious incidents by phase of flight involving ATM/ANS contribution



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Chapter 9

**Occurrence reporting
and risk classification**





This chapter intends to measure the volume of occurrence reports collected in the European Central Repository (ECR) under Regulation (EU) 376/2014 over the period 2016-2023 and to put the changing levels of occurrence reporting in perspective with changes to the level of aviation activity in Europe. It also intends to measure the volume of occurrence records that were risk-classified in accordance with the European Risk Classification Scheme (ERCS) over the year 2023.

9.1 Overall levels of occurrence reporting and levels of traffic

Occurrence reporting rates are important to monitor as they are an indicator of the changes to safety culture in Europe. A large number of reports can be regarded as a sign of a good safety culture. In this respect, whereas in the rest of the annual safety review, a higher number of accidents and serious incidents may be viewed in as negative; in this section an increase in overall occurrence reporting, which includes incidents, can be viewed as a positive development.

This section had initially been developed for the 2021 annual safety review by the safety performance indicators working group (SPI WG), under the Network of aviation safety Analysts (NoA), which is established under Article 14 of Regulation (EU) 376/2014.

For all figures in this section, the number of reports should be interpreted as the number of reports from distinct reporting entities. For a single occurrence record, if more than one report is reported by the same reporting entity (e.g., in case of follow-up or final reports), the record is counted as one report. For reports from two different reporting entities about a single occurrence, the record is counted as two reports, etc. The counting of distinct reports was performed using a software platform different from last year, therefore the numbers were recomputed in a consistent manner from 2016 onwards, and they may slightly vary compared with last years' edition.

The traffic data used in this section were provided by Eurocontrol. The extent of the data scope is 30 out of the 31 EASA Member States, since Eurocontrol does not collect data for Iceland. The IFR traffic data used in this report includes both EU and Non-EU operators.

It should be highlighted that the figures shown in this section are highly dependent on the quality and completeness of the coding of the occurrences collected in the ECR, in particular on the attribute 'Reporting Entity'.

To reach more accurate figures from which more solid interpretations can be built, it is important that reporting organisations and competent authorities continue their effort to improve the coding quality of occurrence records submitted under Regulation (EU) 376/2014.

The hereafter paragraphs give a high-level quantitative analysis of the total number of reports collected in the ECR over the period 2016-2023, in parallel with the evolution of the level of traffic in Europe. The data were extracted from the ECR on April 15, 2024.



Annual evolution over the period 2016-2023

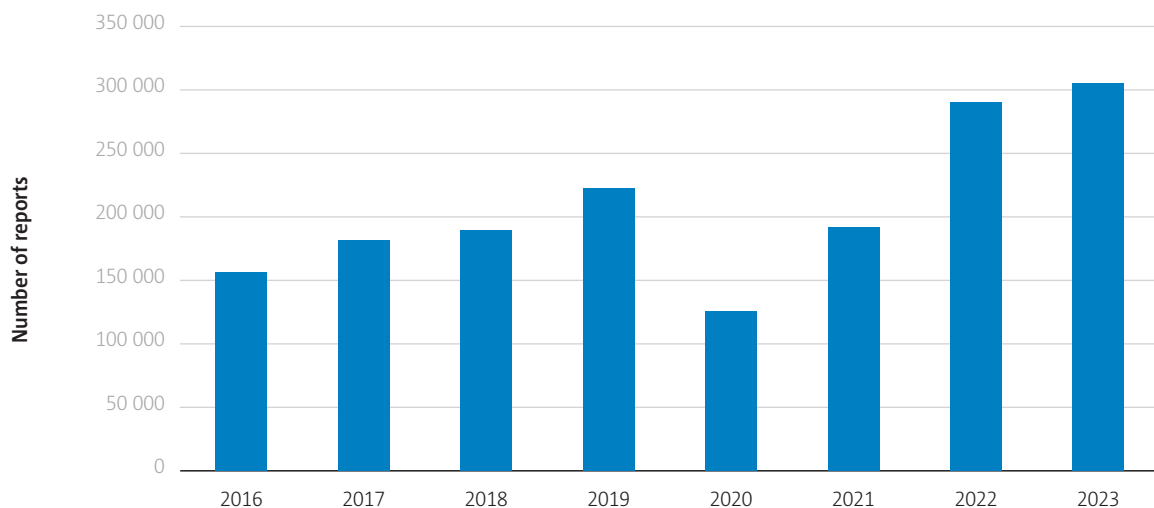
The total number of reports collected in the ECR over the period 2016-2023 is shown in Figure 9.1, and the number of cumulated airport movements in Europe for the same time period is illustrated in Figure 9.2. Reporting rates were then calculated by normalising the volumes of reports with the airport movements, as shown in Figure 9.3.

After the entry into force of Regulation (EU) 376/2014 at the end of 2015, the number of reports in the ECR steadily increased from 2016 to 2019, with the figure for 2019 being 43% higher than for 2016. By contrast, the level of traffic in Europe increased at a slower pace, with +8% of airport movements in 2019 compared to 2016. The overall reporting rate, therefore, increased over this period from 14.9 to 19.6 reports per 1 000 airport movements.

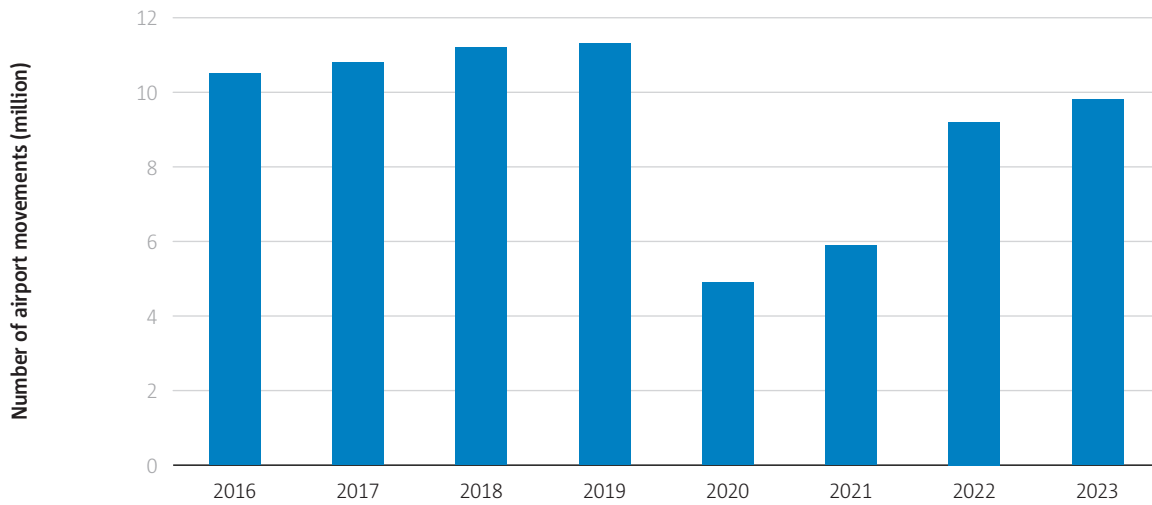
In 2020, the COVID-19 pandemic caused a drastic decrease in the level of traffic, which then recovered only partially in 2021. The total number of reports also dropped substantially in 2020, but this drop was less pronounced than the drop in traffic. Also, in 2021, the number of reports increased rapidly compared to 2020, reaching back to the volumes reported in 2018. Consequently, the overall reporting rate continued to increase significantly over 2020 and 2021, reaching 33.9 reports per 1 000 airport movements, which is doubled compared to 2016.

