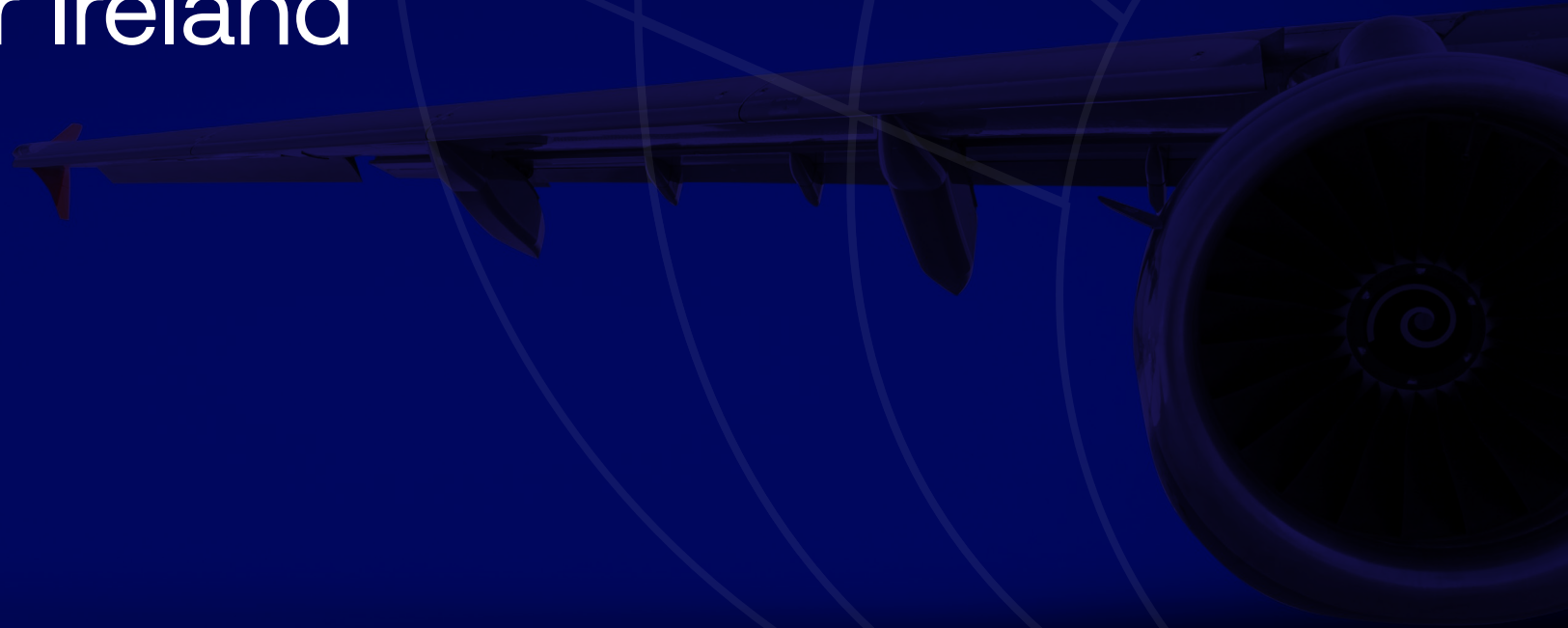


Annual Safety Performance Review for Ireland

ÚDARÁS EITLÍOCHTA NA hÉIREANN
IRISH AVIATION AUTHORITY



2023



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Foreword



The Irish Aviation Authority is pleased to present the Annual Safety Performance Review (ASPR) for 2023, it's fifteen year of publication.

While 2022 heralded the start of the return to normal operations, 2023 was the first full year without any Covid disruptions or restrictions and witnessed the civil aviation industry stage a remarkable return to near normal pre-pandemic levels of activity. The execution of this recovery is also noteworthy given the levels of safety under which this recovery was achieved, and safety is what defines this industry.

The consolidation of the recovery in the Irish civil aviation industry in 2023 is evidenced by the fact that CAT movements were 15% higher than in 2022, while Aerodrome movements increased 13% in 2023 compared to 2022 levels and were almost on a par with 2019. The number of aircraft on the Irish register increased in 2023 with a 35% decrease year on year in the number of commercial land aeroplanes in storage.

Globally, 2023 was one of the safest years on record with the fatal accident rate in commercial air transport below the five-year average. In Ireland there were no fatalities in 2023. The main statistics for accidents and serious incidents in both commercial aviation and general aviation were lower than 2022.

The ongoing war in Ukraine and the Israeli conflict presented risks to air travel that came to the fore in

2023. There are always emerging threats that must be monitored such as growing geopolitical uncertainty, rising fuel and living costs, disrupted supply chains, climate change concerns and cyber security attacks. Safety risk management skills are constantly required to monitor hazards and mitigate risks in a safety critical industry like aviation.

It would not be possible to present the safety performance data shown here without a healthy safety occurrence reporting culture. The IAA recognises and encourages the active participation of all involved in all aspects of civil aviation to report safety concerns to their organisation or to the IAA at (<https://www.iaa.ie/safety/safety-reporting>) so that safety in the industry can be continuously improved. This is a fundamental tenant of the Irish State Safety Programme.

Thank you for taking the time to read this review.

IAA CEO

A handwritten signature in blue ink, reading 'Declan Fitzpatrick'.

Declan Fitzpatrick
CEO

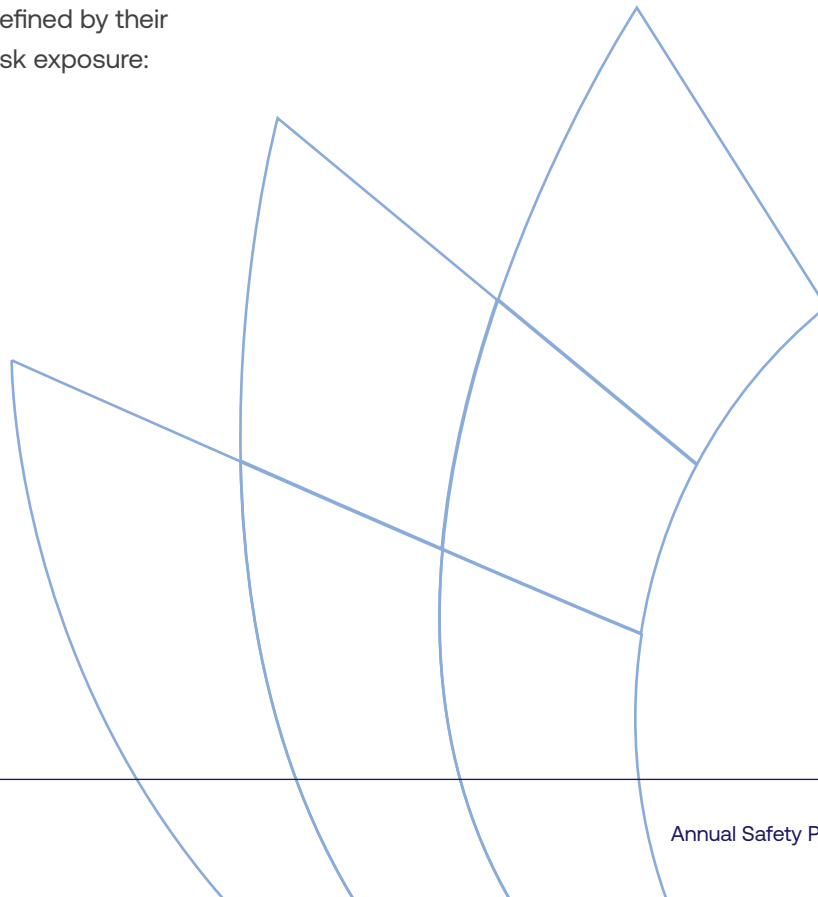
Executive summary

The Irish Aviation Authority (IAA) herewith presents its Annual Safety Performance Review for Ireland for 2023. This is the 15th consecutive year of publication which presents the safety performance of Irish civil aviation to the end of 2023 along with the main safety issues as identified by the IAA. This review is prepared using State Annex 13 data and occurrence reporting data collected in accordance with EU 376/2014 along with safety information provided at EU (e.g. EASA) and global (e.g. ICAO) levels.

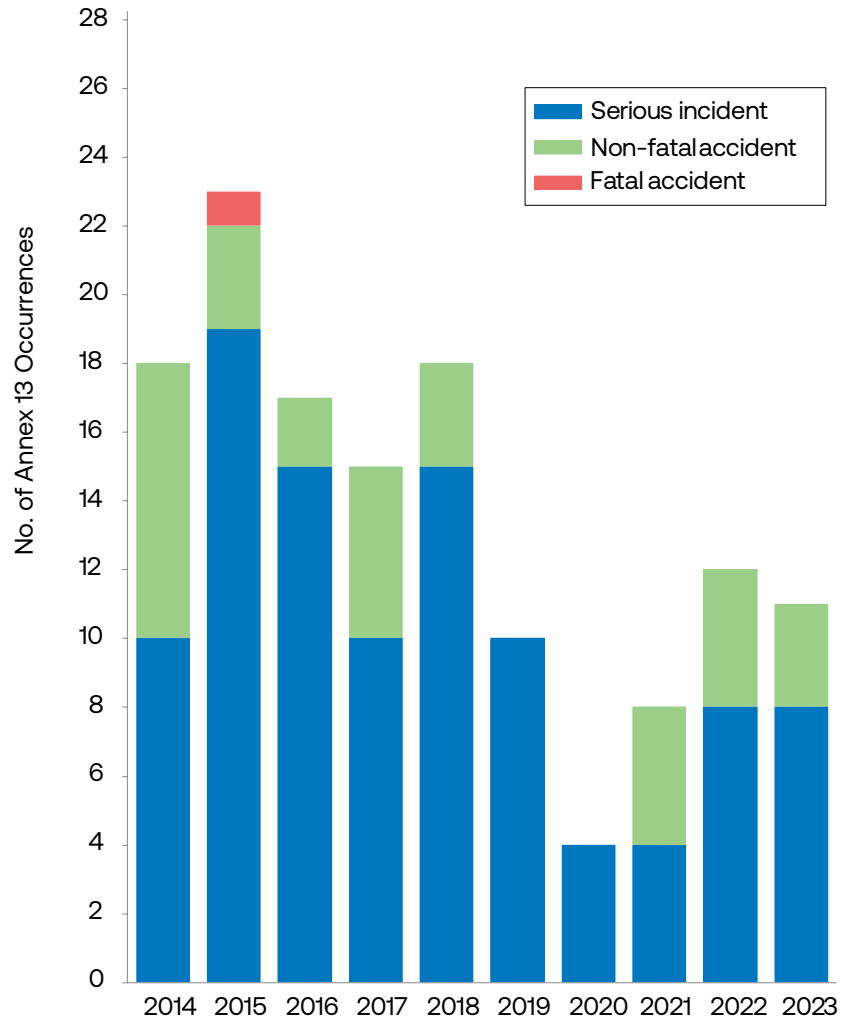
Safety performance information is aggregated and presented under the following four primary sectors of Irish civil aviation, which are defined by their principal type of operation and resultant similarity in terms of risk exposure:

- The Irish Fixed-Wing Commercial Air Transport Sector
- The Irish Commercial Helicopter Sector
- Air Navigation Services and Aerodromes in Ireland
- General Aviation in Ireland

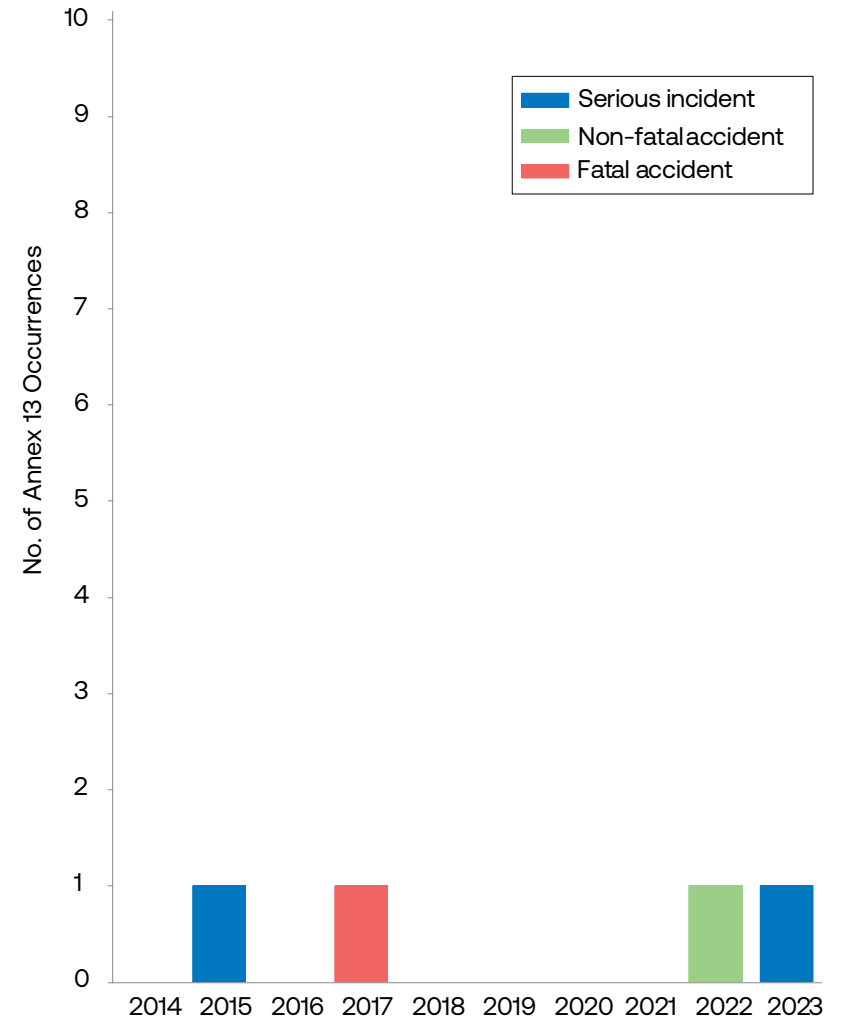
Opening Infographics provide a summary of the main performance statistics for each of these sectors. More detail on the supporting analysis is presented within the domain chapters on a tiered basis. Firstly, Annex 13 data is presented for the past 5 years. Next, comparative occurrence reporting graphs are offered for 2023 and the preceding 6 years (2017-2022) along with event type charts for 2023. Lastly a breakdown of the associated safety issues is tabulated for each domain.



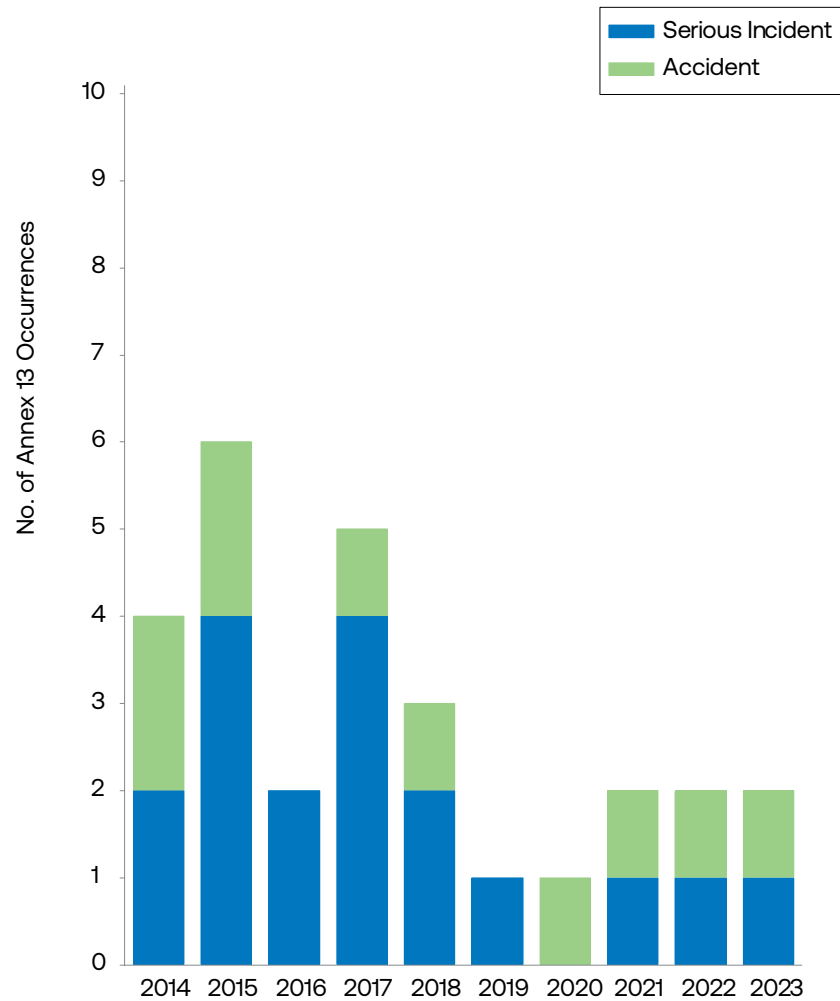
Commercial Air Transport - Fixed Wing



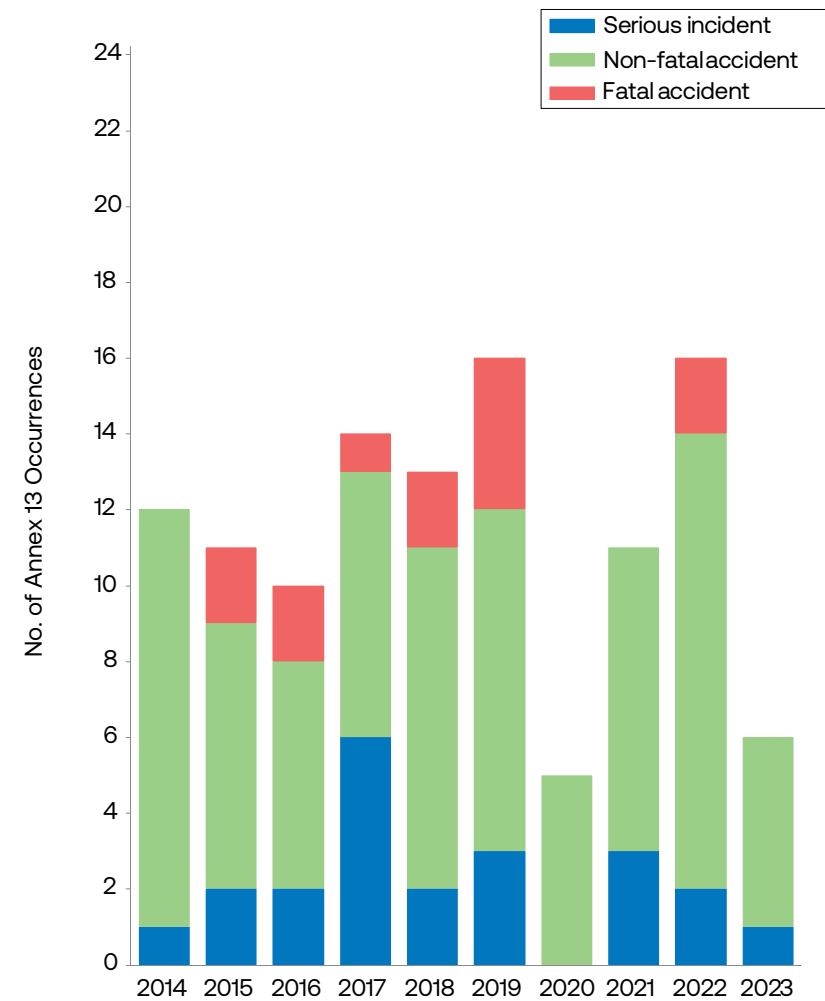
Commercial Helicopter



Commercial Air Transport at Irish Certified/licensed Aerodromes with ATS



General Aviation



Irish Air Fixed-Wing Commercial Air Transport Sector



Accidents and Serious Incidents

Accidents 2019-2023

11 non-fatal accidents (3 in 2023) and no fatal accidents.

The top three occurrence categories were:



Ground
handling



Ground
collision



ARC

Serious Incidents 2019-2023

34 serious incidents (8 in 2023)

The top three occurrence categories:



Airprox / near
midair collision



System failure
of malfunction



Ground
handling

Occurrence Reports – Irish AOC Holders

2023

9,451 reports.