In 2022, the reporting rate remained higher than 30 reports per 1 000 airport movements, but was slightly down compared to the previous year, with 31.4 reports per 1 000 airport movements.

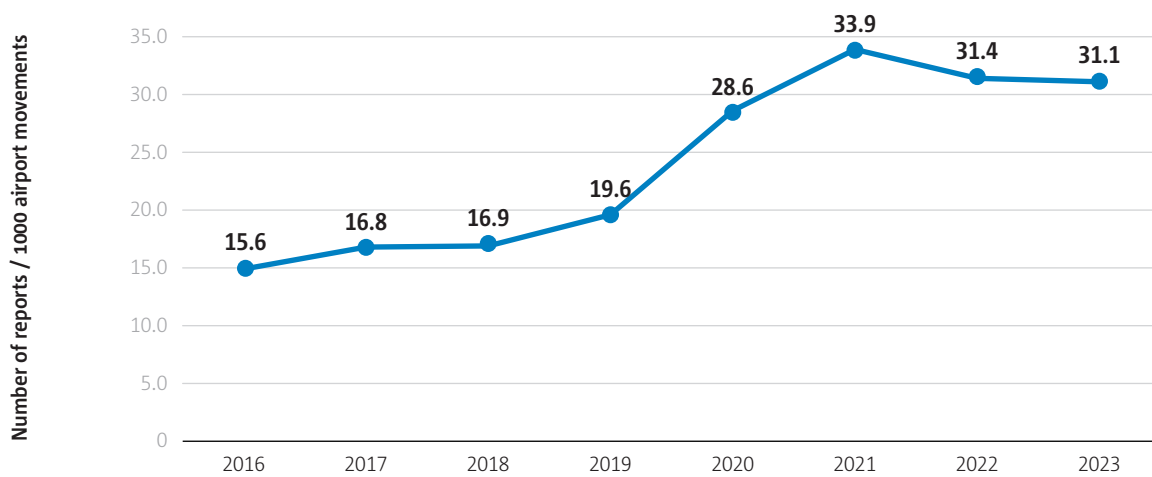
The volumes of reports in 2023 were the highest observed since 2016, and 37% higher than in 2019. In terms of activity, 2023 saw the traffic continuing its recovery to reach 87% of the level of 2019. As a result, the reporting rate in 2023 remained almost at the highest level observed in 2021 and very near to the rate observed in 2022, with 31.1 reports per 1 000 airport movements.



► **Figure 9.1** Number of reports collected in the ECR per year



► **Figure 9.2** Number of airport movements per year, for all EASA Member States (except Iceland)



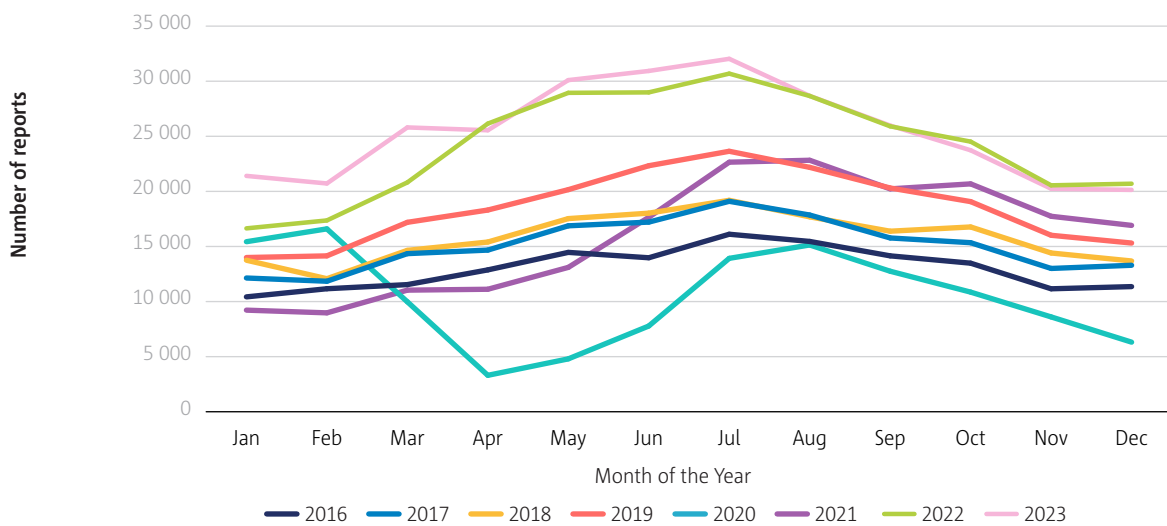
► **Figure 9.3** Reporting rate (number of reports/1 000 airport movements) per year



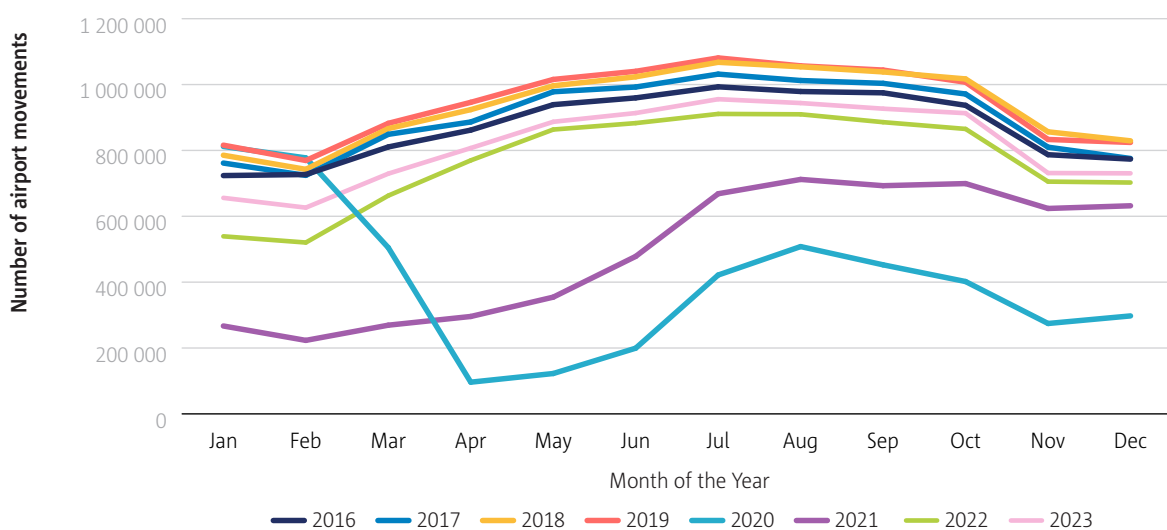
Monthly variation for each year

Figure 9.4 shows the number of reports by month for each year over the period 2016-2023.

The steady increase in reporting levels is clearly visible from 2016 to 2019. 2020 shows a very different profile, with a substantial drop in the number of reports from March 2020, which coincides with the even more pronounced drop in traffic, as shown in Figure 9.5. In 2021, whereas the first months of the year showed a lower number of reports compared to the preceding years, the number of reports progressively caught up with the levels of 2019 and were even alike 2019 for the second semester of the year. This trend for reports in 2021 was not observed in the number of airport movements which stayed lower than the pre-pandemic levels despite a visible increase over the year. In 2022 and 2023, the evolution of airport traffic went back to their more usual seasonal profile, which was still slightly below the pre-pandemic years, including below the level of traffic in 2016. The number of reports was the highest observed in 2023, almost all along the year, with a particular increase observed during the first quarter of the year.