The top three occurrence categories:



System failure
of malfunction



Birdstrike



OTHER

2017-2022

40,584 reports.

The top three occurrence categories:



System failure
of malfunction



Cabin safety



Birdstrike



Aerodromes in Ireland

Includes CAT aircraft at Irish certificated/licenced aerodromes that provide Air Traffic Control services.

Accident and Serious Incidents

Accidents 2019-2023

4 non-fatal accidents (1 in 2023).

No fatal accidents.

The top three occurrence categories were:



ARC



Ground collision



Loss of control on ground

Serious incidents 2019-2023

4 serious incidents (1 in 2023).

The top three occurrence categories were:



Runway excursions



Ground handling



Medical

Occurrence Reporting

Aerodromes

2023

924 Aerodrome reports.

The top three occurrence categories were:



Aerodromes



Birdstrike



Navigation Errors

2017-2022

2,977 Aerodrome reports.

The top three occurrence categories were:



Ground handling



Aerodromes



OTHER

ATS providers

2023

1,998 ATS reports.

The top three occurrence categories were:



Navigation Errors



Air traffic management



Medical

2017 - 2022

8,305 ATS reports.

The top three occurrence categories were:



Air traffic management



Navigation Errors



System failure or malfunction

The Irish Commercial Helicopter Sector



Accidents and Serious Incidents

Accidents 2019-2023

1 non-fatal accident (categorised as 'Loss of control- inflight') and no fatal accidents.



Loss of control

Serious Incidents 2019-2023

1 (categorised as 'Turbulence').



Turbulence encounter

Occurrence Reporting

2023

61 reports.

The top three categories were:



System failure of malfunction



OTHER



Ground handling

2017-2022

244 reports.

The top three occurrence categories were:



System failure of malfunction



OTHER



Navigation Errors

General Aviation in Ireland 2019-2023



Aeroplanes over 2,250 kg

0 Fatal Accidents
3 Non-Fatal Accidents
0 Serious Incidents



Helicopters over 2,250 kg

0 Fatal Accidents
0 Non-Fatal Accidents
0 Serious Incidents



Annex I 1 (c) Amateur/ Home builds

1 Fatal Accidents
4 Non-Fatal Accidents
1 Serious Incidents



Aeroplanes under 2,250 kg

1 Fatal Accidents
11 Non-Fatal Accidents
7 Serious Incidents



Helicopters under 2,250 kg

1 Fatal Accident
1 Non-Fatal Accident
0 Serious Incidents



Sailplanes and Powered Sailplanes

0 Fatal Accidents
2 Non-Fatal Accidents
0 Serious Incidents



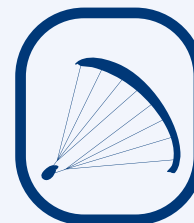
Annex I 1 (e) incl. Microlights

1 Fatal Accident
9 Non-Fatal Accidents
0 Serious Incidents



Gyroplanes

0 Fatal Accidents
1 Non-Fatal Accident
0 Serious Incidents



Gliders, Paragliders, Powered Paragliders & Powered Parachutes

2 Fatal Accident
6 Non-Fatal Accidents
0 Serious Incidents



Hot Air Balloons

0 Fatal Accidents
0 Non-Fatal Accidents
0 Serious Incidents



Amphibians

0 Fatal Accidents
0 Non-Fatal Accidents
1 Serious Incident

Section A: Introduction



Throughout 2023, the aviation industry displayed its resilience and adaptability by continuing to build on the post pandemic recovery commenced in 2022, leading to the first full year with no Covid related distributions or restrictions. The challenges in meeting the stronger post pandemic demand for travel appears to have been anticipated and managed better in summer 2023, compared to 2022.

The continuing war in Ukraine and the escalation of the Israeli conflict later in the year piled further pressure on reduced air traffic capacity and flows for neighbouring Air Navigation Service Providers (ANSPs) and the European aviation network as a whole. Emerging risks such as GPS/GNSS spoofing and jamming, and Cybersecurity became more pertinent and are expected to continue into 2024.

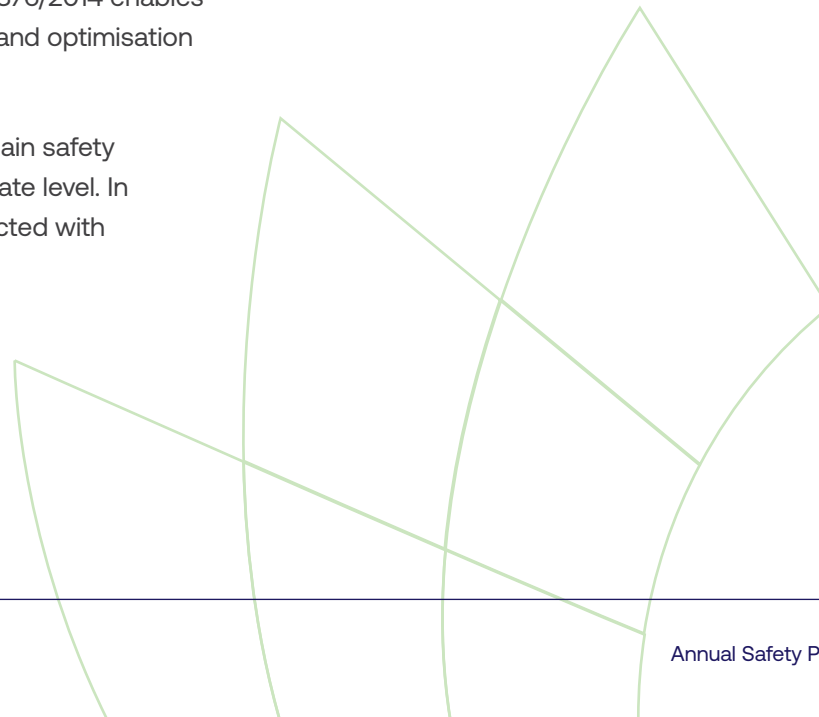
The IAA is responsible for ICAO Annex 19 functions of safety performance monitoring in the State. In addition to the regulatory oversight of the Irish civil aviation industry, it monitors safety performance of the industry through the collection, analysis and exchange of safety data. The collection and analysis of occurrence reports in accordance with Regulation (EU) No 376/2014 enables enhanced safety intelligence that allows for the identification and optimisation of safety measures that can target the areas of greatest risk.

This annual report presents an aggregated summary of the main safety intelligence derived from safety performance monitoring at State level. In addition, tailored reviews of pertinent safety issues are conducted with individual regulated organisations.

The data sources for this report include the independent Irish Air Accident Investigation Unit for accident and serious incident investigations as well as the analysis of occurrence reports submitted to the IAA. In accordance with regulations the statistical information is presented in an aggregated manner so that individuals involved are not identified.

Thankfully, there were no fatal accidents in Irish civil aviation in 2023 however, regrettably, the report includes references to a number of fatal accidents in previous years. The IAA extends its' sincere sympathies to family and friends of the deceased in all these cases. The numbers of Accidents and Serious Incidents were lower in 2023 than previous years despite the increased level of activity across all domains.

Year on year data for Irish air traffic demonstrates the robustness of the recovery experienced in 2023. The number of Aerodrome movements in 2023 increased 13% on 2022 levels and was almost on a par with 2019, trailing a mere 0.3% lower. Total airspace movement levels in 2023 were 5% lower compared to 2022 levels.



Occurrence Reports

Aviation safety is supported by a robust regulatory framework that includes strict regulations on occurrence reporting. The regulations include mandatory provisions for who should report safety occurrence and the type of occurrences that must be reported. They also require organisations and States to establish appropriate systems to facilitate the collection and analysis of such reports and provide follow up details of the results of the investigation of these reports. The regulations also provide for voluntary reporting systems to enable any person to report occurrences to address any safety concern. For further details on how to report to the IAA see <https://www.iaa.ie/safety/safety-reporting>

Occurrence reports are subject to investigation and analysis by regulated organisations and the IAA, and both entities are required to ensure that any safety concerns are addressed in a manner commensurate with the level of safety risk identified. To achieve this objective, each occurrence report is subjected to a risk classification that is used to target the higher risk occurrence for more immediate safety action. Only a very small proportion of occurrences reported to the IAA concern an accident or a serious incident and the vast majority of occurrence reports to IAA were classified as low risk.

The IAA, in common with all other aviation authorities across the world, receives thousands of occurrence reports each year that are subject to safety analysis. To support this analysis, ICAO has endorsed an occurrence reporting “Common Taxonomy” which facilitates the categorisation of events using standardised terminology to improve the aviation community’s capacity worldwide to focus on common safety issues.

Independent Air Accident Investigation

The Irish Air Accident Investigation Unit (AAIU) is responsible for investigating the more serious occurrences that have resulted in an aviation accident or a serious incident as defined by Annex 13 to the International Civil Aviation Organisation Convention, REGULATION (EU) No 996/2010 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, and Statutory Instrument No. 460 of 2009.

The AAIU maintains a register of all accidents and serious incidents of concern to Ireland, including those investigated by AAIU and those investigated by a foreign safety investigation authority (SIA). It operates independently from the IAA.

The statistics on accidents and serious incidents presented within this document have been compiled using the data provided by the AAIU.

Layout of annual safety performance review

This report is divided into four sections to address:

- commercial air transport aeroplane operations
- commercial helicopter operations
- aerodromes and air navigation services
- general aviation

In each section the main statistics of safety performance of the Irish civil aviation system are presented for accidents, serious incidents and occurrences. The report then focuses on identifying the main safety issues that emerge from the analysis of the data.

The vast majority of reports submitted to the IAA come from organisations who must investigate and analyse their own reports and identify risks and risk mitigating actions as part of their safety management systems. The role of the IAA, and this review in particular, is to share safety information and highlight the cross-sector safety issues that emerge from analysis of the safety performance of multiple organisations operating within that sector.

As part of the risk management processes in the IAA, the safety issues are recorded in sector-based registers where they are subjected to a risk assessment to prioritise the areas of greater safety concern and to plan the relevant actions to mitigate the risk identified.

A summary of the actions that emerge from this process is provided in the State Plan for Aviation Safety (see <https://www.iaa.ie/safety/state-safety-plan>)

Section B: The Irish Fixed Wing Commercial Air Transport Sector



Introduction

The Irish fixed-wing Commercial Air Transport (CAT) industry considered here incorporates two types of commercial organisations:

- operators who hold an Irish Air Operators Certificate (AOC) issued by the IAA (12 fixed-wing operators at the end of 2022).
- operators who operate an Irish registered aircraft on an AOC issued by a foreign State under Article 83 bis of the Chicago Convention, hereafter referred to as the 'Irish lease fleet'.

As of the 31st of December 2023, there were 722 land aeroplanes on the Irish aircraft register engaged in CAT operations for both Irish AOC holders and foreign AOC operators with the Irish lease fleet. This included 77 aircraft in storage, down on last year's 119.

Part-NCC (non-commercial operations with complex aircraft) operations increased throughout the year, primarily for private business jet activities and ferry flights. Although such operations are not commercial, they are included within this section, as they are subject to a similar risk profile as commercial operators and both have commonalities in their safety issues and key risk areas.

The recovery which commenced in 2022 was reinforced throughout 2023, as the pent-up demand for travel was steadily met by operators increasing their activity and carrying ever increasing numbers of passengers. 2023 was the first full year post pandemic entirely free from travel restrictions and impediments such as requirements for proof of vaccinations or negative PCR test. This resulted in 2023's CAT movements being 15% higher than 2022 levels, however this was still 32% lower than the levels observed in 2019.

The continuing war in Ukraine and the escalation of the Israeli conflict in October 2023 were issues that came to the fore in 2023. The resultant airspace restrictions and operations close to conflict zones impact operators and require careful risk management. EASA issued updates to SIB 2022-02R2 on Global Navigation Satellite System Outage and Alterations Leading to Navigation / Surveillance Degradation as well as its Conflict Zone Information Bulletins (CZIB's). Cybersecurity and supply chain issues were other emerging concerns for operators in 2023.

All in all, the industry continued to utilise the risk management capability of their safety management systems (SMS) as an integral business tool to successfully negotiate a pathway through these emerging risks as they built operations back up to new levels.

The Irish State Plan for Aviation Safety (2023-2025) includes actions to help enhance the effectiveness of safety management at the levels of both the regulator and the regulated organisations in Ireland.

The occurrence reporting rate in 2023 increased on 2022 levels. These increased reporting rates indicate that CAT operators' SMSs continue to deliver a maturing reporting culture despite the challenges experienced by aviation staff during the pandemic and also in this new era of expansion.

Accidents and serious incidents

The rate of aircraft accidents and serious incidents involving Irish commercial air operators provides the Tier 1 Safety Performance Indicator (SPI) for the State Safety Program (SSP). In addition, accident investigation is instrumental in determining the root cause and contributory factors of accidents without apportioning blame. It ensures that past mistakes are not repeated, and the lessons learnt are shared with all stakeholders. Over the last five years, aeroplanes operated by the Irish AOC holders or on the Irish lease fleet were involved in 11 accidents (3 in 2023) and 34 serious incidents (8 in 2023) as summarised in Table B.1 below.

Table B.1: Accidents and serious incidents involving Irish registered aeroplanes engaging in CAT.

Year	Number of aircraft	Accidents			Serious incidents
		Non-fatal	Fatal	Total	
2019	815	0	0	0	10
2020	683	0	0	0	4
2021	660	4	0	4	4
2022	701	4	0	4	8
2023	722	3	0	3	8
Total		11	0	11	34

There were no fatal accidents, 3 non-fatal accidents and 8 serious incidents in 2023. Of the 3 non-fatal accidents 2 were categorised as 'Abnormal Runway Contact' (ARC) and 1 as 'loss of control on the ground' (LOC-G). The 8 serious incidents included 'medical' (MED), mid-air collision (MAC), 'loss of control-inflight' (LOC-I), a runway excursion (RE), 'Abnormal Runway Contact' (ARC), 'loss of control on the ground' (LOC-G) and 'abrupt manoeuvre' (AMAN).



Figure B.1 outlines the categories assigned to the accidents and serious incidents that occurred in the past five years.

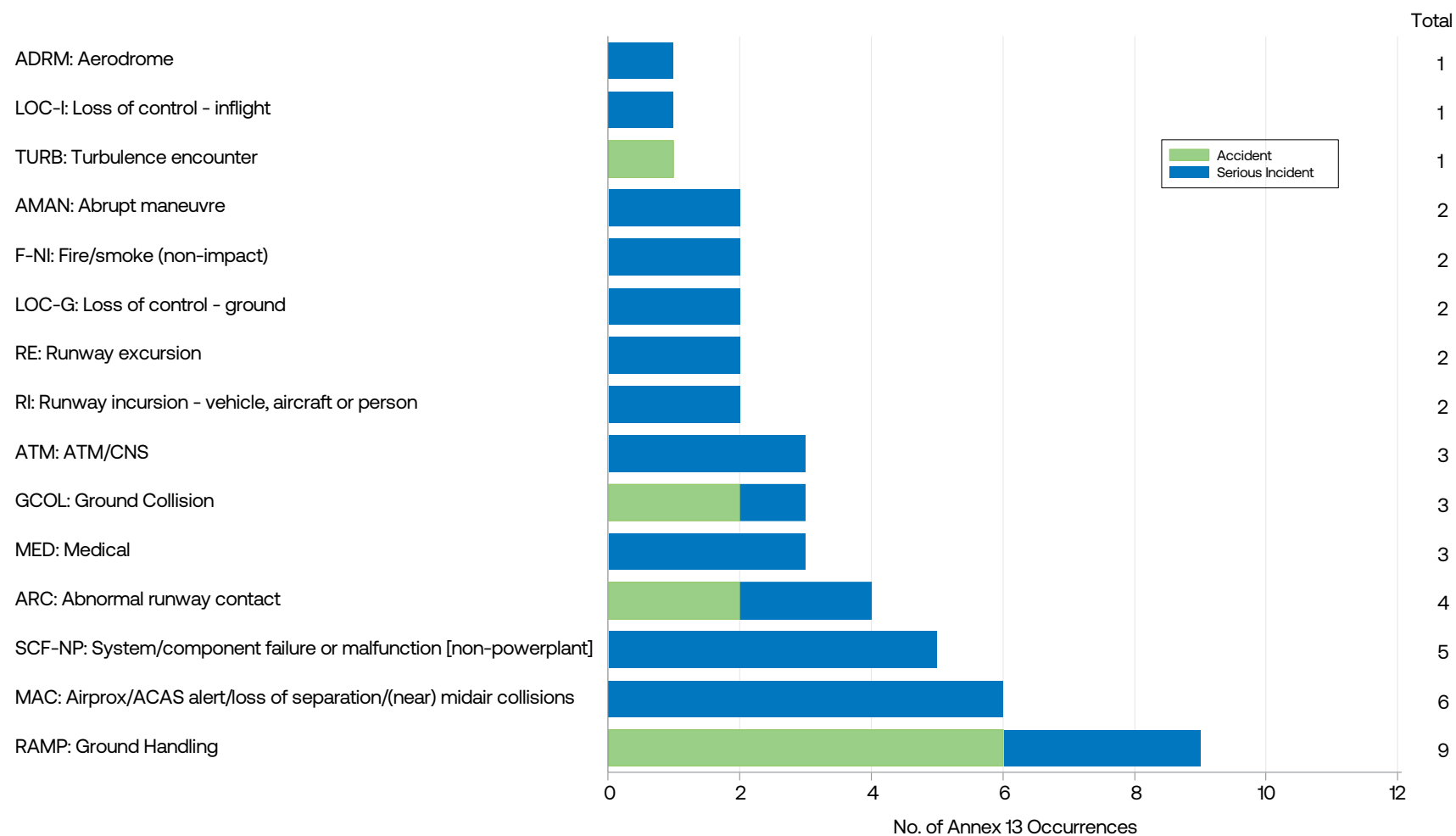


Figure B.1: Categorisation assigned by the investigating SIA to the Annex 13 Occurrences

Occurrences

The insight gained from safety occurrence reports provides the Tier 2 Safety Performance Indicators and adds another layer of intelligence that enables a proactive and predictive element in the timely detection of operational hazards and system deficiencies. This additional awareness can help focus resources towards the areas most in need of mitigation in order to promptly improve aviation safety performance.

In 2023 the Irish civil industry experienced its first full year without Covid-19 related travel restrictions, while passengers enjoyed the freedom from the requirements of previous pandemic years to demonstrate compliance with various vaccination programmes and/or the completion of Covid-19 Passenger Locator Forms. Organisations had gained some insight from the previous year's challenges in restarting operations rapidly and so were better able to predict the increased likelihood of the release of further pent-up demand for travel as the pandemic faded further in the rear-view mirror. The chances of being on a flight operated by an Irish AOC Holder that experienced a safety occurrence remained very low. In 2023 Irish AOC Holders flew 727,518 flights and submitted 9,451 occurrence reports. While this represented a 14.6% increase in movements compared to 2022, it was still down 32% on 2019. This means that over 98% of these flights passed off without any safety occurrence that required reporting to the IAA and over 99.99% of these flights passed off without being involved in an accident or serious incident. In 2023 there were zero fatalities associated with Irish CAT operations.

The AAIU and the IAA employ the same common occurrence category taxonomy in the analysis of their respective databases, which combined make up for the State's National Occurrence database. Analysis of reported mandatory and voluntary occurrences by the IAA takes into further consideration factors that could be assessed to be precursors to accidents and/or serious incidents.

A breakdown of the top occurrences submitted by Irish AOC Holders involved in CAT operations by occurrence category and risk classification band is presented in the following 2 graphs, Figures B.2(a) and B.2(b). The first graph Figure B.2(a) presents the data for 2023 and Figure B.2(b) presents the data for the preceding 6 years, 2017-2022. The intention is to enable a comparison of any emerging pattern in predominant occurrence categories in 2023 with the preceding 6 years (2017-2022).

In last year's ASPR the occurrence reporting graphs were presented in three separate timeframes, pre-Covid (2017-2019), Covid (2020-2021) and post Covid (2022), to enable a comparative analysis of safety performance between those different periods demarcated by the Covid-19 pandemic. It was noted that the top reported categories pre-Covid (2017-2019), during Covid (2020-2021) and post-Covid largely remained the same. There were no adverse trends observed that had not been signalled as emerging risks in the COVID-19 Safety Risk Portfolio published in 2020. Therefore, it was deemed appropriate for this year's report to collate the MOR data from 2017 to 2022 the preceding years to 2023 in one graph. The top occurrence categories have largely remained the same.

The most common event types for 2023 are outlined in Figure B.3 which provides more granularity to information supplied in the reports. Birdstrike was the top event type which corresponds with it being the second most reported MOR occurrence category for 2023. The 2nd most common event type reported in 2023 was 'difficult/unruly passengers' which is one of the topics mentioned in the EASA SIB 2023-05: "Possible Risks Emerging During Summer 2023" and appears to have continued to be an issue throughout 2023.

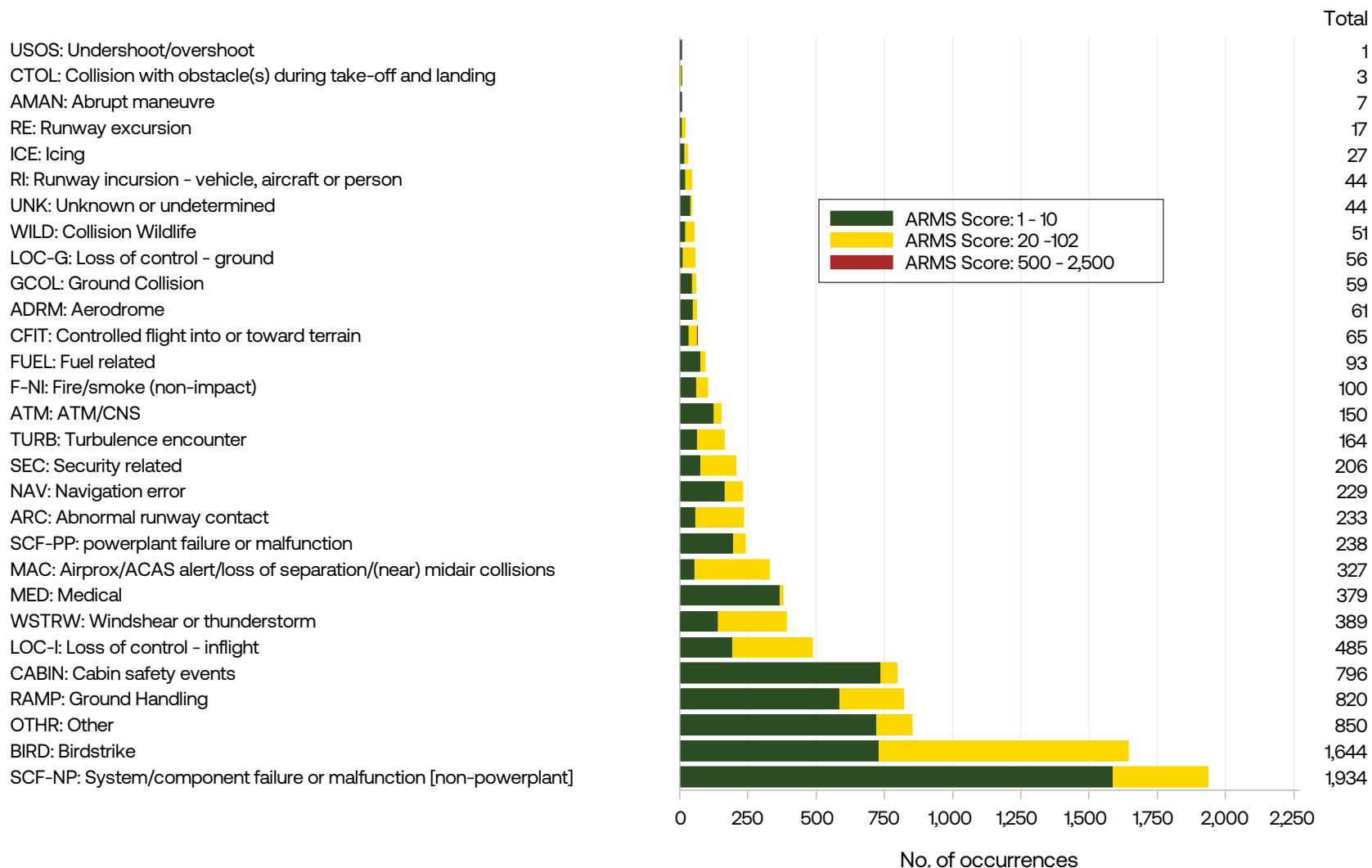


Figure B.2(a) Categorisation of MORs Involving Irish CAT Fixed-wing Aeroplanes during 2023

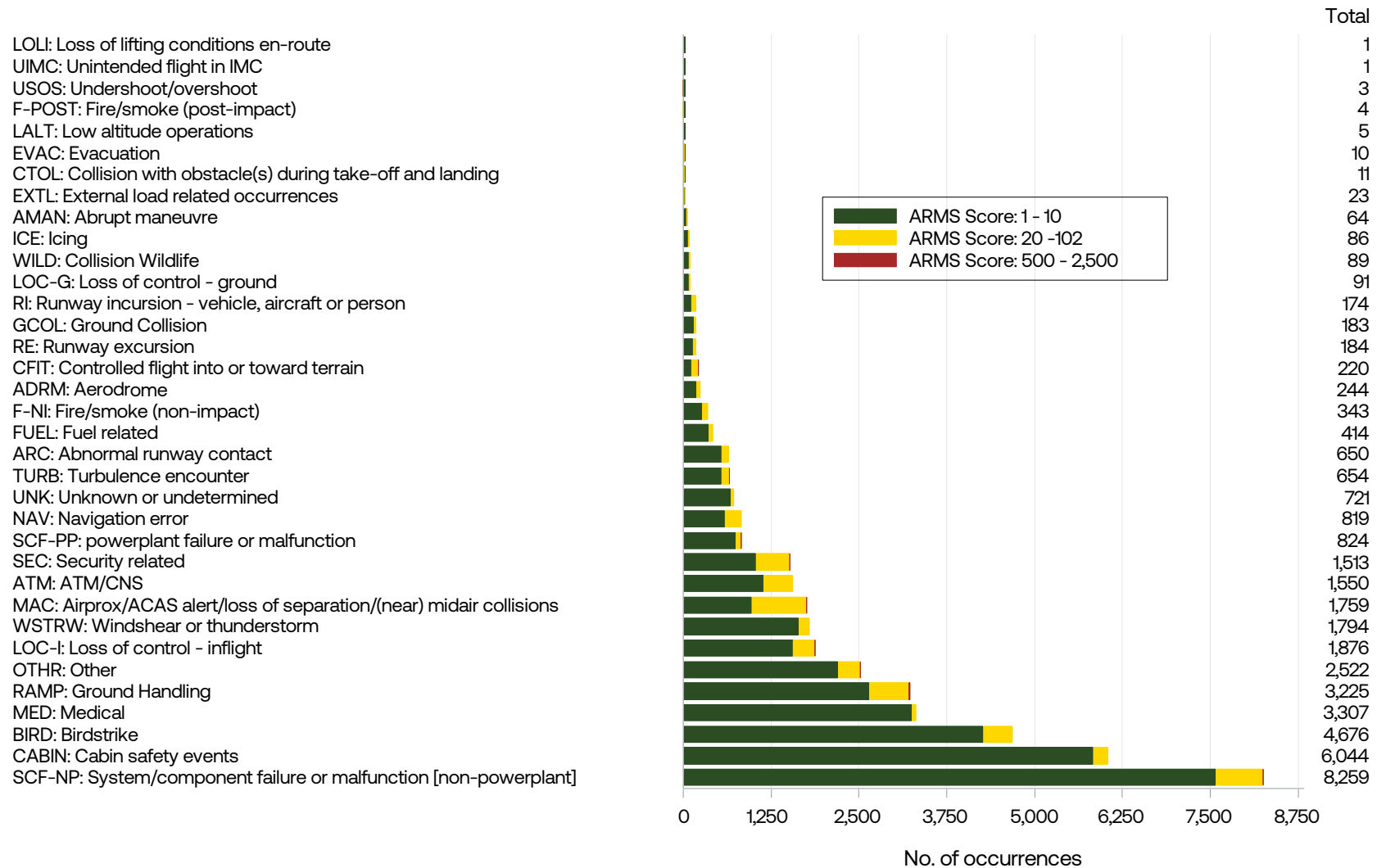


Figure B.2(b) Categorisation of MORs Involving Irish CAT Aeroplanes during 2017-2022

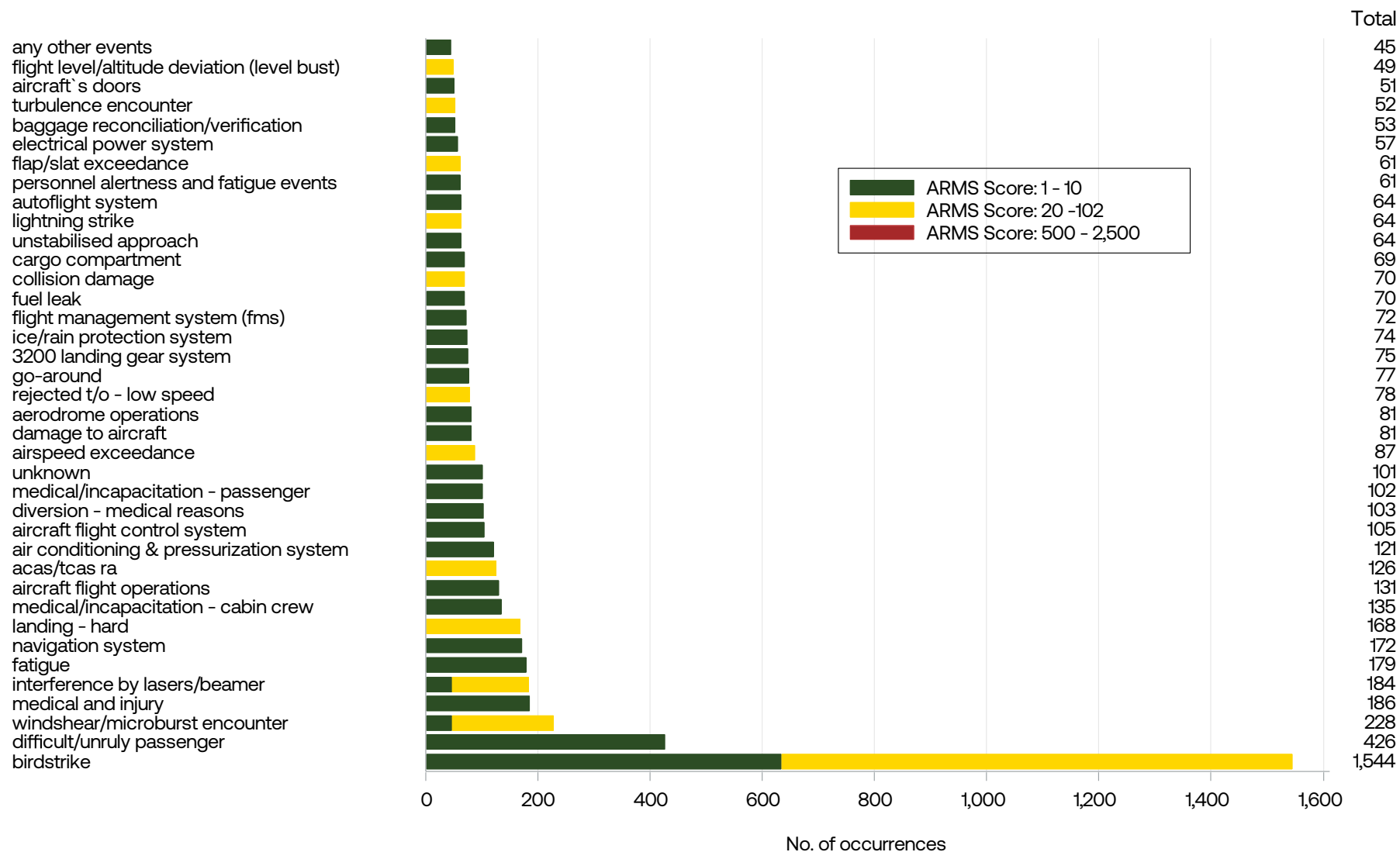


Figure B.3 Top Event Types Involving Irish CAT Fixed-wing Aeroplanes 2023

Safety Issues

- This section provides a summary of the main safety issues that emerge as a result of the analysis of these safety performance statistics for CAT aeroplane operations. The first sub-section focuses on the key safety areas identified across the globe as the main causes of fatalities in aviation, and the second sub-section focuses on the other safety areas where the likelihood of fatalities is low but where high severity occurrences could lead to costly damage to aircraft or major inconvenience to aircraft occupants.

Key Safety Area	Safety Issues
Mid-Air Collision (MAC)	<ul style="list-style-type: none"> • Airborne conflict with non-transponder equipped aircraft (e.g. airspace infringement into controlled airspace or flight by CAT aircraft in un-controlled airspace) • Integration of drone operations into air traffic system • Emerging threat of GPS/GNSS spoofing and jamming impacting aircraft navigation and warning systems
Aircraft Upset (LOC-I/AMAN)	<ul style="list-style-type: none"> • Monitoring of flight parameters to prevent loss of situational awareness, and/or warning system activation, and/or aircraft upset, and/or unstable approach. • Management of technical failures to prevent aircraft upset • Avoidance of flight into convective weather or icing conditions which could cause aircraft upset • Management of Birdstrike or laser attack to prevent aircraft upset • Recognition and recovery from aircraft upset • Optimum state of wellbeing and fitness for flight
Runway Excursion (RE)	<ul style="list-style-type: none"> • Management of approach path • Avoidance of flight into convective weather, microbursts or windshear • Management of crosswind landings and unstable approach • Recognition of runway condition for take-off or landing • Reliability of critical equipment (e.g. landing gear, wheels, brakes, thrust revers and spoilers)
Runway Incursion (RI)	<ul style="list-style-type: none"> • Awareness or response to the unauthorised presence of other aircraft or vehicles on the runway • Deviation from ATC clearances by Flight Crew
Controlled Flight into Terrain (CFIT)	<ul style="list-style-type: none"> • Implementation of APV approach procedures to replace Non-Precision Approach • Implementation of advanced ATS services in terminal maneuvering area • Management and monitoring of altitude setting procedures, awareness of blunder error • Optimum state of wellbeing and fitness for flight

Key Safety Areas:

While we await official publications such as EASA's Air Ops Risk Review for 2023 and ICAO's Safety Report 2023, indications are that globally the accident rate for 2023 was low with no fatal accidents to large turbofan powered, passenger aeroplanes in commercial service. There were 2 fatal accidents to large passenger aeroplanes in commercial service and one accident where a ground handler was fatally injured.

ICAO and EASA analysis of aviation safety data on a worldwide basis has identified the following categories: controlled flight into terrain (CFIT), loss of control-inflight (LOC-I), mid-air collision (MAC) and runway incursions (RI) and excursions (RE) as the main contributors to accidents with a high number of fatalities in commercial aeroplane operations. CFIT, MAC and LOC-I accidents often have catastrophic results with very few, if any, survivors. Although statistically very few runway incursions result in collisions, there is a high fatality risk associated with these events. Runway excursions remain predominant in terms of number of occurrences with the majority of runway excursions survivable, however the fatality risk remains significant.

Figure B.1 shows that over the past five years there were no accidents in these occurrence categories involving the Irish AOC holders and Irish lease fleet operators. However, there were 11 categorisations of serious incidents in the following key safety areas: 6 categorised as MAC, 2 categorised as RI, 2 categorised as RE and 1 categorised as LOC-I. MAC was assigned to 1 of the serious incidents in 2023 down from 3 in 2022, all 4 occurred outside of the Irish state. ICAO Doc 10161 Global Aviation Safety Roadmap recommends safety enhancement initiatives for MAC such as the identification of additional contributing factors, e.g., traffic conditions - traffic density, complexity, mixture of aircraft types and capabilities, etc. The emerging threat of GPS/GNSS spoofing and jamming around conflict zones in Ukraine and Middle East could impact aircraft navigation and warning systems (refer to EASA SIB 2022-02R2).

Figures B.2.(a) and B.2.(b) show that occurrence reports of precursor events categorised as MAC and LOC-I continued to be similarly placed in the top 10 of the most reported occurrence categories in 2023 and during the preceding 6 years 2017-2022. Analysis of these reports enables the identification of weaknesses and trends in the sector that can be used to inform appropriate mitigations. The CFIT category has proportionally fewer related occurrences and most of these relate to activation of TAWS alerts due to momentary breach of protection envelopes, which demonstrates the effectiveness of this technological mitigation. There are fewer reports from CAT aeroplane operators in the high-risk occurrence categories of RI and RE. In addition to the insight gained from their analysis as a sector they highlight the need to address safety risks from a cross domain perspective, such as flight operations, aerodrome operators and air navigation services provision, in order to maximise the effectiveness of safety barriers.

Figure B.3 provides more insight into the types of events that underlie the occurrence categories for 2023 with birdstrike and difficult/unruly passengers the top event types reported.

Detailed analysis of all these events in conjunction with follow-up information from the reporting organisation has identified the following safety issues that have been tabulated below with their corresponding key safety area.

Other Safety Areas:

The following table summarises other safety areas outside of the key risk areas discussed above.

Safety Area	Safety Issues
Ground Operations	<ul style="list-style-type: none">• Adherence to aircraft loading procedures (e.g. passengers, baggage and cargo, fuel) and accurate calculation of mass and balance• Adherence to aircraft ground handling procedures (incl. towing, de-icing, refueling etc.)• Reporting of damage to aircraft during ground operations• Oversight of ground operations subcontracted activities
FIRE	<ul style="list-style-type: none">• Lithium batteries or other material presenting a fire hazard in cargo or cabin baggage• Placing of intended passenger carry-on baggage in the aircraft hold at the departure gate
CABIN/MED	<ul style="list-style-type: none">• Management of difficult/unruly passengers

The key safety areas discussed above address the main causes of fatalities in CAT operations, however there are other areas worthy of consideration, while they do not generally contribute to fatal accidents, they can sometimes be associated with serious injury to persons or damage to aircraft. The areas of focus in this review are ground operations, fire, cabin safety and medical emergency.

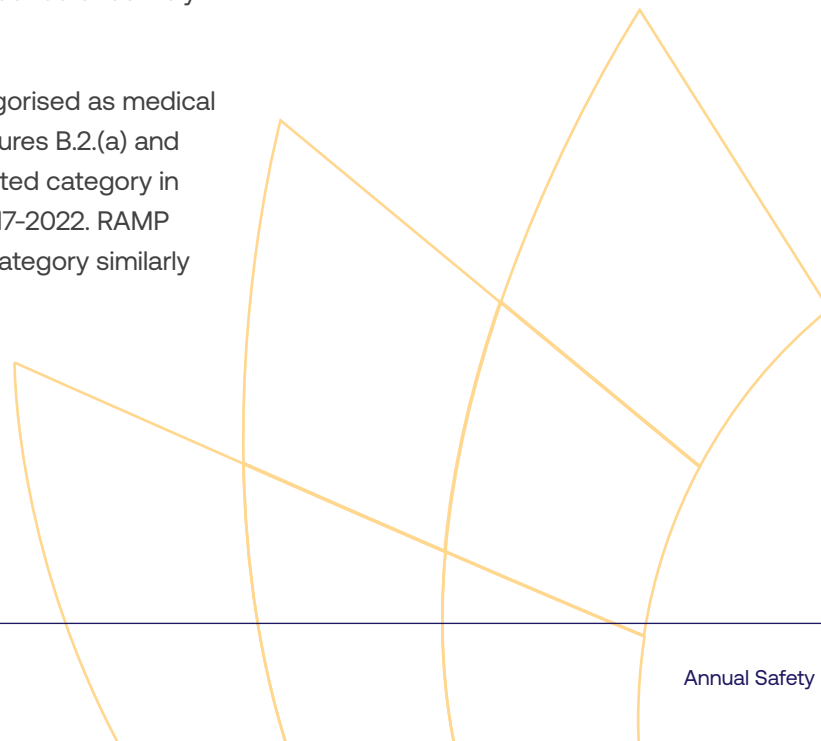
Ramp: ground handling was ascribed to 6 accidents and 3 serious incidents over the past five years up to and including 2023, see Figure B.1 Due to the nature of their operation i.e., slow speed whilst moving on the ramp or taxiway, the most credible accident outcome in this domain is less catastrophic than other categories such as mid-air collisions. However, there is still a potential risk of some casualties, the loss of revenue due to damaged aircraft and passenger anxiety due to delayed flights. Undetected errors in aircraft loading and non-reporting of aircraft damage by ground vehicles present a higher level of threat as they could lead to further difficulties for the operation of the flight once the aircraft becomes airborne.