► **Figure 9.4** Number of reports collected in the ECR per month per year



► **Figure 9.5** Number of airport movements per month per year, for all EASA Member States (except Iceland)



9.2 Volumes of reporting for the main types of organisations

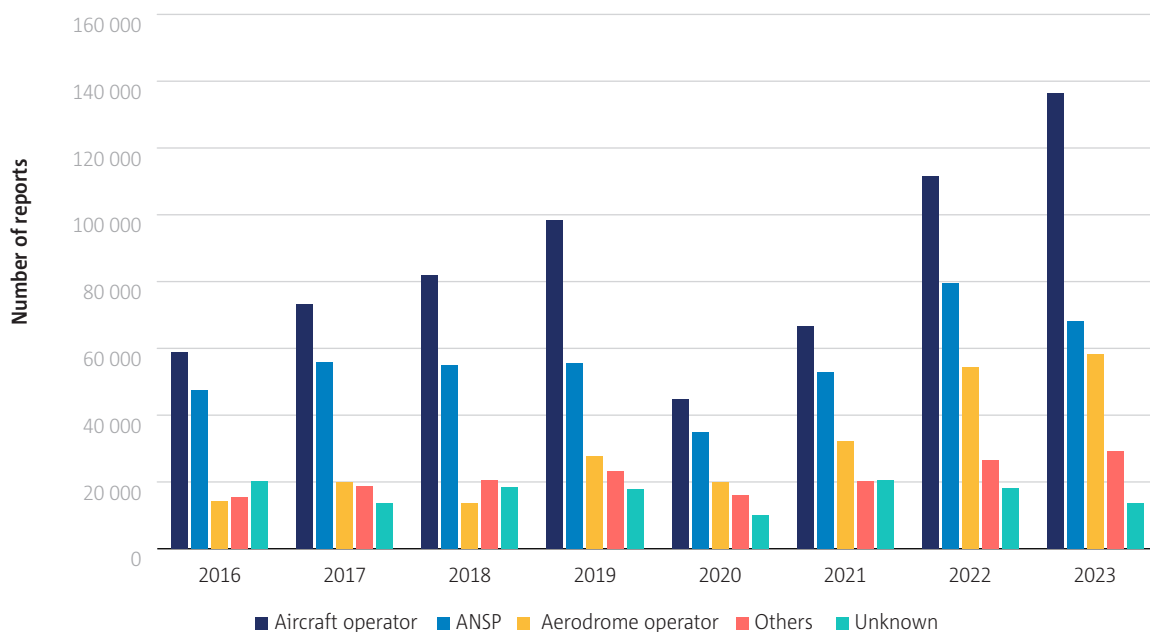
This section provides data split by the main type of reporting organisations, to better identify which organisations are the main contributors to safety occurrence reporting and evaluate how their relative contributions have evolved over the period 2016-2023.

Comparison of the volume of reporting

In Figure 9.6, the total number of reports was split into five main categories of reporting organisations, using the ECR attribute 'Reporting Entity'. These five categories are as follows:

- Aircraft operators;
- Air navigation service providers (ANSPs);
- Aerodrome operators;
- Other types of reporting entities, such as design organisations, maintenance organisations, ground handling organisations, production organisations, individuals;
- Unknown: the reports for which the 'Reporting Entity' value was not completed.

For the three main types of organisations, following a progressive increase from 2016 to 2019, and lower numbers during 2020 and 2021, the number of reports in 2022 was the highest observed since 2016. In 2023 however, while the total number of reports continued to increase, the number of reports from ANSPs decreased for the first time. In comparison to the last pre-pandemic year 2019, the number of reports in 2023 from aircraft operators is 39% higher, also 23% higher for ANSPs, and doubled (109% higher) for aerodrome operators.



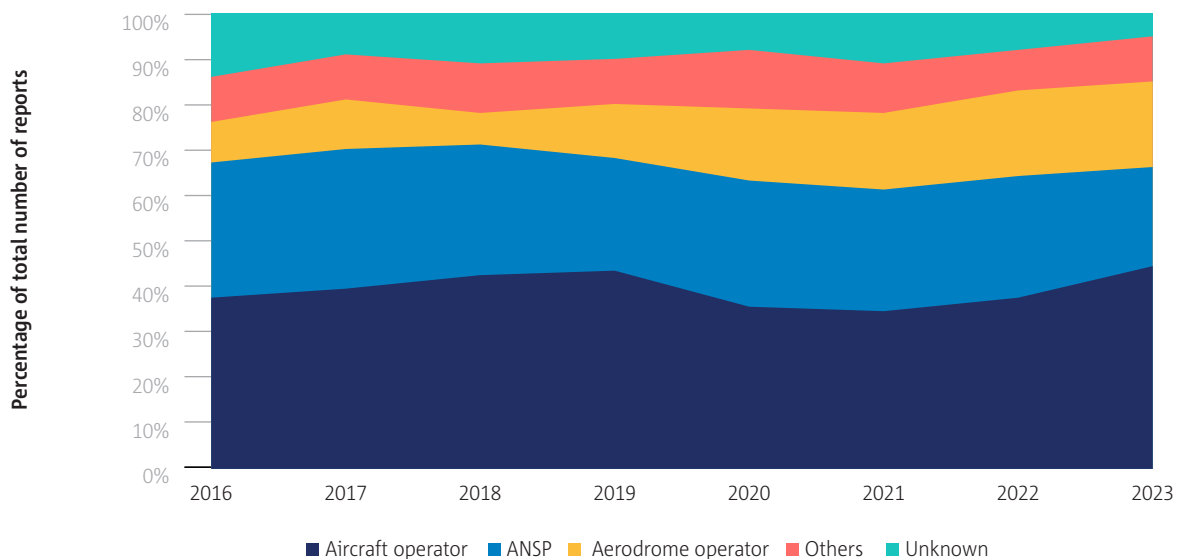
► **Figure 9.6** Number of reports collected in the ECR per type of reporting organisation



Figure 9.7 brings an additional perspective on the trend in occurrence reporting, by showing the relative proportion of reports for the five categories defined in Figure 9.6.

The proportion of reports from aircraft operators increased from 38% to 45% of all reports over the period 2016-2023, with an exceptional drop to 35% in 2020 and 2021. For the ANSPs, the proportion of reports slightly decreased since 2016 to stabilise around 28% of the total reports over 2020-2022, dropping to 22% in 2023 though. The proportion of aerodrome reports had a continuous increase since 2016, starting from 9% of the total reports in 2016 to reach 19% of the overall reports over the last two years.

It is important to highlight that the accuracy of the figures and trends described here are affected by the proportion of reports for which the type of reporting entity is unknown. The number of reports in the ECR with no reporting entity value oscillated between 7% and 13% of the overall reports for each year between 2016 and 2021. Over the last two years, this proportion was reduced to 6% and 4% of the overall reports, which is encouraging, but still a limiting factor in the interpretability of the ECR data.



► **Figure 9.7** Proportion of reports (in % of the total number of reports) per type of reporting organisation

9.3 Overall levels of occurrence risk classification

Regulation (EU) 376/2014 on the reporting, analysis and follow-up of occurrences in civil aviation introduced the requirement for a common risk classification of occurrences at the national and EASA levels. As a result, the ERCS was developed to risk classify occurrences.