There were 2 fire/smoke/fumes related serious incidents over the five years between 2019–2023. On-board fire is an event that must be dealt with promptly and effectively, using aircraft fire protection systems and operational procedures to prevent a fire from starting in the first instance or preventing it from escalating to a loss of control of the aircraft. The unique fire hazard characteristics of lithium-ion batteries and their proliferation in commonly used electronic devices pose a significant safety risk that must be effectively mitigated and managed.

Figure B.1 illustrates that there were 3 serious incidents categorised as medical emergency between 2019–2023. A comparison between Figures B.2.(a) and B.2.(b) highlights that MED (Medical) was the 8th most reported category in 2023 compared to 4th most reported category between 2017–2022. RAMP (Ground Handling) continued to be a significantly reported category similarly placed across both timeframes.

Difficult/unruly passengers came to the fore in 2022 being the 2nd most reported event category, compared to pre-Covid when it was the 7th most reported event type (see ASPR for 2020). The IAA conducted a detailed statistical analysis on this subject toward the end of 2023 and confirmed a statistically significant increase in the rate of unruly passenger reports. This trend has also been reported across Europe and hosted a dedicated Unruly Passenger Campaign in June 2023. The IAA is currently working with Irish stakeholders (including airlines, airports and national police and security services) to facilitate a collaborative approach to address this problem.

The EU regulatory framework recently introduced requirements for Safety Management Systems in the airworthiness domains including aircraft maintenance, maintenance management, design and production. Figure B.4 shows the breakdown of airworthiness event types reported to the IAA during 2023.



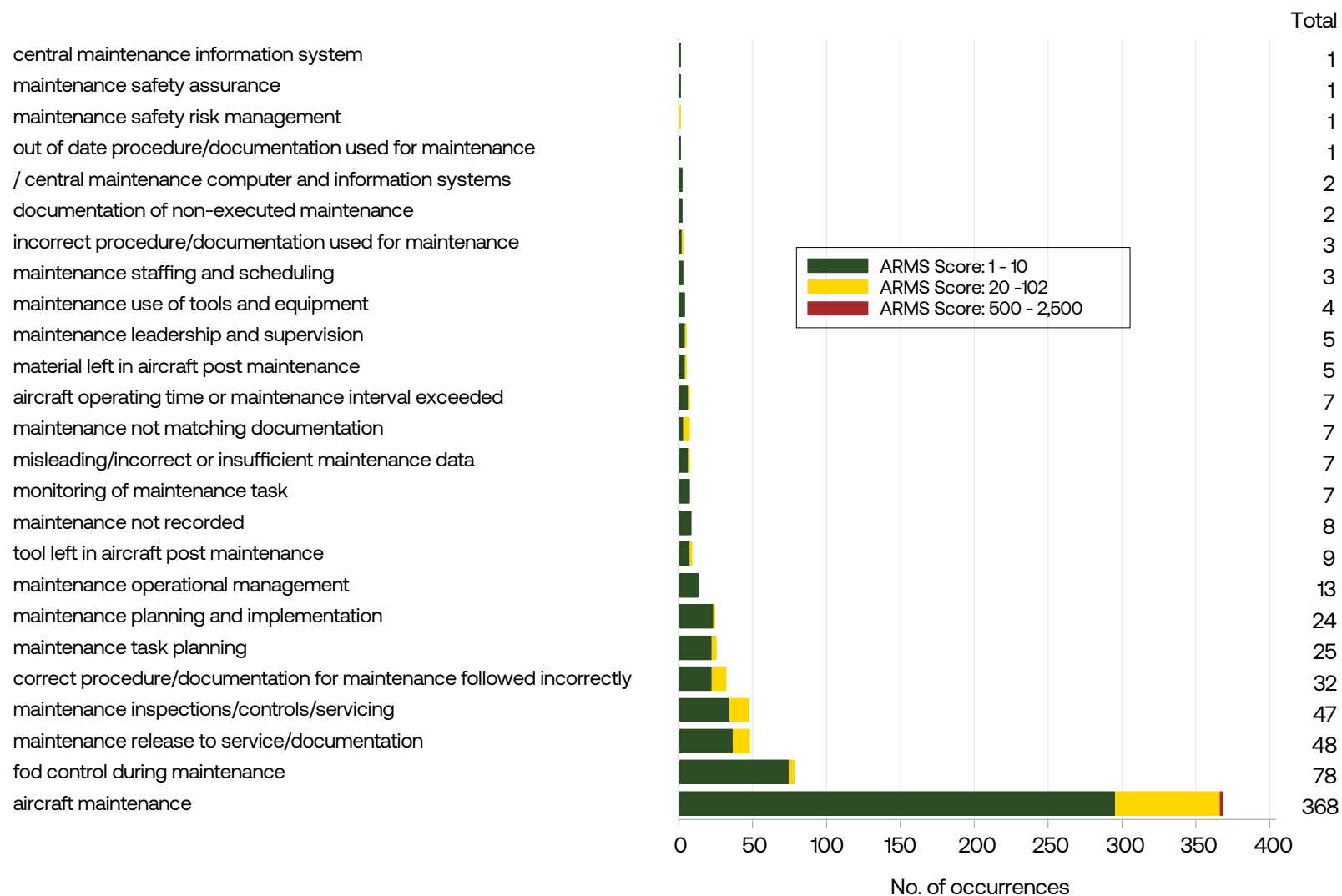


Figure B.4 Airworthiness related Event Types reported during 2023.

The key safety issues identified for airworthiness include maintenance task performance, maintenance documentation, maintenance planning, Human Factors and maintaining skilled staff.

Occurrence reporting rates

Commercial Air Transport (CAT) activity increased 15% in 2023 compared to 2022, but this was still down 32% on 2019. Overall, the occurrence reporting rate has trended upwards throughout the past 7 years, with the exception of 2022 which saw a drop compared to the previous year. The rate increased again in 2023. It is encouraging to observe a steadily strengthening reporting culture, despite the various challenges presented to the industry in recent years. Table B.2 below, provides data on the number of sectors flown annually between 2017 and 2023 along with the corresponding MOR rates.

Table B.2: Statistics on MORs submitted by the Irish AOC holders who operate aeroplanes (MOR rates were calculated per 10,000 flights)

Year	Sectors Flown	Total	
		Number	Rate
2017	1,018,688	6,846	67.20
2018	1,096,104	8,677	79.16
2019	1,068,939	9,976	93.33
2020	305,513	3,358	109.91
2021	313,639	4,092	130.47
2022	634,531	7,635	120.33
2023	727,518	9,451	129.91
Total/rate	5,164,932	50,035	96.87

Part NCC

NCC declarations in 2023 were lower than in 2022 which saw a sharp rise in ferry delivery flights post Covid. The activity in 2023 consisted mainly of ferry flights and maintenance check flights (Part SPO). EASA's ASR 2023, the latest publication available currently, states that, during 2022, there were two fatal accidents involving an EASA MS registered NCC business aeroplane, resulting in 6 fatalities. They also note that the top 5 categories assigned to the serious incidents and accidents in the past five years (2018-2022) were 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 and ARC: Abnormal runway contact. The IAA continues to work with organisations to advocate for improvement in the reporting culture to improve safety management processes in this sector.

Section C: The Irish Commercial Helicopter Sector



Introduction

This section addresses the commercial helicopter services sector in Ireland, which is a relatively small sector in comparison to the fixed-wing CAT operations domain. It includes helicopter commercial air transport (CAT) operators, helicopter commercial specialised operators (SPO) and operations of non-commercial air operations with complex motor-powered helicopters (NCC).

Ireland had 2 helicopter Air Operator Certificate (AOC) holders operating 11 helicopters in commercial air transport (CAT) during 2023. One operator is approved to undertake helicopter emergency services (HEMS) and search and rescue operations (SAR).

Commercial SPO flights, such as surveying or photography, require that a helicopter operator declare its capabilities to the Irish Aviation Authority. Two of the above helicopter operators have also declared their capabilities to undertake commercial SPO activities operating 10 of the above helicopters in the SPO role.

To undertake non-commercial air operations with complex motor-powered helicopter (NCC) flights a helicopter operator must declare its capabilities to the Irish Aviation Authority. Two operators have declared their capabilities to undertake NCC activities operating 1 foreign registered and 2 Irish registered helicopters.

The Irish helicopter lease fleet are included here with the Irish CAT helicopter operators, as they are exposed to the same risks even though their approval and oversight regime differs. During 2023, 9 Irish registered helicopters operated under the provisions of Article 83 bis of the Chicago Convention on foreign issued AOCs.

The level of activity in this sector in 2023 was down 4% compared with 2022. During 2023 some of the activity in this sector transferred to an operator with an EASA AOC issued by another Competent Authority and as such outside the oversight responsibility of the IAA. Overall, the Irish commercial helicopter sector was not impacted during the pandemic years as significantly as other domains, such as the fixed wing CAT or Aerodrome sectors, due to the essential nature of many of Irish commercial helicopter operations such as SAR and HEMS.

Accidents and serious incidents

Over the last five years helicopter operators in this sector were involved in 1 non-fatal accident in 2022 categorised as 'loss of control-inflight' (LOC-I) and 1 serious incident in 2023 categorised as 'turbulence' (TURB). Table C.1 below provides the details.

Table C.1: No. of accidents, fatal accidents and serious incidents involving helicopters engaged in CAT, Part-NCC and Part-SPO operations.

Year	Total registered in Ireland	Accidents			Serious incidents
		Non-fatal	Fatal	Total	
2019	20	0	0	0	0
2020	20	0	0	0	0
2021	19	0	0	0	0
2022	22	1	0	1	0
2023	22	0	0	0	1
Total	-	1	0	1	1

Occurrences

The IAA categorises helicopter occurrences using the same common taxonomy as discussed in Section B. A breakdown of the top occurrences submitted by Irish Helicopter AOC holders and NCC/SPO declared operators, according to occurrence category and ARMS Risk Classification Band is presented in Figure C.1 below for 2023. A similar dataset has been produced for 2017-2022 in Figure C.2, to enable a comparison of the predominant occurrence categories between 2023 and the preceding 6 years.

In last year's ASPR the occurrence reporting graphs were presented in three separate timeframes, pre-Covid (2017-2019), Covid (2020-2021) and post Covid (2022), to enable a comparative analysis of safety performance between those periods. It was noted that the top reported categories pre-Covid (2017-2019), during Covid (2020-2021) and post-Covid largely remained the same with "SCF (system component failure or malfunction)", and "Other" being the most common. Therefore, it was deemed appropriate for this year's report to group the 6 years preceding 2023 into one graph.

All the mandatory occurrences in 2023 were low risk which indicates minor failures or failure of redundant systems that had little effect on operations. Many of these operations are undertaken in harsh environments which can affect on-board systems. The categorisation of "Other" has decreased over the years which may indicate better application of the ADREP taxonomy in the helicopter domain. However, the usage of category "Other" in the helicopter domain may be necessary when the ADREP taxonomy does not fully account for helicopter low level SPO operations. Occurrences categorised as "other" include for example, failure of Part SPO role equipment and accuracy of aeronautical charts. There were no appreciable trends in occurrence categories in 2023 as compared with the years prior (2017-2022) which saw Navigation errors (NAV) and Security issues (SEC) more commonly reported.

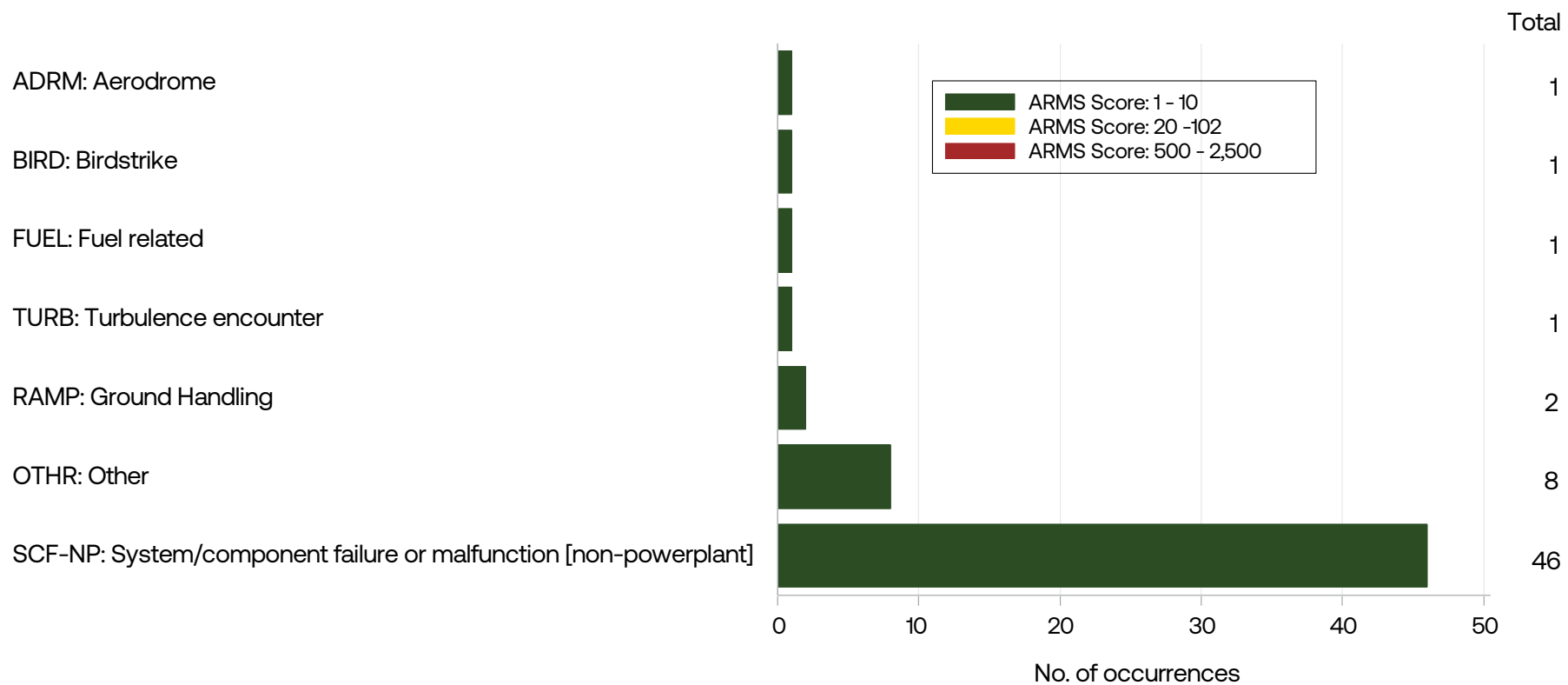


Figure C.1 Categorisation of MORs Commercial and Declared Helicopter Operation 2023

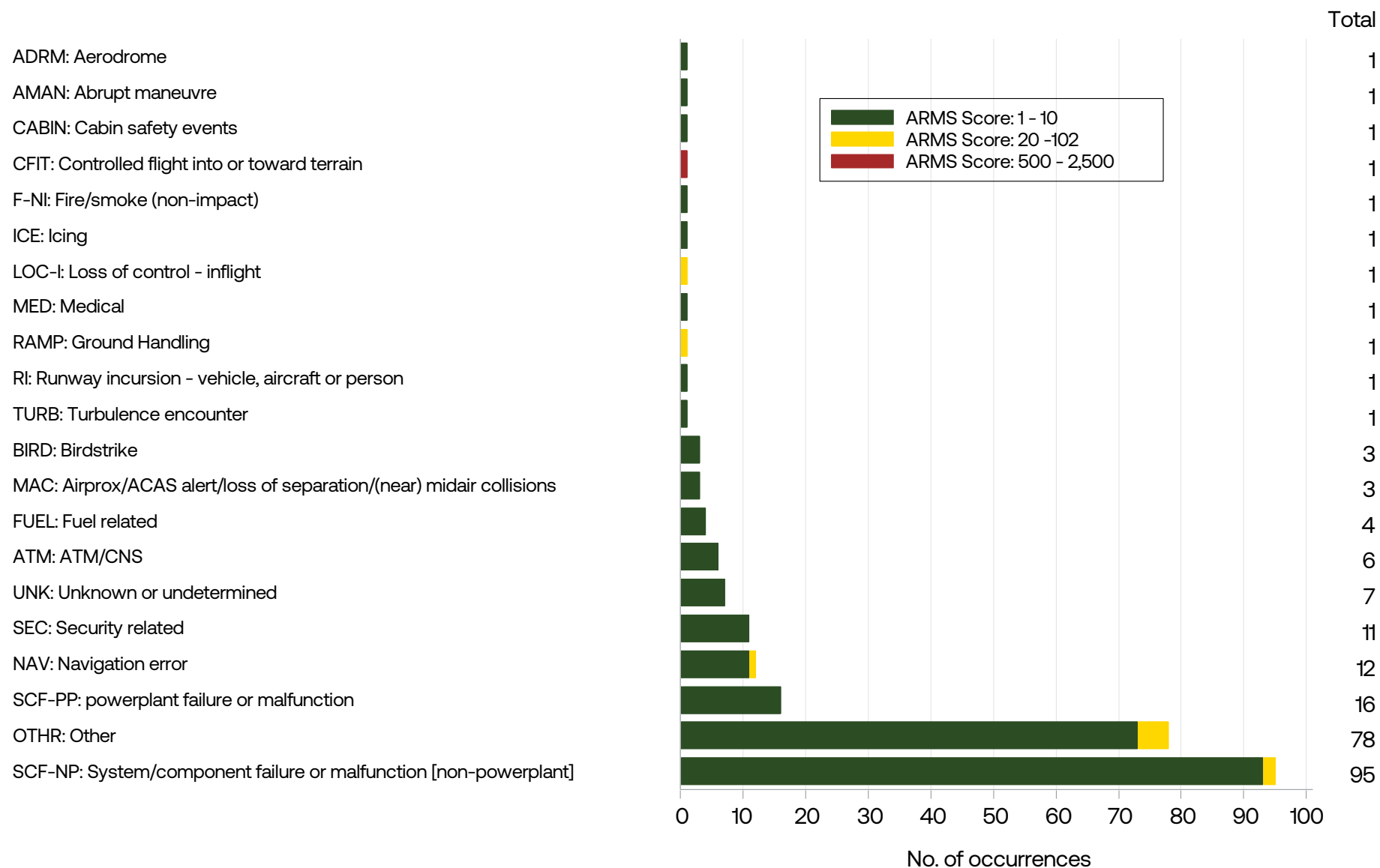


Figure C.2 Categorisation of MORs Commercial and Declared Helicopter Operation 2017-2022

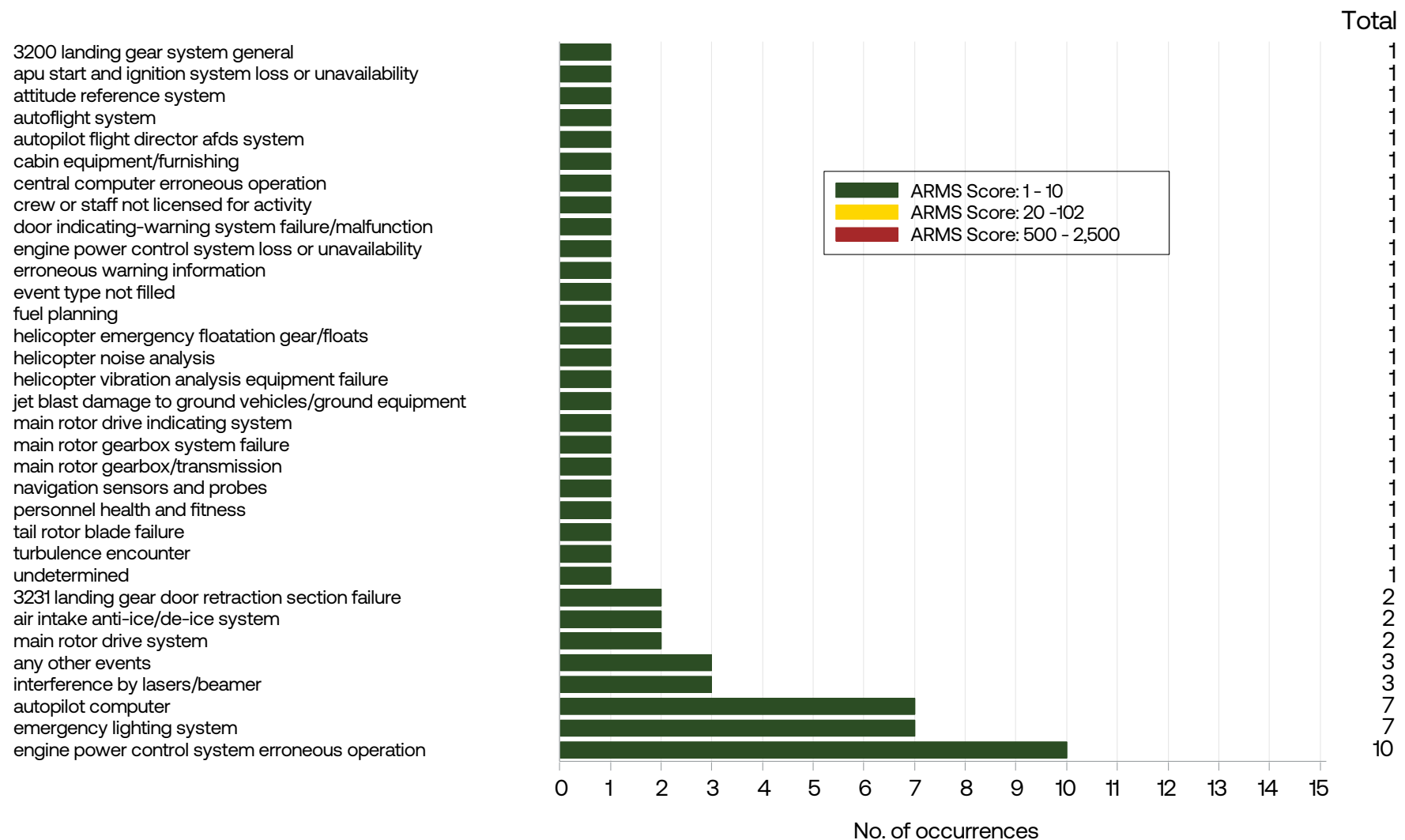


Figure D Top Event Types – Commercial and Declared Helicopter Operations 2023

Safety Issues

This section provides a summary of the main safety issues that emerge as a result of the analysis of these safety performance statistics for commercial and declared helicopter operations. This first sub-section focuses on the key safety

areas identified across Europe as the main causes of fatalities in helicopter operations, and the second sub-section focuses on the other safety areas where the likelihood of fatalities is low but where high severity occurrences could lead to injuries to occupants and damage to helicopters.

Key Safety Areas:

Detailed analysis of helicopter events in conjunction with follow-up information from the reporting organisations has identified the following safety issues that are included in the sector-based risk register.

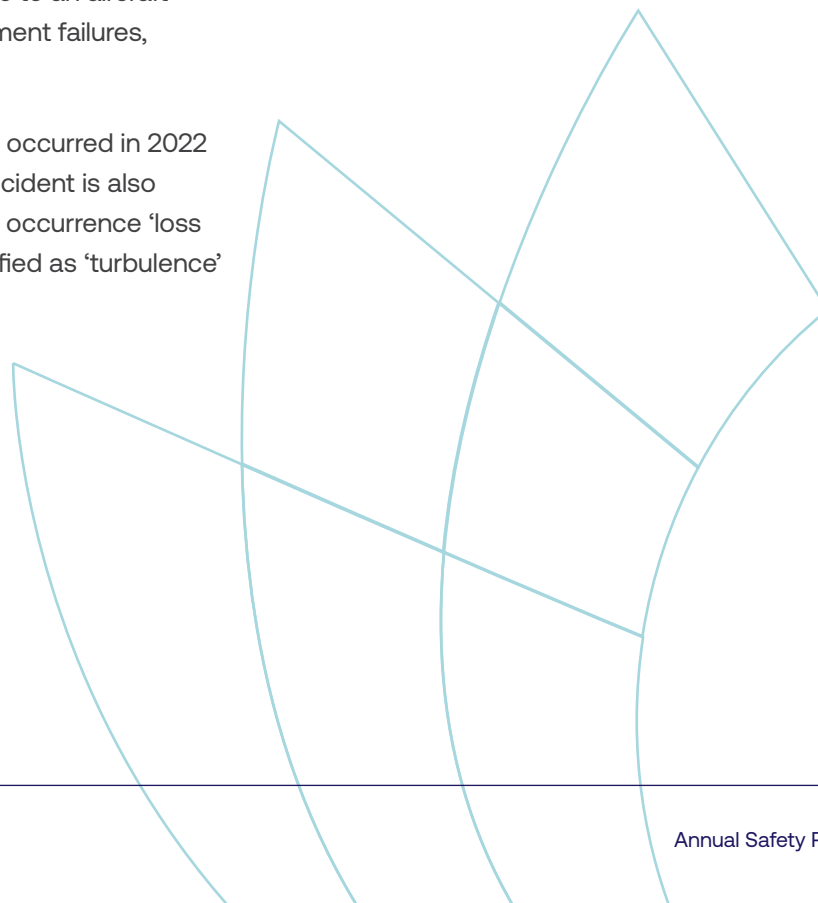
Key Safety Area	Safety Issues
Aircraft upset (e.g. LOC-I, AMAN)	<ul style="list-style-type: none">• Monitoring of flight parameters to prevent loss of situational awareness, and/or warning system activation, and/or aircraft upset.• Management of flight path• Management of technical failures to prevent aircraft upset• Avoidance of flight into convective weather or icing conditions which could cause aircraft upset• Reaction to birdstrike or laser attack to prevent aircraft upset• Recognition and recovery from aircraft upset• Optimum state of wellbeing and fitness for flight
Collision with terrain or obstacle (e.g. CFIT, CTOL, LALT)	<ul style="list-style-type: none">• Intentional low-level operations• Operations in degraded visual environments• Maintenance of situational awareness by crews• Use of helicopter see and avoid• Use of take-off and landing sites outside of airports/heliports• Accuracy and appropriate use of aeronautical charts and terrain and obstacle databases• Use of company routes• Adequacy of TAWS database for low level helicopter operations• Adequacy of cockpit lighting for the required operational conditions• Increased number of Windfarms• Optimum state of wellbeing and fitness for flight
Mid-Air Collision (MAC)	<ul style="list-style-type: none">• Potential conflict with non-transponder equipped general aviation aircraft• Potential conflict with drones

Due to the relatively low activity level of commercial and declared operations in Ireland and consequently the relatively low levels of safety occurrences reported, it is challenging to identify the key risk areas from the analysis of the Irish safety information alone. However, the analysis performed by EASA of the safety performance of this sector across the EU (including Ireland) can support the IAA efforts in this regard. EASA has identified the key risk areas based on analysis of helicopter accidents and serious incidents in this sector across Europe as aircraft upset/loss of control, obstacle collision in flight, airborne collision and CFIT.

Figure D gives more insight into the events that led to the occurrence reports during 2023. Although the specific circumstances of these reports did not lead these events to be categorised in the key risk areas they could in other circumstances or in combination with other events, contribute to an aircraft upset or collision with terrain or obstacles (e.g., critical equipment failures, aeronautical chart errors, birdstrike, laser attack).

Over the past five years there was 1 non-fatal accident which occurred in 2022 which was classified as loss of control-inflight (LOC-I). This incident is also noted in Figure C.2 which shows that there was 1 risk bearing occurrence 'loss of control-inflight' (LOC-I). There was 1 serious incident classified as 'turbulence' (TURB) which can lead to an aircraft upset event.

The risk of mid-air collision is another safety area for helicopter operators, notwithstanding the fact that there are very few reports from this sector concerning this risk area. There were 3 low risk reports during 2017-2022. Many helicopter operations occur outside of controlled airspace where a wide variety of general aviation aircraft freely operate, and many of these aircraft are not equipped (nor required to be equipped) with transponder equipment. Therefore, helicopter must rely on flight planning, situational awareness and see and avoid procedures to avoid airborne conflict. There is also the new threat of drone operations to consider, especially important for low level helicopter operations.



Other Safety Areas:

The highest number of reports submitted by this sector concern system component failure. Most of these events were classified as low risk which means that the failures had little impact on the safe operation of the aircraft (e.g. due to built-in system redundancy). By its very nature, helicopter operations present a challenging environment for aircraft equipment, and EASA as competent authority for aircraft design in Europe, has identified a number of mitigating actions to address the main safety concerns arising from helicopter equipment failures in the European Plan for Aviation Safety. (Refer to [https://European Plan for Aviation Safety \(EPAS\) 2024 - 13th edition](https://european-plan-for-aviation-safety-epas-2024-13th-edition) | EASA (europa.eu) for more details)

The other categories reported in 2023 were Aerodrome (ADRM), Birdstrike (BIRD) and Fuel with 1 report each and Ground handling (RAMP) 2 reports. These low numbers are not ample to indicate a trend, but it would be prudent to continue monitoring these areas in future years for any discernible trends.

The EPAS Vol III – 2024 edition presents an elevated priority index for Rotorcraft which includes Inadequate obstacle clearance during low-altitude operation, take-off and landing (SI-8031), Poor pre-flight planning and preparation (SI-8017) and Poor operational management at take-off and landing sites (SI8034). EASA's Annual Safety Review 2023 presents the Rotorcraft safety roadmap SPI which is based on number of accidents that have caused at least one fatality or serious injury. Unfortunately, there were more accidents with at least one

fatality or serious injury in 2022 as compared to the previous year and is the third highest observed number since 2012. The ASR also notes that 52% of all accidents and serious incidents involved certified helicopters performing non-commercial operations and for which an EASA MS was either the state of operator or state of registry and 24% of all accidents and serious incidents involved certified helicopters performing specialised operations and for which an EASA MS was either the state of operator or state of registry.

The IAA works with Helicopter operators through oversight activities (e.g. SMS oversight) and safety promotion to ensure these safety issues are being addressed by helicopter operators, as appropriate to them. Refer also to the latest edition of the IAA State Plan for Aviation Safety, <https://www.iaa.ie/safety/state-safety-plan>.

Number and rate of MORs

The following table provides data on the number of sectors flown annually over the last 7 years with the corresponding MOR rates per 1,000 flights. The number of movements in 2023 decreased slightly by 4% compared to 2022. While the reporting rate during the Covid period (2020-2021) was lower when compared to the pre-Covid (2017-2019) reporting rate, the 2023 reporting rate has almost doubled that of 2022.

Table C.2: Statistics for MORs submitted by the Irish AOC holders operating helicopters (MOR rates were calculated per 1,000 flights)

Year	Sectors flown	Total	
		Number	Rate
2017	6,887	35	5.08
2018	7,206	35	4.86
2019	8,144	60	7.37
2020	9,176	34	3.71
2021	7,236	43	5.94
2022	6,236	37	5.93
2023	5,964	61	10.23
Total/rate	50,849	305	6.00

Section D: Air Navigation Services and Aerodromes in Ireland



Introduction

Aerodromes within Ireland which are open to public use, serve commercial air transport and have a paved runway of 800m or more or exclusively serve helicopters with instrument procedures, are certified by the IAA in accordance with EU Regulation No. 139 of 2014. These are known as certified aerodromes.

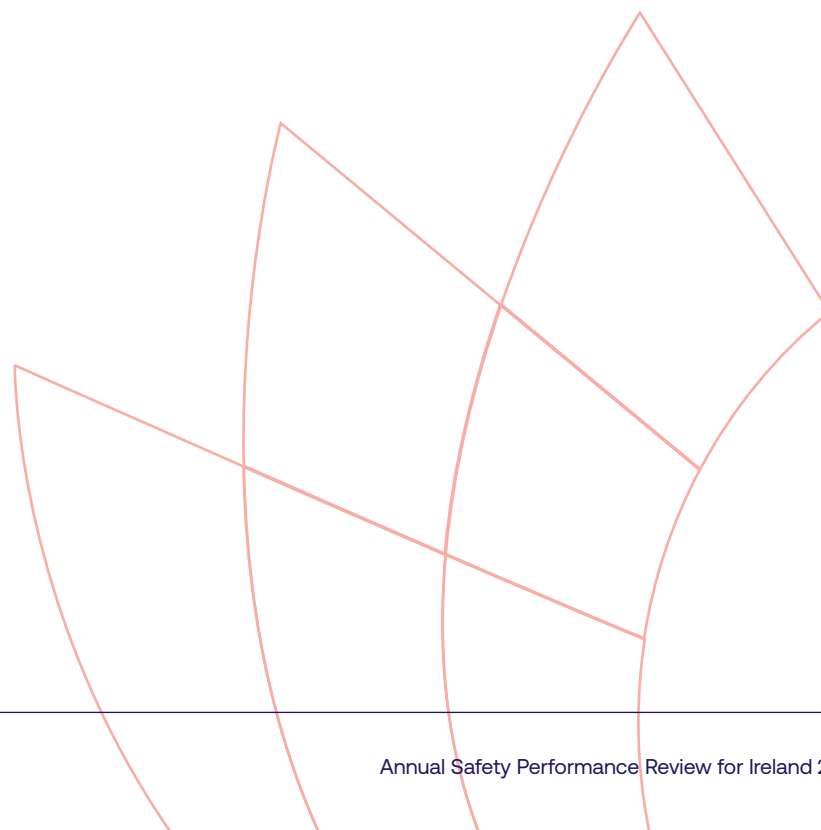
Under national aviation law, those aerodromes which are not within the scope of the European regulation require licensing if take-off or landing by aircraft carrying passengers or goods for hire or reward is being undertaken. These are known as nationally licensed – public use aerodromes.

Additionally, under national aviation law, where instruction in flying is being undertaken, there is a requirement under S.I. 355 of 2008 – Aerodromes and Visual Ground Aids Order for the aerodrome to be licensed. These are known as nationally licensed – private use aerodromes. In limited circumstances, an unlicensed aerodrome may be prescribed as suitable by the Authority dependent on the complexity of infrastructure and volume of instruction in flying activity taking place. A declaration can be made to the Authority to allow for the use of such an unlicensed aerodrome for instruction in flying.

During 2023, there were 8 certified aerodromes within Ireland, 5 nationally licensed public use aerodromes and 9 nationally licensed private use aerodromes. Details of the current certificated and licensed aerodromes are published in AIP Ireland, AD Section 1.5 – Status of Certification of Aerodromes. There were 5 unlicensed aerodromes where such a declaration is in place.

The Air Navigation and Aerodrome sector experienced its first post Covid-19 year totally free from pandemic disruptions and restrictions in 2023. Therefore it is considered more comparable in that regard with 2019. Traffic levels at Irish airports exceeded 2022 levels by 13% and were just shy of 2019 levels by 0.3%, a remarkable recovery.

The continuing war in Ukraine and the Israeli conflict which commenced in October 2023 have resulted in airspace restrictions and impacted traffic flows throughout Europe. Conflict Zone Information Bulletin (CZIB's) were issued and revised by EASA throughout the year. EASA also issued SIB 2022-02R2 providing the latest guidance on the subject of GPS/GNSS jamming and spoofing. The staffing and capacity issues that airlines, airports and ground handlers experienced in 2022 were better predicted and appeared to be less acute in 2023. The sustained release of the pent-up demand for travel continued apace through the busy summer season.



Accidents and Serious Incidents

This section discusses flight hours, departures, accidents and serious incidents involving aircraft engaged in Commercial Air Transport (CAT) at certified and licenced aerodromes in Ireland where there is an ATC service available. Those aerodromes are Dublin, Cork, Shannon, Ireland West, Kerry, Donegal, Sligo, Waterford and Weston. The aircraft involved may be registered in Ireland or abroad and hold an AOC issued by the IAA or a foreign NAA. Accidents and serious incidents involving aircraft engaged in General Aviation (GA) are not included in this section (refer to Section E below), unless there was a second aircraft involved in the same occurrence that was providing commercial services.

There were 4 non-fatal accidents and 4 serious incidents over the five-year period between 2019 and 2023 inclusive. In 2023 there was 1 non-fatal accident categorised as ‘Abnormal Runway Contact’ (ARC) and 1 serious incident categorised as ‘Runway excursion’ (RE).

Table D.1: Non-fatal accidents and serious incidents involving CAT at Irish certificated and licenced aerodromes which provide ATC services.

Year	2019	2020	2021	2022	2023	Total
No. flights at Irish airports	301,124	114,483	118,861	264,924	300,337	1,099,729
No. flight hours in Irish airspace	319,775	131,296	154,877	288,262	290,217	1,184,427
Non-fatal accidents	0	1	1	1	1	4
Serious incidents	1	0	1	1	1	4

Based on the findings of their investigation the AAIU assigns a CAST/ICAO common taxonomy category (sometimes more than one taxonomy may be assigned). Figure D.1 summarises the categories assigned to these 4 accidents and 4 serious incidents that took place between 2019 and 2023.

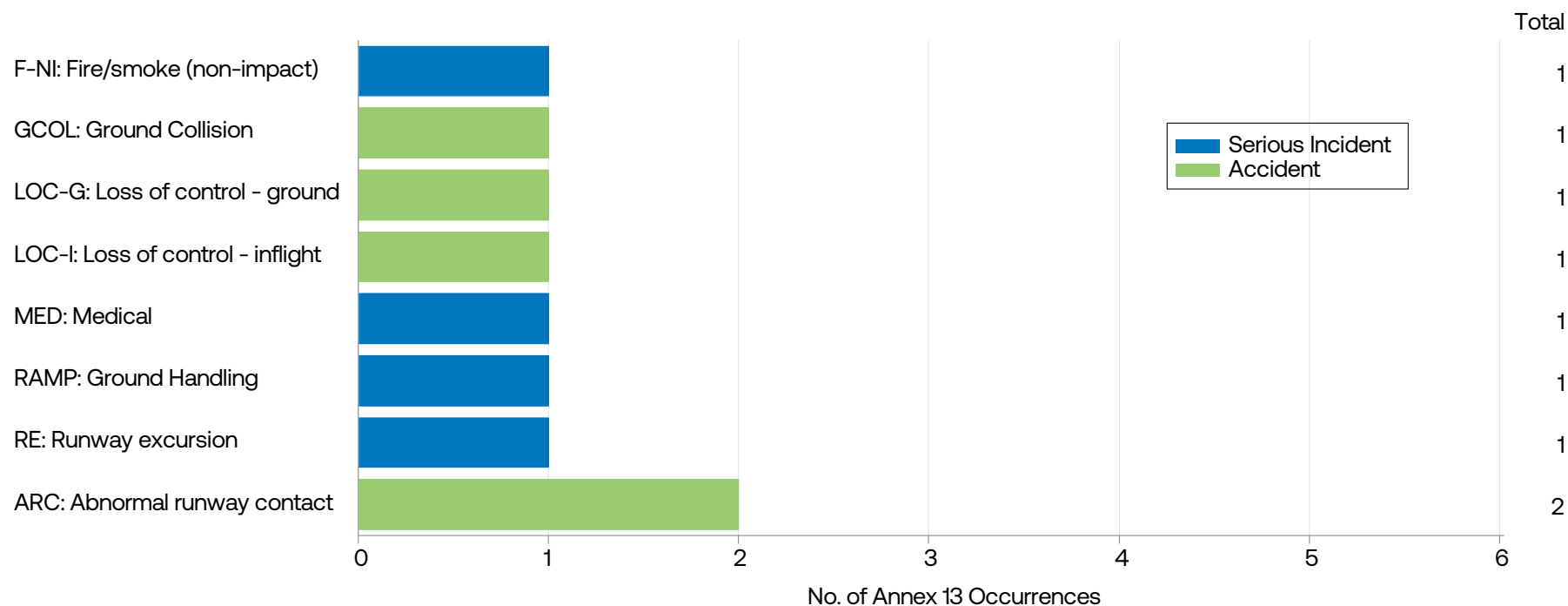


Figure D.1: Categorisations of Annex 13 occurrences involving CAT that occurred at Irish certificated/licenced aerodromes that provide ATC services.