Within the risk classification scheme of the ERCS, the severity component is addressed by identifying the worst likely accident outcome that would have resulted if the occurrence had escalated into an accident, which considers both the most likely type of accident -called key risk area (KRA)- and the potential loss of life, considering, for example, the size of the aircraft involved. The likelihood component is then measured, by looking at how close the occurrence was to the worst likely accident outcome, based on a weighted barrier model. The resulting ERCS score is shown as a two-digit value where the first digit corresponds to the alphabetic value resulting from the calculation of the severity of the occurrence (severity score A to X) and the second digit represents the numerical value from the calculation of the corresponding score of the occurrence (0 to 9). Table 9.1 provides the ERCS matrix reflecting the different possible ERCS scores.



The ERCS is part of the legal framework of Regulation (EU) 376/2014, through a Commission Delegated Regulation published in 2020 and later a Commission Implementing Regulation, published in 2021. The application of the ERCS is mandatory as of January 1, 2023.

SEVERITY		CLASSIFICATION (ERCS Score)											
Potential Accident Outcome	Score												
Extreme catastrophic accident with the potential for significant number of fatalities (100+)	X	Pending Risk Assessment	X9	X8	X7	X6	X5	X4	X3	X2	X1	X0	
Significant accident with potential for fatalities and injuries (20-100)	S		S9	S8	S7	S6	S5	S4	S3	S2	S1	S0	
Major accident with limited amount of fatalities (2-19), life changing injuries or destruction of the aircraft	M		M9	M8	M7	M6	M5	M4	M3	M2	M1	M0	
An accident involving single individual fatality, life changing injury or substantial aircraft damage	I		I9	I8	I7	I6	I5	I4	I3	I2	I1	I0	
An accident involving minor and serious injury (not life changing) or minor aircraft damage	E		E9	E8	E7	E6	E5	E4	E3	E2	E1	E0	
No likelihood of an accident	A		<i>No Implication to Safety</i>										
Corresponding Barrier Score			9	8	7	6	5	4	3	2	1	0	
Barrier Weight Sum			17-18	15-16	13-14	11-12	9-10	7-8	5-6	3-4	1-2	0	
PROBABILITY OF THE POTENTIAL ACCIDENT OUTCOME													

► Table 9.1 ERCS matrix



The hereafter paragraphs give a high-level quantitative analysis of the ERCS completion for the occurrence records collected in the ECR for the year 2023. The data were extracted from the ECR on April 15, 2024.

For the purpose of this analysis, the values 'unsurvivable environment' and 'injuries or damage' of the KRA attribute were respectively consolidated into 'fire, smoke and pressurisation' and 'other injuries'. The values 'significant incident', 'major incident', 'occurrence with no flight intended', and 'observation' of the occurrence class attribute were consolidated into 'incident'.

Volumes of occurrence records risk classified in accordance with the ERCS

There were around 300 000 occurrence records collected in the ECR in 2023.

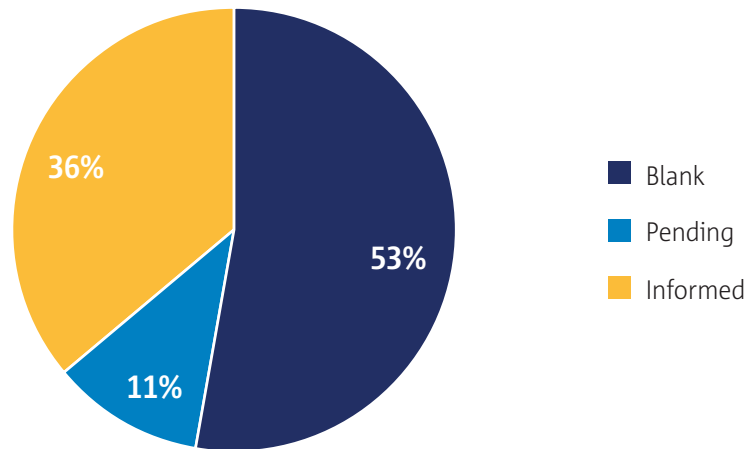
Figure 9.8 provides the percentage of occurrence records in the ECR that were risk classified in accordance with the ERCS.

Although the safety risk classification is a mandatory field in the occurrence reporting regulation, and there is an obligation on the competent authorities to risk classify the occurrences in accordance with the ERCS, slightly more than half of the occurrence records in the ECR do not provide any value for the ERCS score field.

Around one out of three occurrence records only are informed with an ERCS score, i.e., not blank/not pending. A similar order of magnitude is observed for accidents and serious incidents.

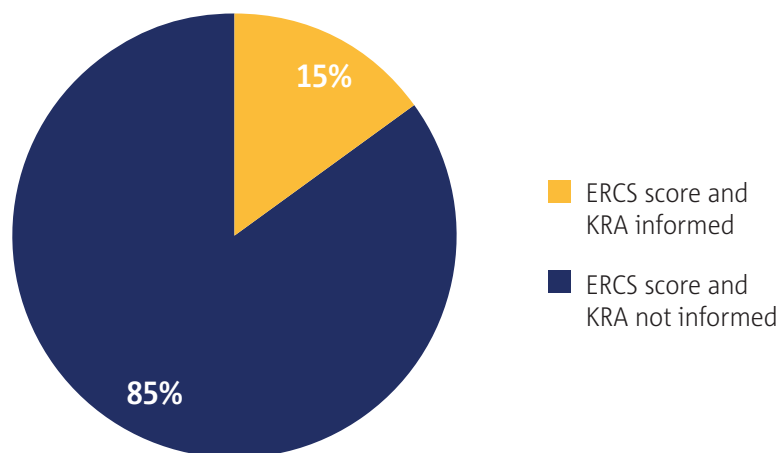
The risk classification is reported as 'pending' by competent authorities in one out of ten occurrence records. From the 31 900 occurrence records with a pending ERCS score, 31 631 occurrence records are the responsibility of one single Member State.





► **Figure 9.8** Number of records in 2023 (in % of the total number of records) per ERCS score status

Figure 9.9 shows the percentage of occurrence records where the KRA and the ERCS score are informed. Only about one in seven of the occurrence records are reported with both values, the KRA and the ERCS score. Unlike the ERCS score, the KRA is not a mandatory field in the occurrence reporting regulation. Therefore, there is no obligation on the competent authorities to complete this field. Unless conversion procedures are used, the application of the ERCS scheme to an occurrence record includes the determination of the KRA, so it is ultimately just a matter of documenting that KRA in the ECR alongside the ERCS score.