Occurrence Reports

This section is divided into two functional sub-sections, the first presents an overview of occurrences reported by air navigation services providers and the second sub-section presents a synopsis of occurrences reported by aerodrome operators. Given the coexistent nature of their service provision a significant number of occurrences at an aerodrome may be reported by both the air navigation services provider and the aerodrome operator. However, it is important to that these occurrences are reviewed and assessed independently as the risk severity and mitigation strategies may differ in the different domains.

Sub-section 1: Air Navigation Service Provision

The IAA receives occurrence reports from ANS providers that occur in Irish airspace, including enroute operations, terminal operations and ground operations where ATC services are provided.

Figure D.2.(a) below provides a breakdown of the occurrences submitted according to occurrence category and ARMS Risk Classification Band for 2023. A similar dataset has been produced for 2017-2022 in Figure D.2.(b), to enable a comparison of the predominant occurrence categories between 2023 and the preceding 6 years.

In last year's ASPR the occurrence reporting graphs were presented in three separate timeframes, pre-Covid (2017-2019), Covid (2020-2021) and post Covid (2022), to enable a comparative analysis of safety performance between

those periods. It was noted that the top reported categories across the three timeframes i.e., pre-Covid (2017-2019), during Covid (2020-2021) and post-Covid largely remained unchanged. Therefore, it was deemed appropriate for this year's report to group the 6 years preceding 2023 into one graph.

Figure D.3 provides a breakdown of the top event types reported during 2023 that underlie the aforementioned occurrence categories and in some instances are precursor events to the more high-profile occurrence categories.

The most reported occurrence categories across both timeframes i.e., 2023 and 2017-2022 largely remain unchanged. These top categories included ATM occurrences (e.g., aircraft separation issues, aircraft go around, ATM equipment problems etc) and Navigation error (e.g., taxiway errors, level bust, ATC clearance issues).

Interestingly, MED occurrences were the 3rd most reported category in 2023 up from being the 7th most reported category during 2017-2022. Medical/incapacitation of a passenger is also the 4th most common event type in Figure D.3. SEC occurrences were 4th most reported category in 2023 up from being the 6th most reported category during 2017-2022. Interference with aircraft was an event type that significantly contributed to this category, it includes interference by disruptive passengers and laser attacks and was the 4th most commonly reported event type in 2023.

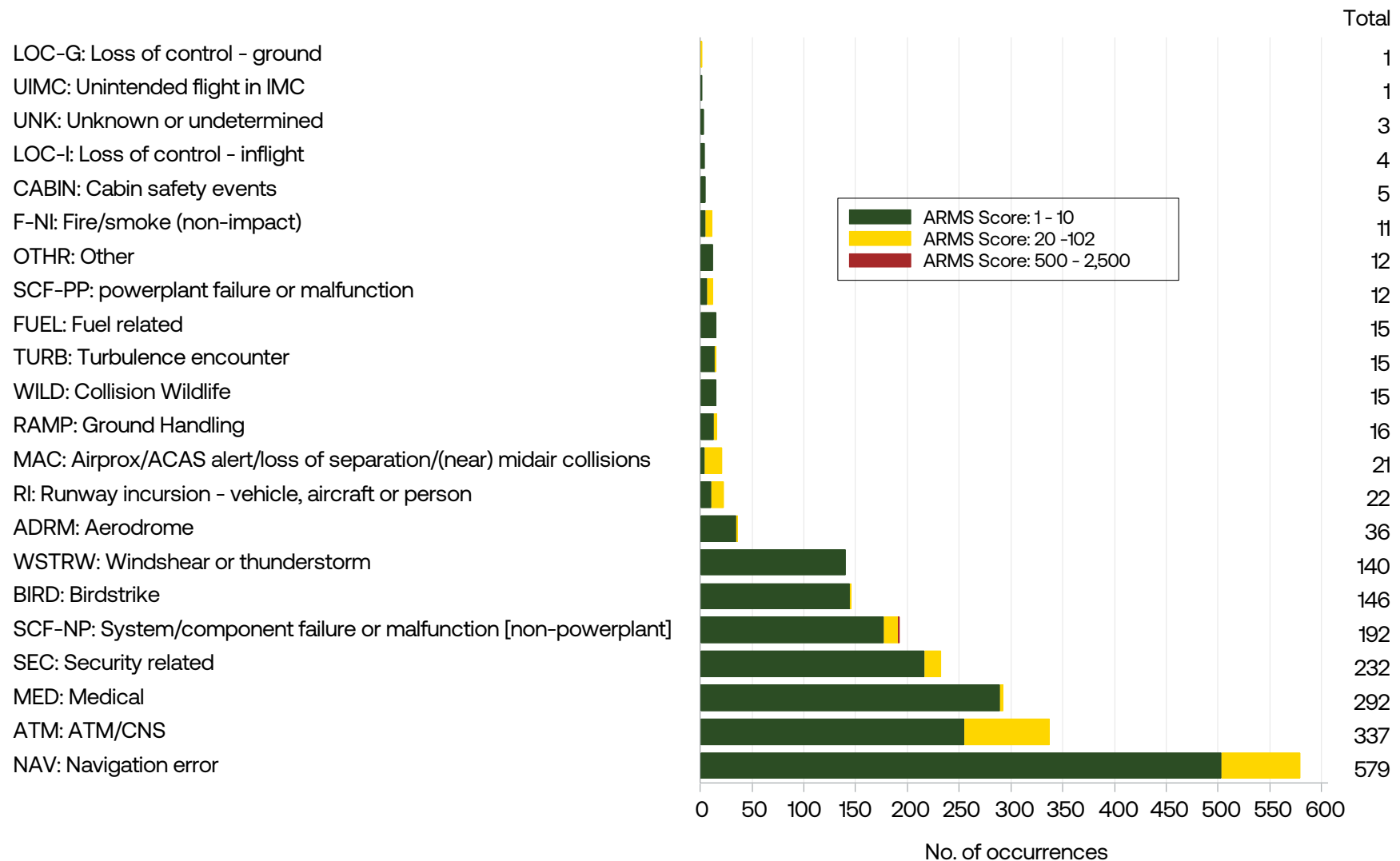


Figure D.2(a) ATC Occurrence Reports 2023

USOS: Undershoot/overshoot
 LALT: Low altitude operations
 EVAC: Evacuation
 UNK: Unknown or undetermined
 GCOL: Ground Collision
 UIMC: Unintended flight in IMC
 RE: Runway excursion
 AMAN: Abrupt manoeuvre
 CFIT: Controlled flight into or toward terrain
 LOC-G: Loss of control - ground
 ICE: Icing
 ARC: Abnormal runway contact
 RAMP: Ground Handling
 CABIN: Cabin safety events
 F-NI: Fire/smoke (non-impact)
 RI: Runway incursion - vehicle, aircraft or person
 TURB: Turbulence encounter
 FUEL: Fuel related
 WILD: Collision Wildlife
 MAC: Airprox/ACAS alert/loss of separation/(near) midair collisions
 SCF-PP: powerplant failure or malfunction
 ADRM: Aerodrome
 LOC-I: Loss of control - inflight
 OTHR: Other
 MED: Medical
 SEC: Security related
 BIRD: Birdstrike
 WSTRW: Windshear or thunderstorm
 SCF-NP: System/component failure or malfunction [non-powerplant]
 NAV: Navigation error
 ATM: ATM/CNS

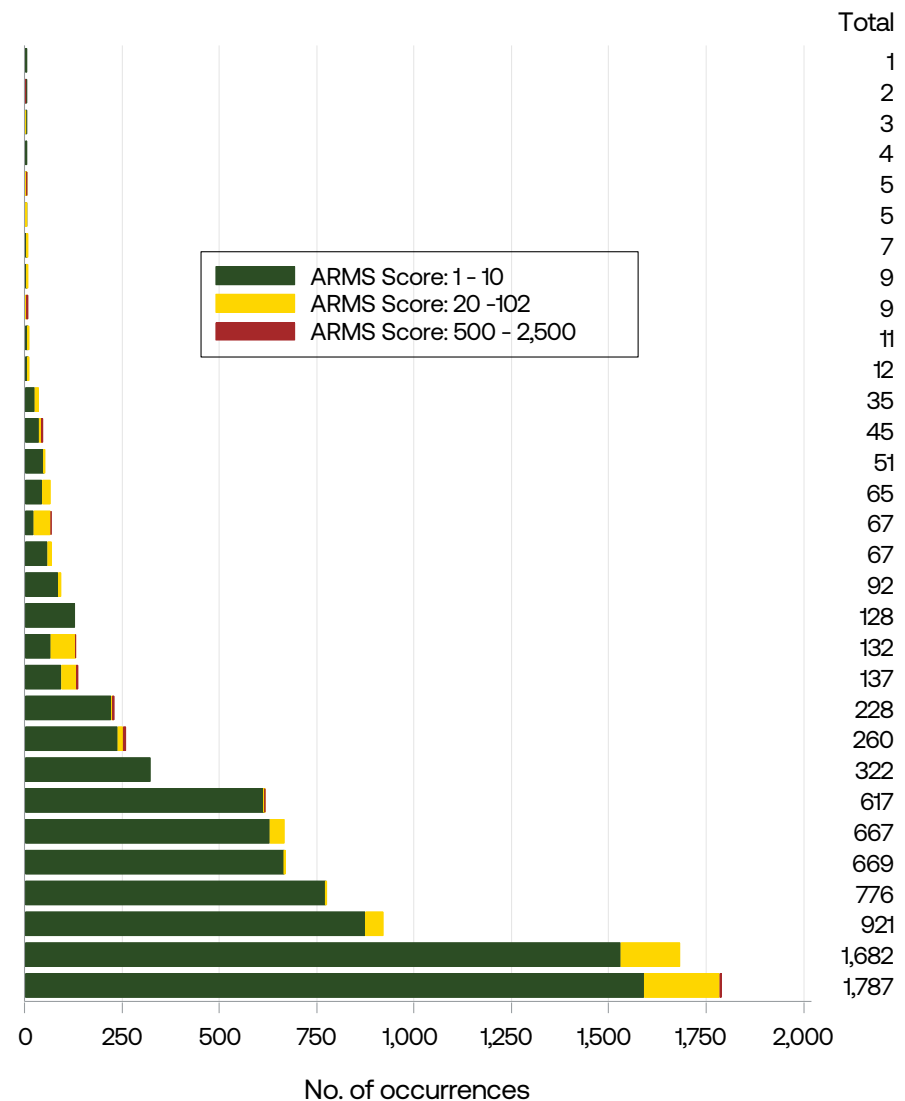


Figure D.2(b) ATC Occurrence Reports 2017-2022

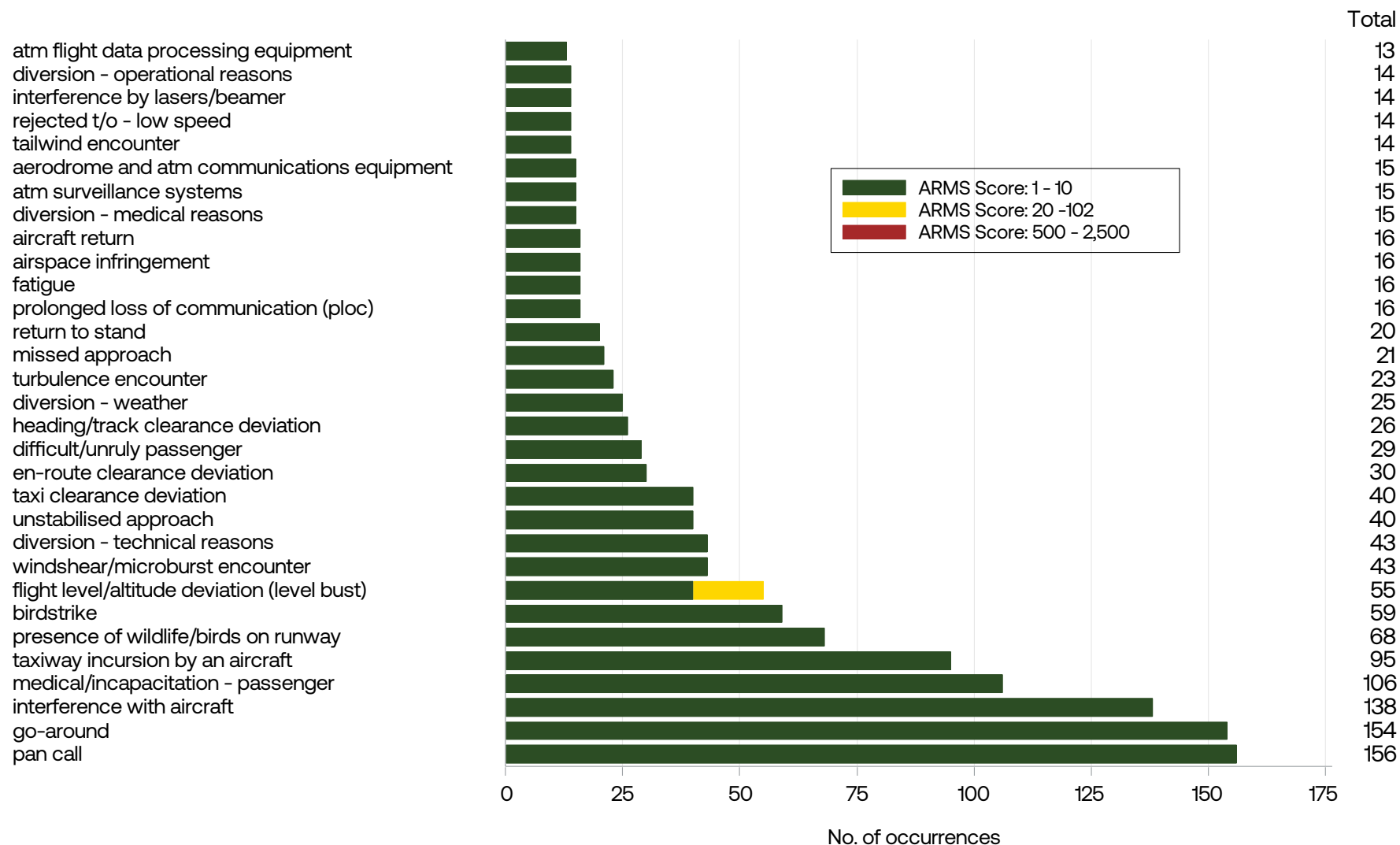


Figure D.3 Top Event Types – ATC 2023

As required by Implementing Regulation (EU) 2017/373, the CA monitors and assesses the safety performance of ATM/ANS service providers under its oversight. Safety performance is monitored through the following set of safety performance indicators (SPIs)

SPI-1; SMI - Separation Minima Infringement

SPI-2; RI - Runway Incursion

SPI-3; AD - Aircraft Deviation from Clearance, Procedures or Regulation

Sub-categorised as:

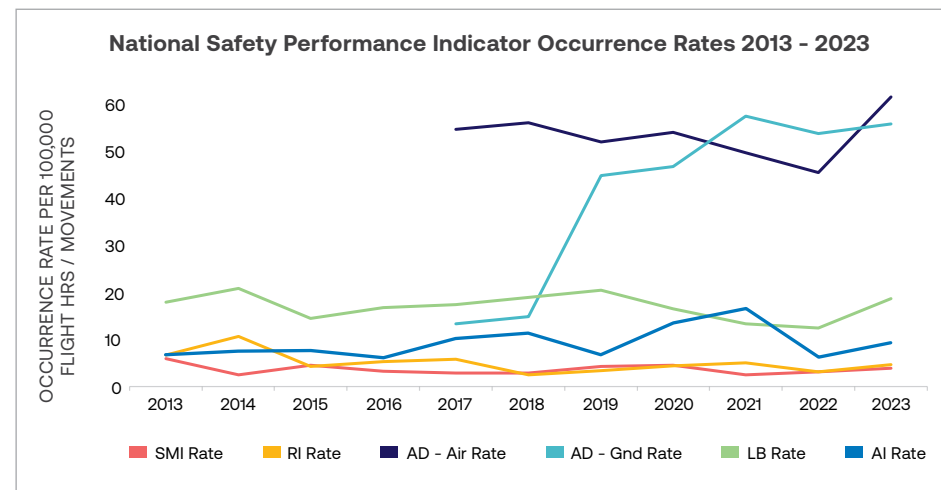
- AD - Air (Airborne Deviation)
- AD - Gnd (Ground-based Deviation)

SPI-4; LB - Level Bust

SPI-5; AI - Airspace Infringement

Nationally, SPIs are measured as a rate per 100,000 flight hours for airborne occurrences. Ground-based aircraft deviations (AD-Gnd) and runway incursions (RI) are measured as a rate per 100,000 movements.

Figure D.2 Annual National SPI Occurrence Rates – 11-year view.



Separation minima infringements (SMI) and runway incursions (RI) are considered to be the two most significant SPIs, as they are inherently closer to the accident scenario than the other SPI categories of, aircraft deviations, level busts and airspace infringements which can be precursors to SMI and RI.

Since 2013, the rates of SMI and RI have continuously remained at 10 or less per 100,000 flight hours and movement respectively.

In 2017, SPI-3: aircraft deviations was sub categorised into airborne deviations and ground-based deviations, to facilitate more relevant measurement of these occurrences.

In 2023, annual rate of ground-based deviations (AD-Gnd) remains high at 56 per 100,000 movements, above the 7-year average rate of 41 per 100,000 movements.

In 2023, the annual rate of airborne deviations (AD-Air) was at the highest recorded rate at 62 per 100,000 flights hours, above the 7-year average of 53 per 100,000 flight hours.

In 2023, the annual rate of Level Busts (LB) has increased and appears to have returned to pre-COVID rates.

In 2023, the annual rate of Airspace Infringements (AI) remained below the 7-year average rate of 11 per 100,000 flights.

These SPI's and related trends are subject to ongoing review at the relevant airport Local Runway Safety Teams, which includes inputs from stakeholders across the relevant domains to identify and address the main safety issues under-lying the safety performance data.

Safety Issues – Air Navigation Service Provision

This section provides a summary of the main safety issues that emerge as a result of the analysis of these safety performance statistics for air navigation service provision.

Key Safety Area	Safety Issues
Mid-Air Collision (MAC)	<ul style="list-style-type: none">• Identification and response to airspace infringement• Control of traffic flow to prevent separation minima infringement• Recognition and response to deviation from ATC clearance• Adherence to standard phraseology in ATC communications• Adherence to ATC communication procedures (e.g. readback/hearback)• Management of declared emergencies• Anticipation and response to aircraft go-around• Reaction to drone infringements into controlled airspace
Runway Incursion	<ul style="list-style-type: none">• Recognition and response to deviation from ATC clearance by aircraft and ground vehicles• Protection of runway operations• Control of ground movements in low visibility operations• Adherence to standard phraseology in ATC communications• Adherence to ATC communication procedures (e.g. readback/hearback)

Key Safety Areas:

ICAO and EASA analyses of aviation safety data on a worldwide basis has identified that two of the main contributors to accidents with a high number of fatalities in commercial aeroplane operations are mid-air collision (MAC) and runway incursions (RI). Whereas the ANS providers may not always contribute to the cause of these type of accidents, they can play an important role in their prevention.

Figure D.1 shows that there were no accidents or serious incidents in the key safety areas of MAC or RI over the past 5 years. Figures D.2.(a) and D.2.(b) combined show that over the past 7 years ANS providers reported 153 MAC related occurrences and 89 RI related occurrences. In 2023, there was 1 non-fatal accident categorised as ‘Abnormal Runway Contact’ (ARC) and 1 serious incident categorised as ‘Runway excursion’ (RE).

Table D.2 shows the trends from 2013 to 2023 for key ANS related safety performance indicators. Separation minimum infringements, airspace infringements and level bust events could be part of the causal chain of events that could lead to a MAC related occurrence, albeit there are other safety nets available (e.g. collision avoidance systems, ATC intervention etc) that add further protections in this regard. Deviation from ATC clearance can be associated with a MAC occurrence or with a runway incursion.

Number and Rate of ANS MORs: 2017 to 2023

Table D.3 provides a comparison between the number of flight hours flown and the corresponding MOR rates per 10,000 flight hours from 2017 to 2023. The reporting rate has steadily increased over the years with a peak in 2020 the first year of Covid-19. This indicates that the organisations SMSs were well managed during the pandemic despite the challenges for ANS staff due to the pandemic and continued to show a maturing reporting culture onwards through the recovery phase.

Table D.3: No. and rate of MORs according to flight hours from 2017 to 2023

Year	Flight hours	Total	
		Number	Rate
2017	311,715	1,400	44.91
2018	315,776	1,717	54.37
2019	319,775	1,693	52.94
2020	131,296	875	66.64
2021	154,877	907	58.56
2022	288,262	1,713	59.43
2023	290,217	1,998	68.85

Sub-section 2 – Aerodrome Operations

A breakdown of the occurrences submitted during 2023 by occurrence category and ARMS Risk Classification Band is shown in Figure D.4 (a) below, followed by comparative charts for 2017-2022 in Figure D.4 (b).

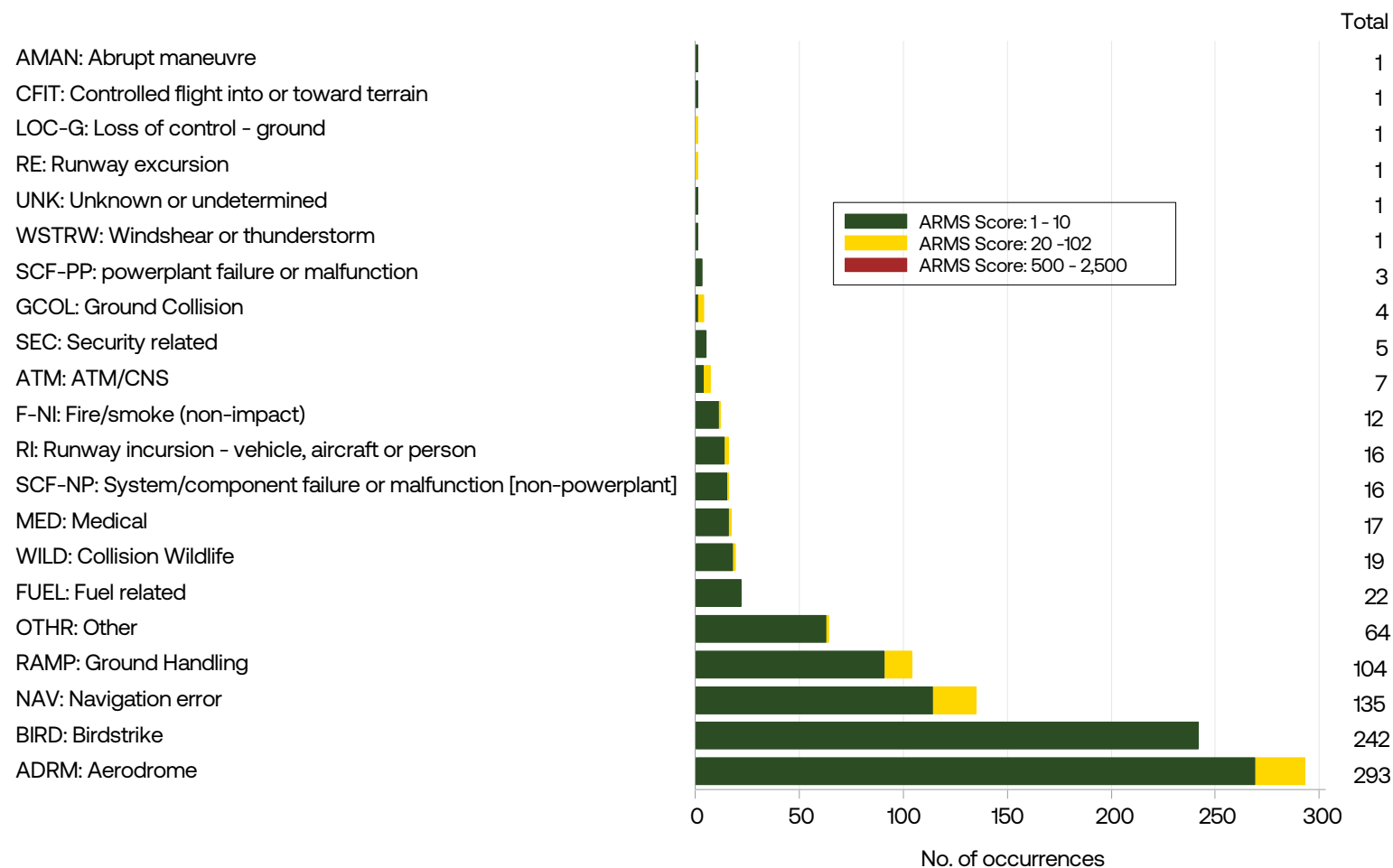


Figure D.4 (a) Aerodrome Occurrence Reports 2023

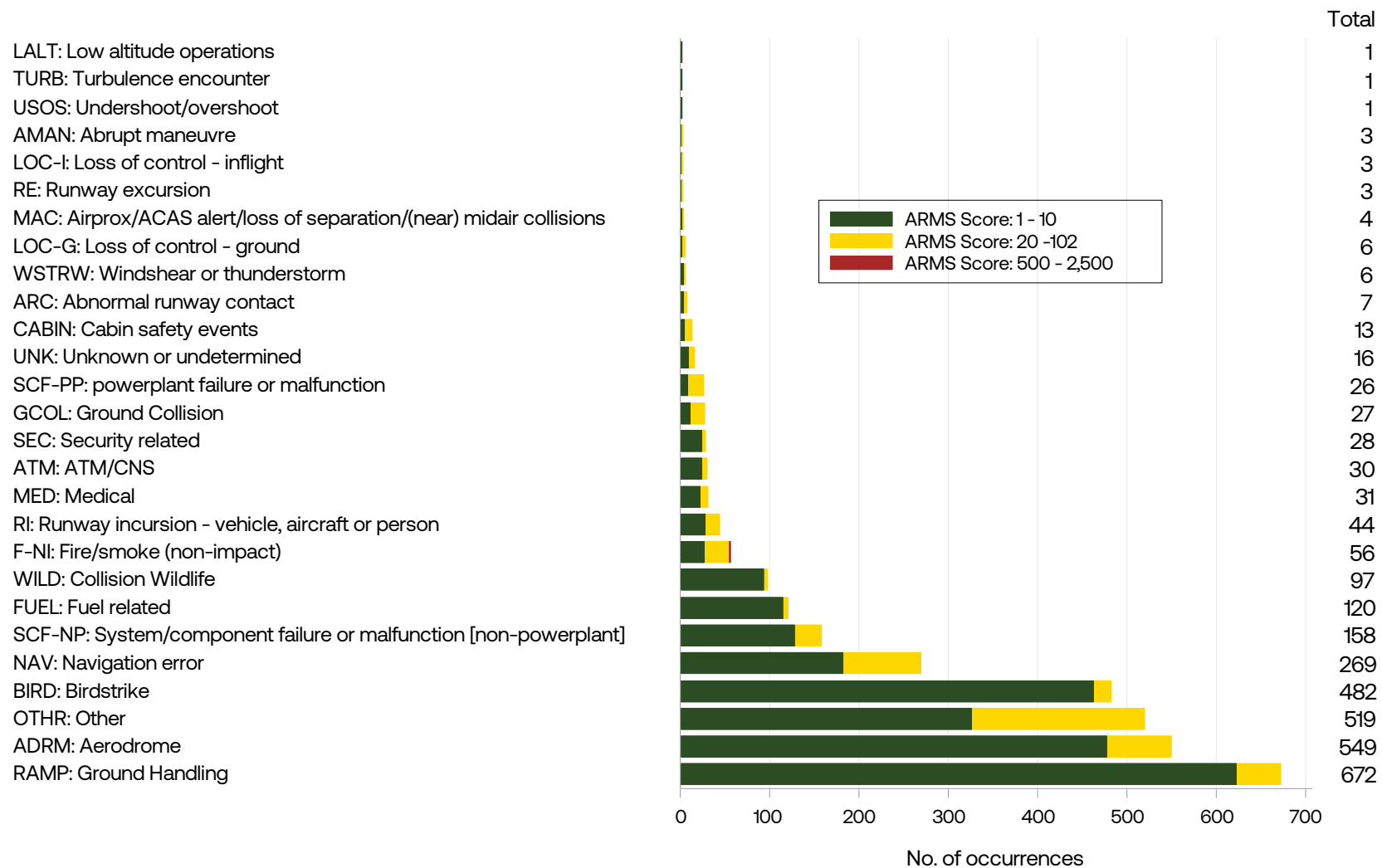


Figure D.4 (b) Aerodrome Occurrence Reports 2017-2022

The top occurrences categories have largely remained the same only changing marginally in their order over the timeframes presented this year and last year. ADRM or aerodrome related occurrences including occurrences relating to the design and servicing of aerodrome facilities and equipment were among the most common occurrence categories reported by aerodrome operators in both 2023 and the preceding 6 years.

NAV or navigation error category which includes ‘flight crew atc clearance deviation’, ‘taxi clearance deviation’ and ‘atm regulation deviation’ continues to be commonly reported in 2023, as it was during the Covid period. This was not the case pre-Covid, and the change may be indicative of the participants in the overall aviation system experiencing more pressure.

During 2023 RAMP ground handling (e.g., loading, towing, fuelling of aircraft etc) was the 4th most reported occurrence category while it was the most commonly reported category during the preceding 6 years.

Figure D.5 shows that the top event types reported during 2022 were ‘aerodrome fod control’, ‘birdstrike’ and ‘flight crew atc clearance deviation’. Birdstrike and the presence of wildlife/birds on runway are events in line with the safety issue of “Increased presence of wildlife on aerodromes” that was identified as part of the Covid-19 risk portfolio and appears to have remained in the return to normal operations.

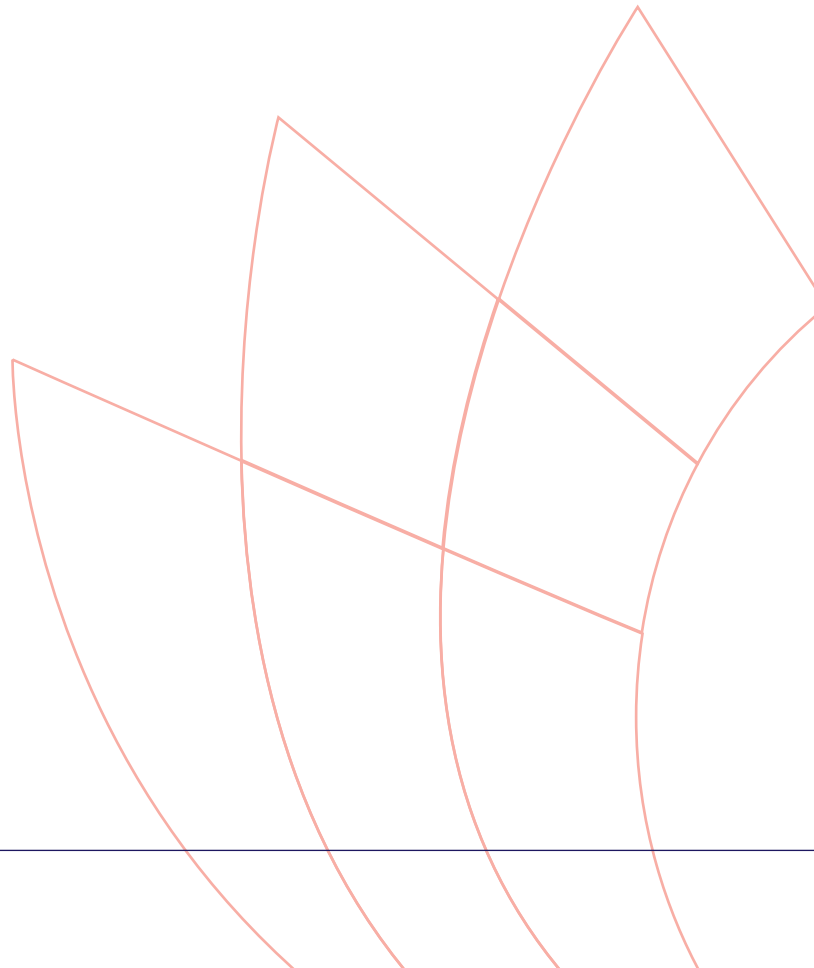


Figure D.5 provides a list of the top event types recorded and so gives more detail as to the events that populate these categorisations.

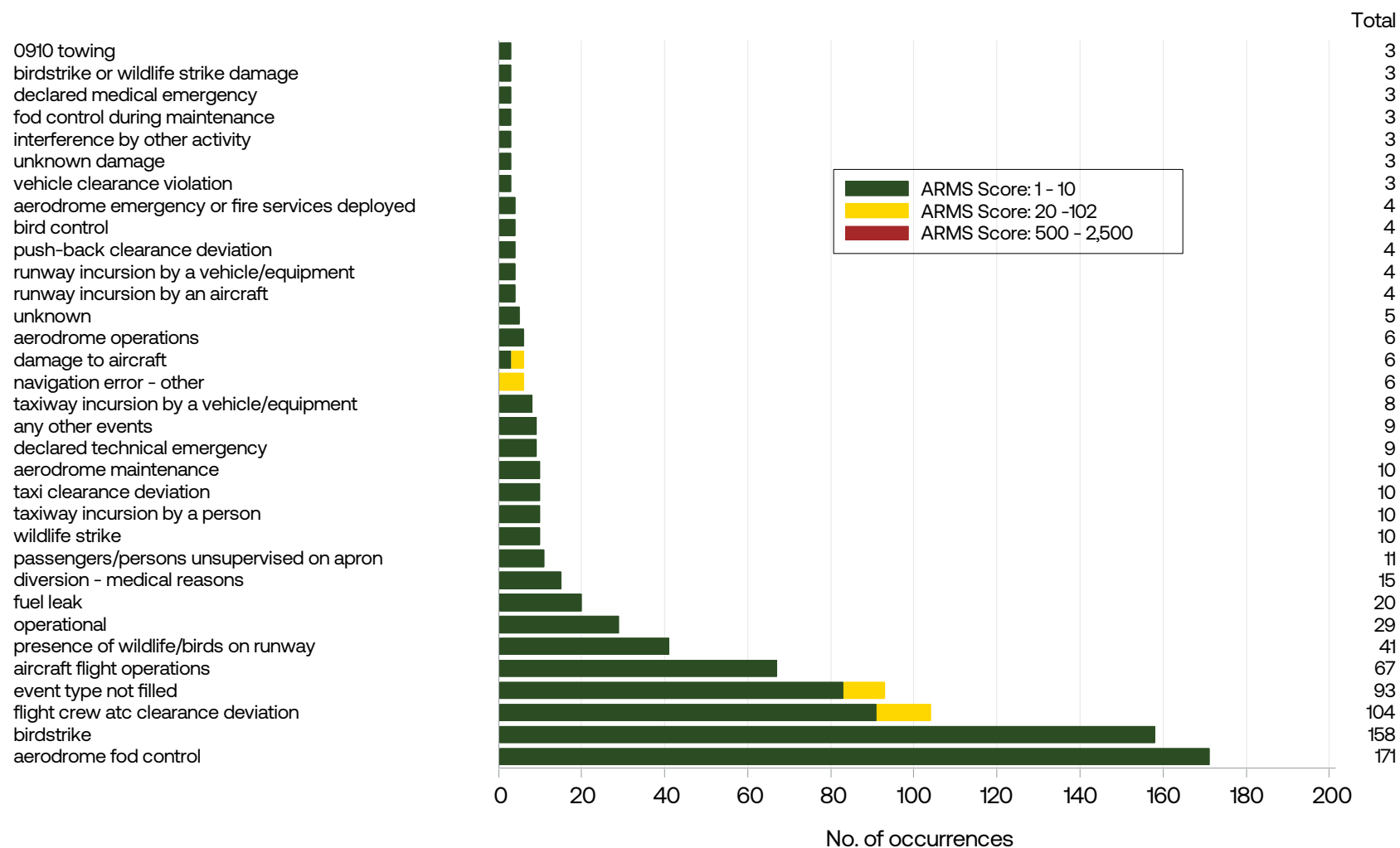


Figure D.5 Top Event Types – Aerodrome 2023

Safety Issues:

This section provides a summary of the main safety issues that emerge as a result of the analysis of these safety performance statistics for aerodrome operations. This detailed analysis of safety information in the Aerodrome

domain in conjunction with follow-up information from the reporting organisations has identified the following safety issues that are included in the Aerodrome sector-based risk register.

Key Safety Area	Safety Issues
Runway Excursions (RE)	<ul style="list-style-type: none">• Removal of runway contamination (e.g. snow, ice, foreign objects)• Maintenance of runway surface condition• Reporting on runway surface condition
Runway Incursion (RI)	<ul style="list-style-type: none">• Management of ground movements in low visibility conditions• Deviation from ATC clearance by ground vehicles• Adherence to standard phraseology in ATC communications• Adherence to ATC communication procedures (e.g. readback/hearback)
Aircraft Upset (LOC-I)	<ul style="list-style-type: none">• Adherence to aircraft loading procedures (e.g. passengers, baggage and cargo, fuel) and accurate completion of aircraft loadsheets when provided by aerodrome operator• Adherence to aircraft ground handling procedures (e.g. de-icing, dangerous goods)• Reporting of damage to aircraft during ground operations• Wildlife strike hazard management in the vicinity of airports• Awareness of LOC-I risk among ground handling agents

Key Safety Areas:

Runway incursion (RI), runway excursion (RE) and aircraft upset/loss of control - inflight (LOC-I) are key safety areas identified globally where aerodrome operations could have a bearing. Runway incursion events could be attributed to the unauthorised presence of ground vehicles on the runway, or the

presence of wildlife, both of which could present a serious risk to an aircraft during take-off or landing. The condition of the runway surface itself, or failure to report this condition accurately, could contribute to the risk of a runway excursion. An aerodrome operator may also provide ground handling services some of which (e.g. aircraft loading or unreported aircraft damage) could in exceptional circumstances lead to flight control difficulties.

Over the past five years there have been no accidents and no serious incidents categorised as runway incursion (RI), there have been no accidents and 1 serious incident categorised as runway excursion (RE), which occurred in 2023, see Figure D.1 There was 1 non-fatal accident categorised as ‘abnormal runway contact’ (ARC) which is still under investigation. While there was no accident or serious incident categorised as runway incursion Figures D.4. (a) and (b) show that there were 60 runway incursions reported by aerodrome operators between 2017 and 2023.

Other Safety areas:

Many of the Ground Handling occurrences reported reflect events that do not affect the key safety areas but could nonetheless result in injury to passengers

or aerodrome staff, and aircraft damage with potentially lengthy delays to passengers.

Aerodrome operators have primary responsibility for protection of the airport from drone infringements, including the temporary suspension of operations in case of an occurrence.

The following safety issues are also included in the Aerodrome sector-based risk register.

Safety Area	Safety Issues
Safety of persons on the zpron	<ul style="list-style-type: none">• Routing of passengers from gate to aircraft steps• Condition of aircraft steps• Movement of ground operations personnel on the apron• Management of ground vehicle traffic in proximity to aircraft• Protection of personnel from jet-blast or propeller wash• Perception and situational awareness, especially during bad weather conditions and at nighttime• Experience, training and competence of individuals
Prevention of aircraft damage	<ul style="list-style-type: none">• Co-ordination and control of turnarounds between various agencies• Ground vehicles approaching and positioning around aircraft and different aircraft types• Adherence to aircraft marshalling, pushback and towing procedures• Management of ground movements in low visibility conditions• Adherence to positioning, securing and decongestion procedures for ground service equipment on the apron
Drone infringements	<ul style="list-style-type: none">• Management of aerodromes operations in the event of drone infringement, including suspension and re-activation of flight operations as required• Prohibition of drone flying in close proximity to an aerodrome

Number and rate of aerodromes MORs from 2017 to 2023

The following table outlines the number of movements along with the corresponding MOR rates per 10,000 movements annually from 2017 to 2023. The number of movements in 2023 increased 13% on 2022 levels and was almost on a par with 2019, registering a mere 0.3% lower. The reporting rate increased in 2023 on 2022's level and is almost at the high recorded during the Covid years (2022-2021). The improved reporting rate over the pandemic years 2020-2021 may have been due to the greater focus by industry on Safety Management Systems in their endeavours to monitor risks posed by the Covid-19 pandemic.