► **Figure 9.9** Number of records in 2023 (in % of the total number of records) with an ERCS score and KRA informed

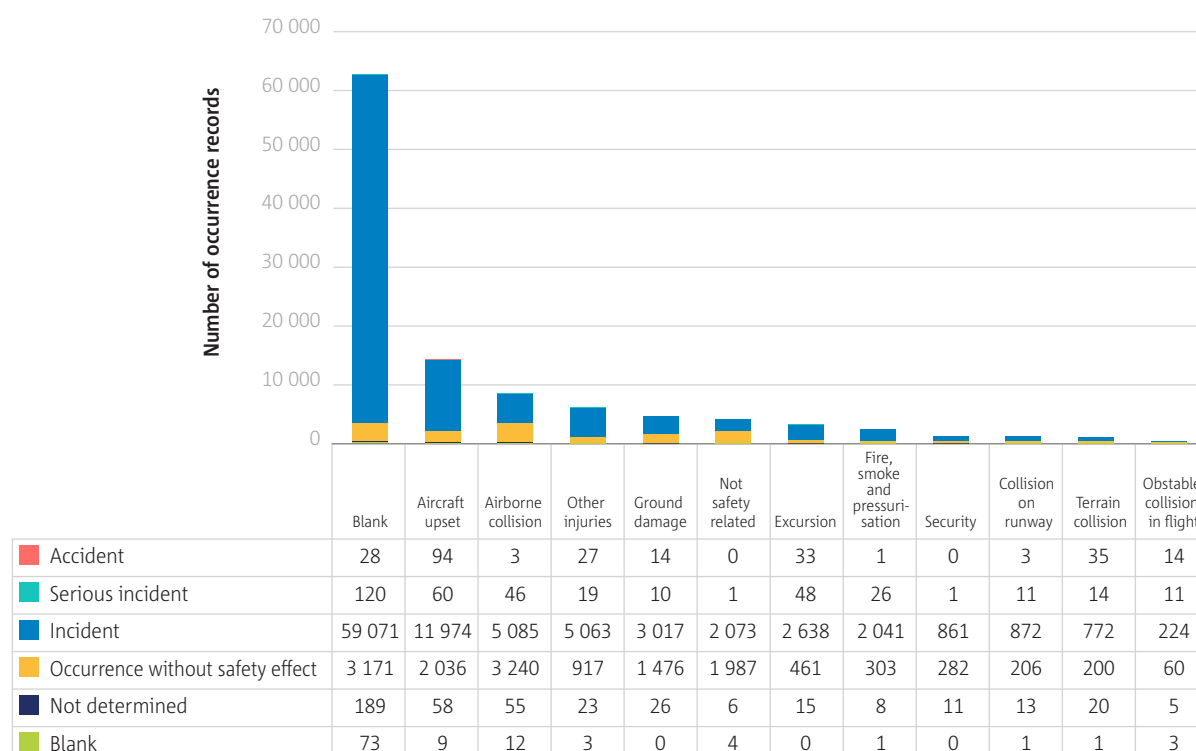
Volumes of occurrence records per KRA, and aggregated ERCS numerical equivalent scores per KRA, are meaningful measures when evaluating the safety performance of an aviation domain. In the context of a safety performance framework, the KRAs are the Tier 2 safety performance indicators (SPIs) for the domain. While it is acknowledged that the 2023 year is the first year of ERCS implementation and that it constitutes a challenging objective, it is important that competent authorities augment their effort to improve the data completeness for the risk classification over the coming years, including safety management essential fields such as the KRA one.



Volumes of occurrence records per key risk area (KRA)

For the occurrence records where an ERCS score is informed (i.e., not blank/not pending), representing only 36% of the total number of occurrence records collected in the ECR in 2023, Figure 9.10 shows the number of occurrence records per KRA and occurrence class.

As already outlined in Figure 9.9, a considerable number of occurrence records do not provide any value for the KRA (i.e., blank), while the occurrence has been risk classified, and the record informed with an ERCS score. The frequency of KRAs, as shown in the right-hand part of Figure 9.10, is based on a volume of occurrence records representing only 15% of the total number of occurrence records in the ECR in 2023.



► **Figure 9.10** Number of occurrence records in 2023 per KRA and occurrence class

Concentrating on accidents and serious incidents, the five most frequent KRAs would become aircraft upset (104), excursion (81), airborne collision (49), terrain collision (49), and other injuries (46).

The value ‘not safety related’ of the KRA attribute is not regulated. It is shown as an historical value in the European Co-ordination Centre for Accident and Incident Reporting Systems (ECCAIRS 2) reporting platform, and can actually no longer be selected for new occurrences. One exception aside, the use of that KRA value was adequately made in combination with the ERCS score A0 ‘no implication to safety’. Its use for occurrence classes other than ‘occurrence without safety effect’ is however questionable.

The ERCS numerical equivalent scores aggregated by KRA are to be found in the domain-specific appendices of the ASR. This section rather focuses on data correctness and completeness.

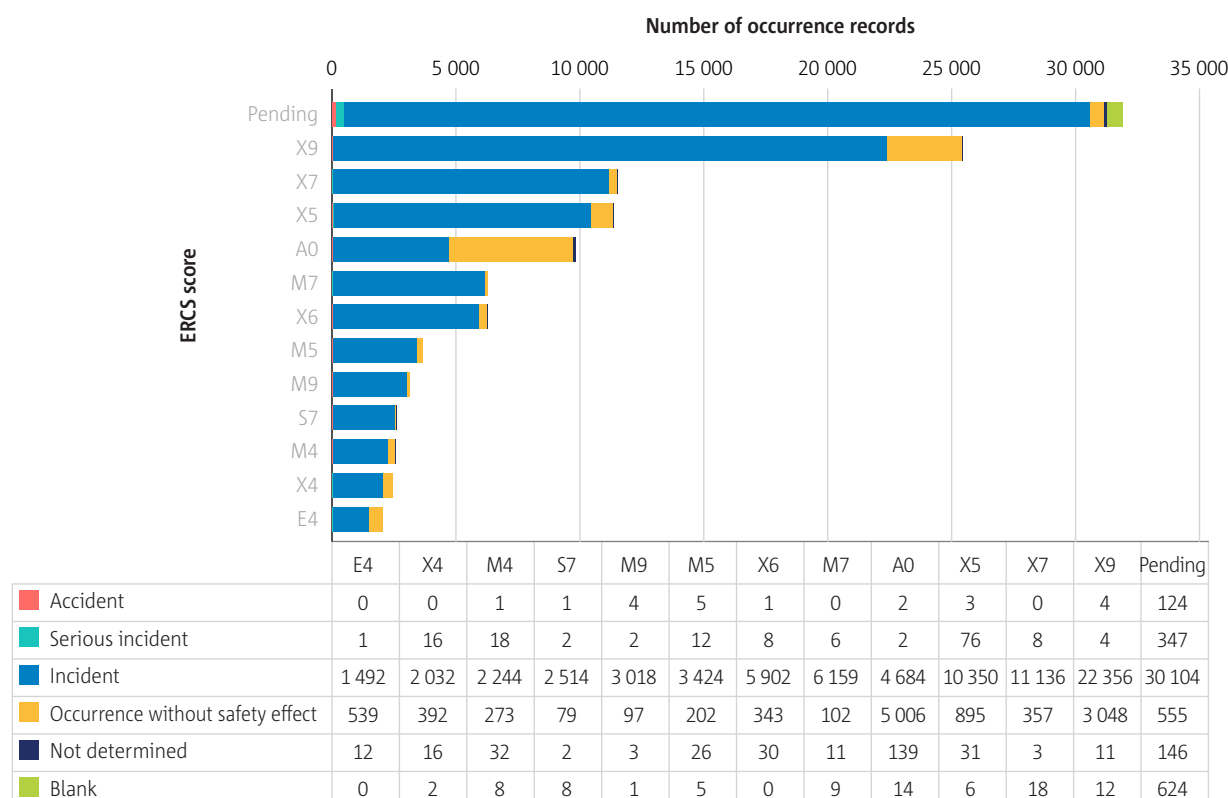
Amongst the approximately 46 500 occurrence records informed with an ERCS score and a KRA, 20 occurrence records provided more than one ERCS risk classification. Besides the documentation of the KRA, as mentioned in the previous subsection, it is important that competent authorities continue their effort to make sure that there is only one ERCS risk classification per occurrence record.



Volumes of occurrence records per ERCS score

For the occurrence records where an ERCS score value is documented in the ECR (i.e., not blank), representing slightly more than half of the total number of occurrence records collected in 2023, Figure 9.11 shows the number of occurrence records in 2023 per ERCS score and occurrence class. For readability purposes, the figure only outlines the ERCS scores whose frequency is greater than 2 000 occurrence records.

Within this subset of occurrence records, a considerable number of occurrence records provide the value ‘pending’ in the ERCS score field. The value ‘pending’ of the safety risk score attribute is not regulated. This value is given in the ECCAIRS 2 reporting platform as an opportunity to complete the mandatory field at an early stage, when information on the occurrence is very limited, thereby complying with the occurrence reporting regulation when transferring the occurrence records into the ECR. Figure 9.11 however, implies a use of the ‘pending’ value departing from this initial intent. This practice appears to be limited to one single Member State.



► **Figure 9.11** Number of occurrence records in 2023 per ERCS score and occurrence class

As mentioned earlier in the review, the use of the ERCS score A0 ‘no implication to safety’ for occurrence classes other than ‘occurrence without safety effect’ is questionable.

While there is no relationship drawn in the regulation between an occurrence class and the ERCS matrix colour scheme, accidents and serious incidents are not expected to be risk classified as low-risk occurrences (green). From the accidents and serious incidents collected in the ECR in 2023, and for which an ERCS score is informed (i.e., not blank/not pending), around two out of five occurrence records are risk classified as low-risk occurrences. Conversely, occurrence records with an occurrence class ‘occurrence without safety effect’ are not expected to be risk classified as elevated risk occurrences, e.g., 392 occurrences without safety effect with an X4 ERCS score. It is therefore important that competent authorities continue their effort to ensure consistency between occurrence classes and ERCS grades (high-, elevated-, low-risk occurrences).

Annual
Safety Review
2024

Chapter 10
Standardisation





Safety is the Agency's core business. Standardisation²⁸, aimed at achieving and maintaining a high and uniform level of safety within the EU, is one of its main tasks. EASA conducts standardisation activities to monitor the application of the requirements of the Basic Regulation²⁹ and its Implementing Rules, the occurrence reporting regulation³⁰ and its delegated and implementing rules, as well as their uniform implementation by the National Competent Authorities (NCAs), in order to ensure that:

- Passengers can fly safely to, from and within the EU;
- The EU industry benefits from a level playing field;
- Certificates issued by NCAs are mutually recognised; and
- The European system is recognised by international partners.

Standardisation activities include the continuous assessment of the NCAs' ability to discharge their safety oversight responsibilities (Continuous Monitoring Activities: CMA), as well as conducting standardisation inspections as necessary to directly verify the implementation of the European rules. Such inspections are prioritised, planned and performed using a risk-based approach, based on the Agency's assessment of well-defined indicators. Feedback from stakeholders has shown that NCAs generally see standardisation inspections as a valuable means to discuss implementation issues and share best practices, also facilitated by the participation of NCAs in inspections as team members or observers.

This chapter summarises the standardisation activities conducted by EASA in 2023. During 2023, the Agency performed standardisation inspections and CMA in the following domains:

1. Systemic Enablers for Safety Management (SYS),
2. Aerodromes (ADR),
3. Airworthiness (Production and Maintenance) (AIR),
4. Air Traffic Management/Air Navigation Services (ATM/ANS),
5. Air Operations (OPS),
6. Ramp inspections (RAMP),
7. Aircrew - Licensing (FCL),
8. Aircrew - Medical (MED),
9. Aircrew - Flight Simulation Training Devices (FSTD)
10. Unmanned Aircraft Systems (UAS).

28 Commission Implementing Regulation (EU) No 628/2013 of 28 June 2013.

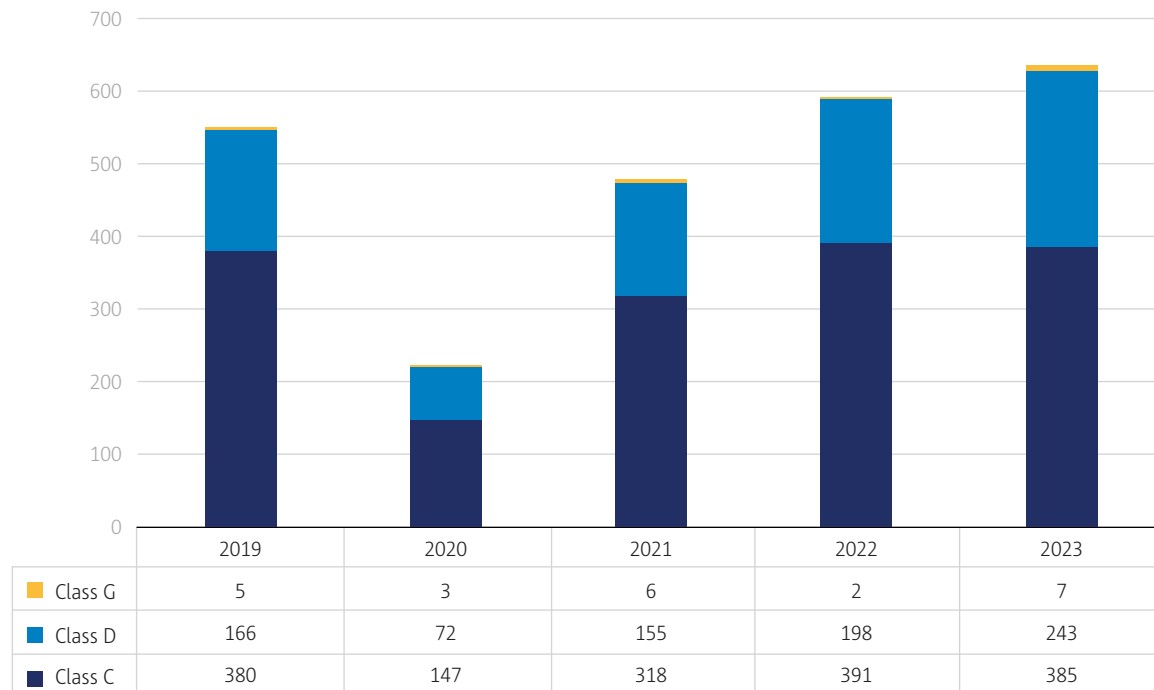
29 Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018.

30 Regulation (EU) No 376/2014 of the European Parliament and of the Council of 3 April 2014. Since 2018, the Agency has conducted standardisation of Regulation (EU) No 376/2014 and its delegated and implementing regulations on a specific mandate from the European Commission.



During the year the Agency continued the build-up of its standardisation activities in the UAS domain. In addition, the scope of the inspection programmes have continued to grow, with new elements such as U-space, the European Risk Classification Scheme (ERCS), as well as the extension of safety management systems (SMS) requirements to maintenance.

In this context, the total number of findings continues to grow, with 635 findings of non-compliance raised in 2023, including 7 immediate safety concerns (ISCs), see Figure 10.1:



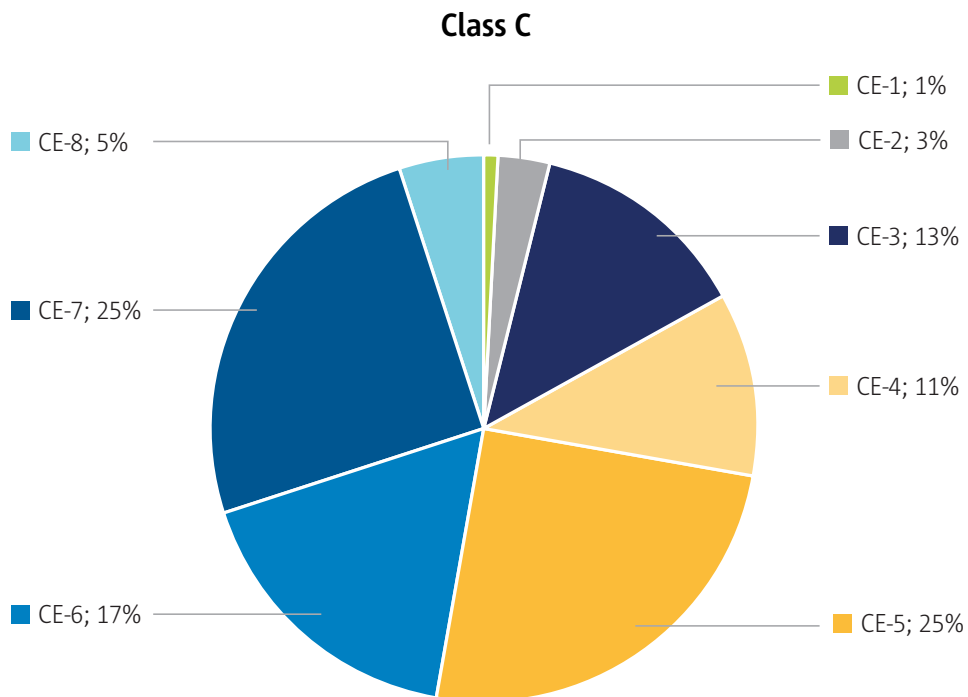
► **Figure 10.1** Number of findings by class and year

Class C findings (385 in 2023) raise mainly standardisation concerns, whereas class D findings (243 in 2023) also raise safety concerns, if not timely corrected, and class G findings (7 in 2023) represent immediate safety concerns (ISCs) requiring the concerned NCA to take immediate corrective actions.

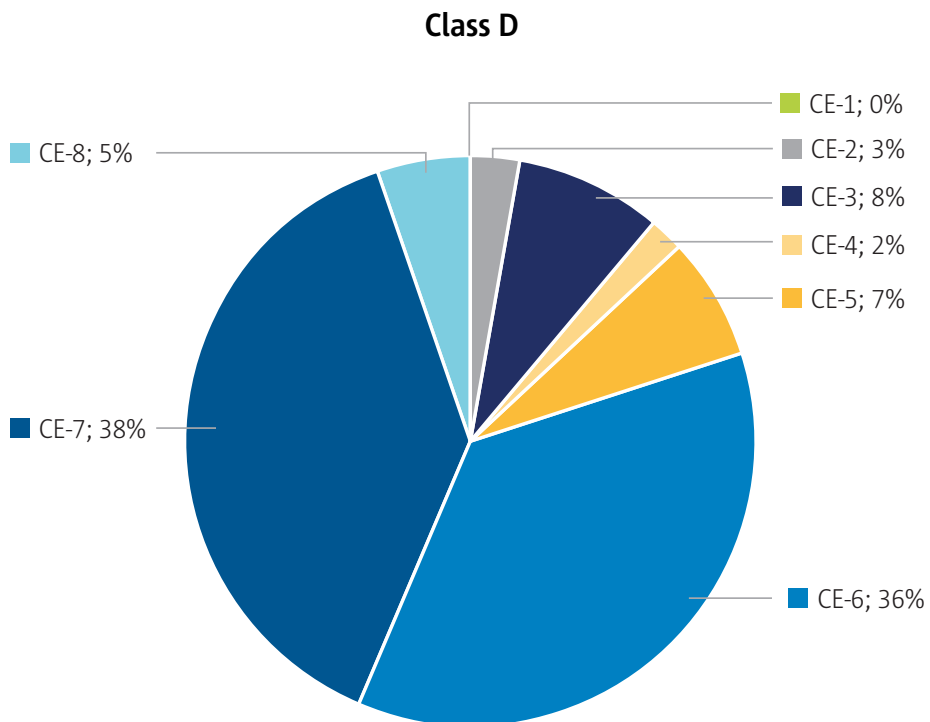
Comparing 2023 and 2022 figures shows that the number of findings in 2023 has increased. The biggest increase is observed in airworthiness with an insufficient implementation of novelties, such as SMS and risk-based oversight (RBO). Other contributing factors are: The ramp-up of unmanned aircraft systems (UAS standardisation inspections and a more data-driven approach with intelligence collected by the Enhanced Continuous Monitoring Approach (ECMA) leading to off-site findings. The aerodromes domain contributes to the increase in the number of findings despite a shift from comprehensive to focused inspections. The main contributor is the verification of the effectiveness of oversight by NCAs where non-compliances are often identified.

The percentage of findings raising safety concerns (class D & class G) increased by 5% to 39% in 2023 compared to 2022. This is due to an increase in aviation traffic and an increasingly complex aviation ecosystem, combined with an increasing shortage of staff and/or competencies in many NCAs.

In terms of the ratio of findings per inspection, the ratio increased from 6.9 in 2022 to 7.7 in 2023. This indicates a need to maintain regular onsite inspections with an upward trend over the last four years (6.3 in 2021 and 6.2 in 2020).



► **Figure 10.2** Distribution of Class C findings by Critical Element



► **Figure 10.3** Distribution of Class D findings by Critical Element



Figure 10.2 and Figure 10.3 illustrate the distribution of class C and D findings raised in 2023 according to the eight Critical Elements (CEs) of a State's Safety Oversight System defined by the International Civil Aviation Organisation (ICAO) in its Doc 9734 'Safety Oversight Manual'. The ICAO CEs are the main constituents of a safety oversight system. They encompass the whole spectrum of civil aviation oversight activities, and their effective implementation is an indication of a State's capability in providing safety oversight. The eight CEs are:

- CE-1** Primary aviation legislation;
- CE-2** Specific operating regulations;
- CE-3** State civil aviation system and safety oversight functions;
- CE-4** Technical personnel qualification and training;
- CE-5** Technical guidance, tools and the provision of safety-critical information;
- CE-6** Licensing, certification, authorisation and approval obligations;
- CE-7** Surveillance obligations;
- CE-8** Resolution of safety concerns.

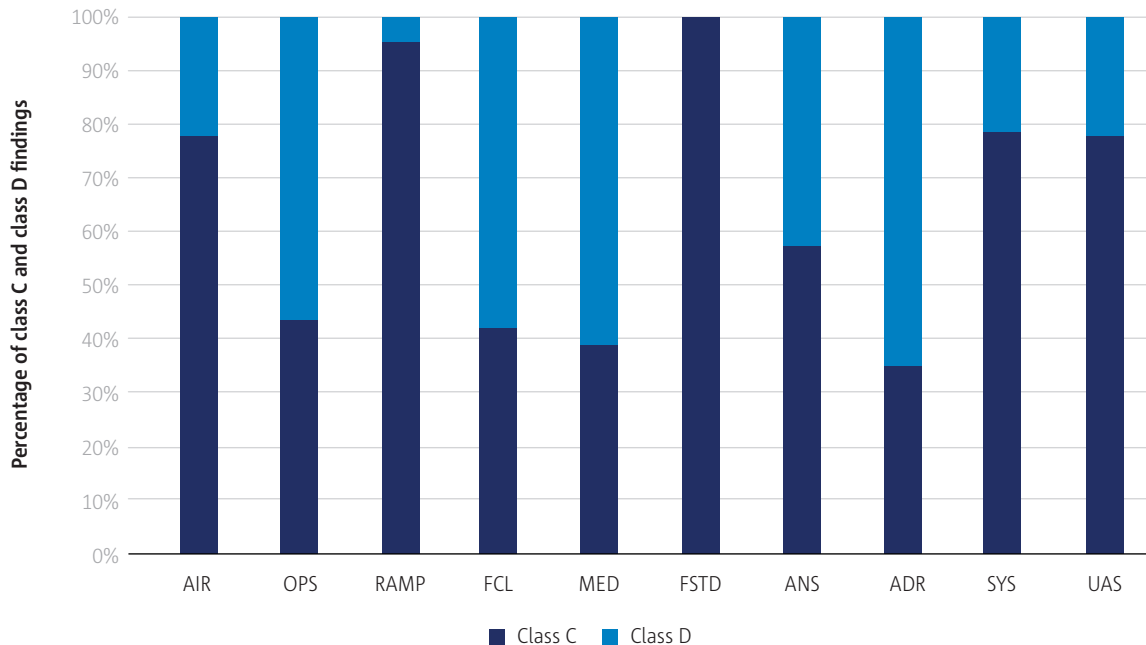
As in previous years, most class D findings (74%) relate to CE-6 (initial certification/approval) and CE-7 (continued oversight/surveillance). This confirms the continued safety impact of the inadequacy of certification and oversight processes that was already observed in the previous years; it represents a standing concern, and it is a focus area for standardisation inspections.

For class C findings, the main areas of concern are CE-5 and CE-7, followed by CE-3, CE-4 and CE-6; combined, they account for 91% of all class C findings. Besides certification and oversight, the unavailability of proper procedures and tools and technical training and qualification of personnel (CE-5), remain a source of standardisation concern.

In 2023 a total of 7 ISCs were raised, 3 in the OPS domain and 1 each in the AIR, FCL, FSTD and ANS domains. This is an increase compared to the 2 raised in 2022, and it is the highest number of ISCs in the last five years. All safety concerns were addressed immediately by the NCAs involved.



The distribution of findings between the classes has essentially shifted somewhat from C to D. In 2023, 38.3% of the findings were classified as D, compared with 2022, when 33.5% were classified as D. For class C findings, the ratio in 2023 is 60.6% compared to 66.2% in 2022. Class G findings, immediate safety concerns, increased from 2 (0.3%) in 2022 to 7 (1.1%) in 2023. This distribution varies by domain, see Figure 10.4.



AIR - Airworthiness; OPS - Air Operations; RAMP - Ramp inspections; FCL - Aircrew Licencing; MED - Aircrew Medical; FSTD - Flight Simulation Training Devices; ANS - Air Traffic Management/Air Navigation Services; ADR - Aerodromes, SYS - Systemic Enablers for Safety Management; UAS - Unmanned Aircraft Systems.

► **Figure 10.4** Ratio of class C and D findings per domain in 2023

More generally, the key outcomes of standardisation activities in 2023 can be summarised as follows:

- Lack of effective oversight.** As in previous years, the NCAs' performance of certification and oversight tasks (ICAO Critical Elements CE-6 and CE-7), remains the most challenging issue. The severity of the issue increased in almost all technical domains, especially in airworthiness (AIR), air operations (OPS), air traffic management and air navigation services (ATM/ANS), flight simulation training devices (FSTD), flight crew licencing (FCL) and Aerodromes (ADR) with 7 immediate Safety Concerns in 2023. The inability of several NCAs to properly discharge their certification and oversight responsibilities has a direct safety impact for example on overdue Airworthiness Directives (ADs) in AIR, non-compliance with ADs regarding Flight Simulation Training Devices (FSTDs) and inappropriate approvals in the OPS, FCL and ANS domains.
- Availability of sufficient and competent personnel.** Ineffective oversight is often linked to difficulties in recruiting and retaining sufficient numbers of competent staff. The competence of personnel and the turn-over of qualified staff remains a concern at a time when industry is recruiting. The best performing NCAs in that respect are typically funded by fees and can adapt their recruitment and salaries to their needs. In addition, more recurrent training and administrative tools are needed for inspectors to cope with an expanded inspection scope due to new SMS requirements, new technologies and concepts as well as regulatory changes, including the requirements to switch to performance-based oversight.



- **Inadequate change management.** NCAs face difficulties to properly implement recent regulatory changes and change management in general. Many States are underestimating the need to establish a proper Management System that meets the specificities of the aviation system. Some re-organise to gain efficiency or outsource activities, but this often leads to a loss of control of safety-relevant tasks. In addition, the implementation of regulatory changes and novelties is often started late, without taking advantage of transition periods. On the other hand, the significant volume and speed of regulatory changes is a permanent challenge for NCAs. A robust change management and compliance monitoring function can mitigate such problems.
- **States struggling to restore their oversight function – a changing landscape.** More States are lagging behind in correcting their non-conformities. This is illustrated by the number of safety-related findings (class D) that remain open and overdue at the end of each year. The increase of supplementary reports combined with European Commission enforcement actions are however driving improvements, especially on findings that the NCA cannot resolve without the involvement of Ministries or other National Authorities. Such findings are often linked to funding, recruitment, civil servants' status and organisational issues at the level of the State. In addition to enforcement activities, EASA also provided technical support to some States. This proactive Standardisation effort helped States in preparing for audits from third parties (e.g. FAA or ICAO).
- **Difficulties in implementing the occurrence reporting obligations and oversight.** The coordination at State level of the State Safety Programme has progressed in many Member States, however, occurrence reporting is the weak point of safety risk management. It generates most findings in the SYS domain. With the ERCS in force, a poor quality of reporting can jeopardise the risk assessment at EU level and lead to delayed and misguided State Plan for Aviation Safety (SPAS) priorities. In order to improve on this aspect, a dedicated task on data quality has been added to the European Plan for Aviation Safety (EPAS), requesting Member States to take action.
- **Action needed for securing maintenance training examinations.** Some recurrent issues were identified related to Part 147 (aircraft maintenance training organisations) regarding the ability of a NCAs to react and take decisive measures against irregularities or deficiencies in the examination processes. This issue can jeopardise the mutual recognition of maintenance licences. A rulemaking activity has been initiated to address these problems.

Delays in incorporating new EU regulations into Annex XIII to the European Economic Agreement applicable to Norway and Iceland were identified in the ASR 2023. The growing technical divergence between the certification and oversight requirements implemented by EU Member States and non-EU EEA States is now in the process of being resolved.

Due to the growing volume of regulations to monitor, EASA needs to adapt its Continuous Monitoring Approach to become more efficient and targeted in executing its inspection programme. For this purpose, EASA is working to increase the use of maturity level assessments of States with an ambition to credit improvements in maturity. The objective is to adapt standardisation activities according to the maturity of States and the domains they oversee. For States facing difficulties, the traditional domain-centric approach will remain. For more mature States, EASA is establishing a State Monitoring Programme. The programme will measure the States' overall performance/maturity and include a sampling of the State safety oversight outputs with less time being spent on checking compliance regarding the enablers (ICAO CEs 1 to 5). This new risk-based approach will be rolled out in the coming years and can be maintained as long as the assessment and overall performance indicators remain positive.



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