Table D.9: No. and rate of MORs according to movements from 2017 to 2023

Year	Flight hours	Total	
		Number	Rate
2017	283,374	510	18.00
2018	293,961	461	15.68
2019	301,124	570	18.93
2020	114,483	362	31.62
2021	118,861	404	33.99
2022	264,924	670	25.29
2023	300,337	924	30.77

Section E: General Aviation in Ireland



Introduction

General Aviation (GA) in Ireland is defined as any aviation activity not categorised as Commercial Air Transport (CAT). It includes aviation activities regulated under European law such as.

- specialised operations (Part SPO) such as aerial photography, and parachute support operations; and
- non-commercial operations using non-complex aircraft (Part NCO) such as private flying, pilot training, introductory flights, and cost-sharing flights.

Aviation activities subject to Irish national law in accordance with Basic Regulation (EU) 2018/1139 Annex I, such as historic, amateur built (sometimes referred to as homebuilt), specific categories of helicopters, sailplanes, powered parachutes and balloons etc. are also included. Please refer to Regulation (EU) 2018/1139 Annex I for a more detailed breakdown of the criteria for aircraft in these categories.

Due to the diverse range of GA activities in Ireland this section has initially been divided into two sections; EASA certified and non-EASA certified (Annex I), followed by a more detailed review on the safety performance of the subsectors active in Ireland.

GA EASA Regulated Aircraft

All aircraft, certified and non-certified, which are not included in Annex I to 2018/1139 including:

- Aeroplanes with a maximum take-off mass (MTOM) of 2,250 kg and above and less than 5700kg.
- Aeroplanes with an MTOM less than 2,250 kg,
- Helicopters – with an MTOM of 2,250 kg and above.
- Helicopters – with an MTOM of less than 2,250 kg.
- Hot Air Balloons.
- Sailplanes and powered sailplanes – with rigid wings and undercarriage.

GA Non-EASA Regulated Aircraft: Aircraft subject to Irish national legislation and included in Annex I to 2018/1139.

- Annex I 1 (a) – Historic Aircraft
- Annex I 1 (c) – Kit /Amateur Built (Homebuilt) Aircraft
- Annex I 1 (e) – Aeroplanes, helicopters, powered parachutes, sailplanes, and power sailplanes meeting associated seating and mass criteria.
- Annex I 1 (f) Gyroplanes.

Note

Performance data for Part-NCC operations (i.e. involving complex aircraft) have been included in the commercial operations sections; refer to Section B: The Irish Fixed-wing Commercial Air Transport Sector and Section C: The Irish Commercial Helicopter Sector.

Accidents and Serious Incidents:

Like the experience of other aviation domains, General Aviation enjoyed its first post Covid-19 year totally free from pandemic disruptions in 2023 and therefore is considered more comparable in that regard with 2019. Unlike in CAT operations, there are no official movement figures for GA, however 2023 saw a resumption of the normal calendar of fly-ins and social gatherings, not experienced since pre-Covid. Unfortunately, the Irish summer weather also returned to normal, and the inclement conditions likely impacted the level of GA activity.

Thankfully there were no fatal accidents in GA in Ireland in 2023. Fatal accidents from previous years are referenced in this document, these events always leave the aviation community deeply saddened by the loss of any of its members and we extend our sympathy to the family, colleagues and friends experiencing this loss.

There were 4 non-fatal accidents, 3 related to Annex I aircraft. They were an Annex I 1 (c), previously referred to as a homebuilt, an Annex I 1 (e), sometimes referred to as a 450kg microlight and a Lithuanian registered Annex I Aerobatic aircraft. These 4 non-fatal accidents also included 1 EASA certified fixed wing < 2250kg. There was also 1 serious incident concerning an EASA certified fixed wing aeroplane < 2250kg.

While the primary objective in accident investigation is the prevention of accidents and incidents, it is a crude means of learning lessons and improving safety, which is why it behoves all of us as stakeholders to endeavour to raise the safety bar by all means possible in order to avoid catastrophic outcomes. This includes the implementation and use of safety occurrence reporting systems as well as safety promotion initiatives to promulgate safety information on lessons learnt hazard identification and risk mitigation.

A tabulated summary of the safety performance of this sector in respect of accidents and serious incidents in 2023 compared to the previous 4 years (2019-2022) is provided in Table E.1 below. It has been subdivided into EASA certified and non-EASA certified (Annex I) aircraft, as these two subdivisions are subject to differing regulatory regimes and oversight procedures.

Charts outlining the categorisation of accidents and serious incidents are provided. These include all General Aviation accidents and serious incidents that occurred in Ireland, whether the aircraft was registered in Ireland, or registered abroad (e.g. visiting aircraft or foreign registered aircraft based in Ireland).

Table E.1

		No. of fatal accidents (fatalities) 2023	Total no. of fatal accidents 2019-2022 with (total fatalities)	No. of non-fatal accidents 2023	Total no. of non-fatal accidents 2019-2022	No of Serious Incidents 2023	Total no. of serious incidents 2019-2022
EASA Certified Aircraft	GA Sub-Sector						
	Aeroplanes >2250 ≤5700 kg	0 (0)	0 (0)	0	3	0	0
	Aeroplanes ≤2250 kg	0 (0)	0 (0)	1	8	1	6
	Helicopters > 2250 kg	0 (0)	0 (0)	0	0	0	0
	Helicopters ≤ 2250 kg	0 (0)	1 (1)	0	0	0	0
	Sailplanes	0 (0)	0 (0)	0	1	0	0
	Balloons	0 (0)	0 (0)	0	0	0	0
Non-EASA Certified Aircraft	Non-EASA Certified Aeroplanes ≤2250 kg	0 (0)	1 (2)	1	1	0	0
	Non-EASA Certified Helicopters ≤2250 kg	0 (0)	0 (0)	0	1	0	0
	1 (c) Homebuilt ≤2250 kg	0(0)	1 (2)	1	3	0	1
	1 (e) Aircraft including Microlights	0 (0)	1 (1)	1	8	0	0
	1 (f) Gyroplanes	0 (0)	0 (0)	0	1	0	0
	1 (e) Sailplane, glider, powered paragliders, paragliders, and powered parachutes	0 (0)	2 (2)	0	7	0	0
	Amphibian	0 (0)	0 (0)	0	0	0	1

Land Aeroplanes - with an MTOM > 2,250 kg ≤ 5,700kg.

There were 6 land aeroplanes with an MTOM 2,250 kg ≤ 5,700kg Irish aircraft register at the end of 2023.

There were no fatal accidents, non-fatal accidents or serious incidents involving land aeroplanes in this category in 2023.

Over the previous four years (2019-2022) there were 3 non-fatal accidents, no fatal accidents and no serious incidents. The 3 non-fatal accidents were all categorised as 'Abnormal Runway Contact' (ARC), 2 accidents involved an Irish registered aircraft and 1 involved a foreign registered aircraft.

EASA Regulated Land Aeroplanes - MTOM ≤ 2,250 kg

There were 128 EASA certified land aeroplanes with an MTOM ≤ 2,250 kg on the Irish aircraft register at end of 2023.

In 2023 there were no fatal accidents, 1 non-fatal accident and 1 serious incident in this sub-sector. Both events were categorised as 'Runway Excursion' (RE).

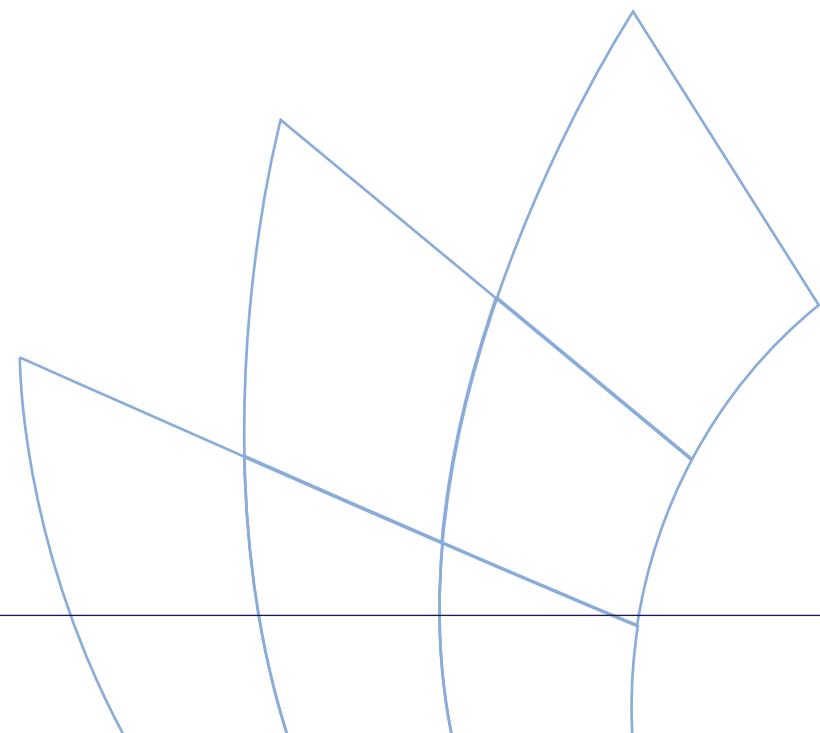
During the previous 4 years (2019-2022) there were no fatal accidents, 8 non-fatal accidents and 6 serious incidents. 'Abnormal Runway Contact' (ARC) was the most assigned categorisation, being designated on 6 occasions. Runway Excursion' (RE) was assigned to 4 events and 'System/ Component Failure – Powerplant' (SCF-PP) on 3 occasions. 'Fuel' (FUEL), 'Collision with obstacles during take-off and landing' (CTOL), and 'Fire/smoke non-impact' (F-NI) were each ascribed once. Over the 5 years, 7 of the accidents and serious incidents involved foreign registered aircraft and 9 related to Irish registered aircraft.

Non-EASA certified Land Aeroplanes MTOW ≤ 2250 kgs.

In 2023 there were no fatal accidents, 1 non-fatal accident and no serious incidents involving aircraft in this sub-sector.

Over the previous four years (2019-2022), aeroplanes in this sub-sector were involved in 1 fatal accident with 2 fatalities, involving an Irish registered aircraft which was categorised as 'System/ Component Failure – Non-Powerplant' (SCF-NP). There was also 1 non-fatal accident involving an Irish registered aircraft categorised 'Loss of control on the ground' (LOC-G).

The AAIU assigned occurrence categories for accidents and serious incidents involving EASA and non-EASA Certified Land Aeroplanes MTOM ≤ 2,250 kg in the last five years are shown in Figure E.2.



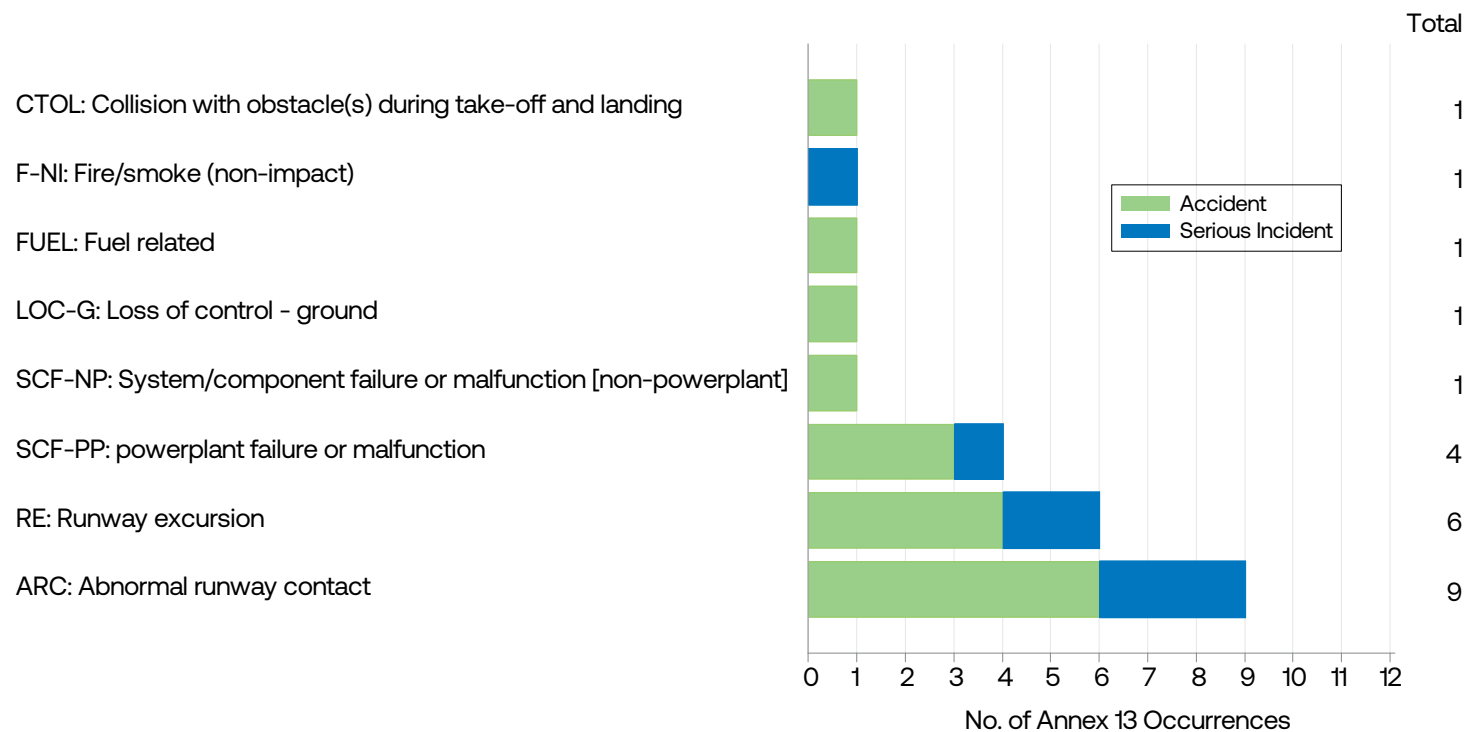


Figure E.2: Occurrence categories assigned to accidents and serious incidents involving GA aeroplanes with an MTOM below 2,250 kg (2019-2023).

Note: some events have been assigned more than one categorisation.

Rotorcraft

There were 6 complex rotorcraft and 23 non-complex rotorcraft registered in Ireland at the end of 2023.

There were no fatal accidents, non-fatal accidents or serious incidents involving GA rotorcraft operations in 2023.

During the previous four years (2019–2022) there was 1 fatal accident involving a foreign registered non-complex rotorcraft with 1 fatality. This accident has been initially categorised as ‘Loss of control in flight’ (LOC-I), the AAIU investigation of this accident is currently ongoing. There was 1 non-fatal accident involving a foreign registered non-complex rotorcraft, also categorised as ‘Loss of control in flight’ (LOC-I). There were no serious incidents in this sector during these 4 years.

Amateur Built (homebuilt) – Annex I 1 (c)

This subsection was previously referred to as homebuilt aeroplanes. There were 60 homebuilt aeroplanes on the Irish aircraft register at end of 2023 in this sub-sector.

There were no fatal accidents, 1 non-fatal accident categorised as RE and no serious incident involving Annex I 1 (c) / homebuilt aeroplanes in 2023.

During the previous four years (2019–2022) there was 1 fatal accident with 2 fatalities which occurred in 2019, involving a foreign registered aircraft and was categorised as ‘Loss of Control- Inflight’ (LOC-I). In addition, there were 3 non-fatal accidents involving 2 Irish registered aircraft and 1 foreign registered aircraft. The most common occurrence category assigned by the AAIU to these non-fatal accidents was ‘Abnormal Runway Contact’ (ARC) with ‘Windshear or thunderstorm’ (WSTRW) being assigned once. There was 1 serious incident, categorised as ‘Abnormal Runway Contact’ (ARC) and ‘System/ Component Failure - Non-Powerplant’ (SCF-NP), during this time.

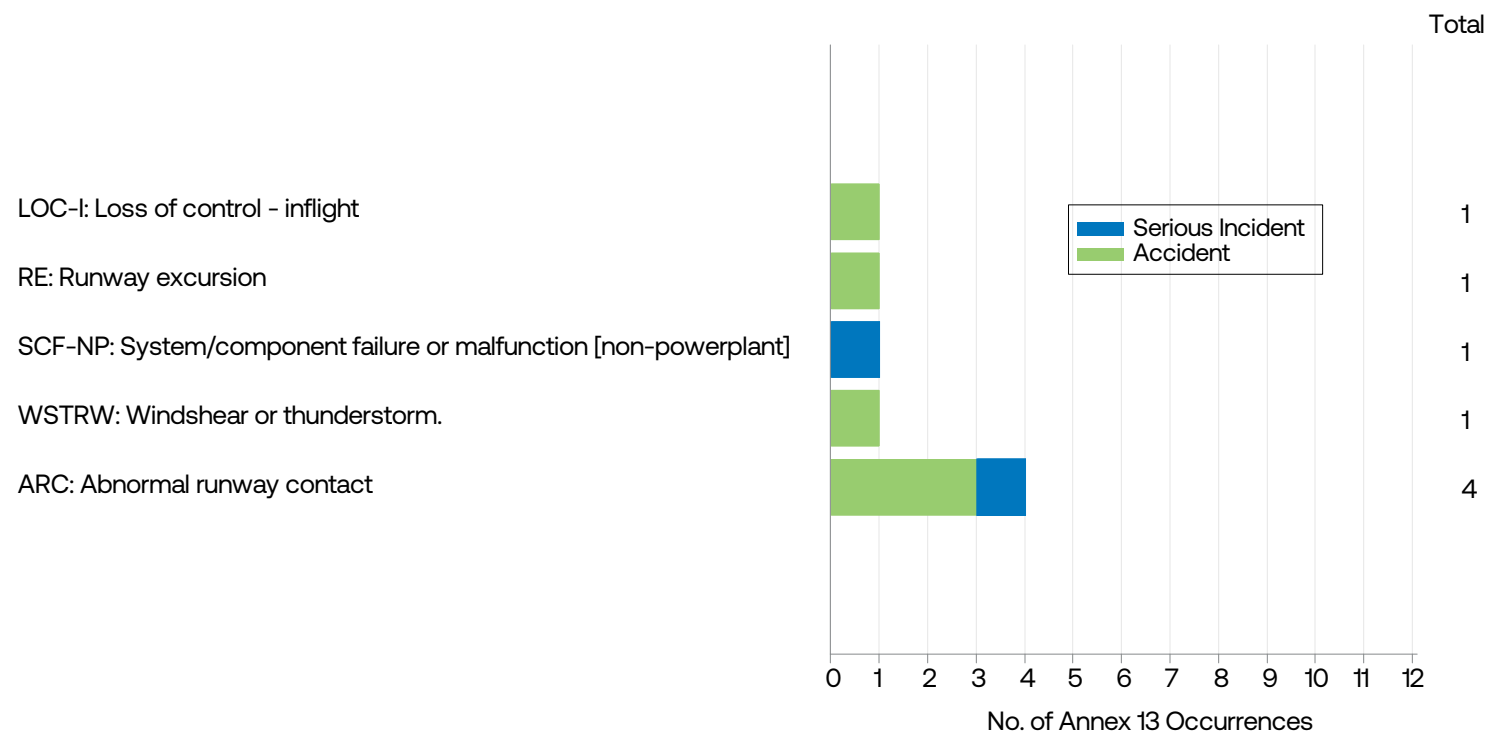


Figure E.3 Categories of accidents and serious incidents involving Annex I (c) Aircraft (2019-2023).

Note: some events have been assigned more than one categorisation.

Non-EASA Aircraft – Annex I 1 (e) [including Microlight aircraft]

At the end of 2023, there were 191 aircraft in this subsection on the Irish aircraft register.

There were no fatal accidents, 1 non-fatal accident categorised as SCF-PP and no serious incidents involving aircraft in this subsection in 2023.

During the previous four years (2019–2022) there was 1 fatal accident, 8 non-fatal accidents and no serious incidents. The fatal accident occurred in 2019 involving

a foreign registered microlight with 1 fatality, categorised as ‘Collision with obstacles during take-off and landing’ (CTOL). The non-fatal accidents involving 7 Irish and 1 foreign registered aircraft were categorised as ‘Loss of Control – Inflight’ (LOC-I), ‘Collision with obstacles during take-off and landing’ (CTOL), ‘System/ Component Failure – Powerplant’ (SCF-PP), ‘Runway Excursion’ (RE), ‘Windshear or thunderstorm’ (WSTRW), and ‘Abnormal Runway Contact’ (ARC). There were no serious incidents in this subsector during this time.

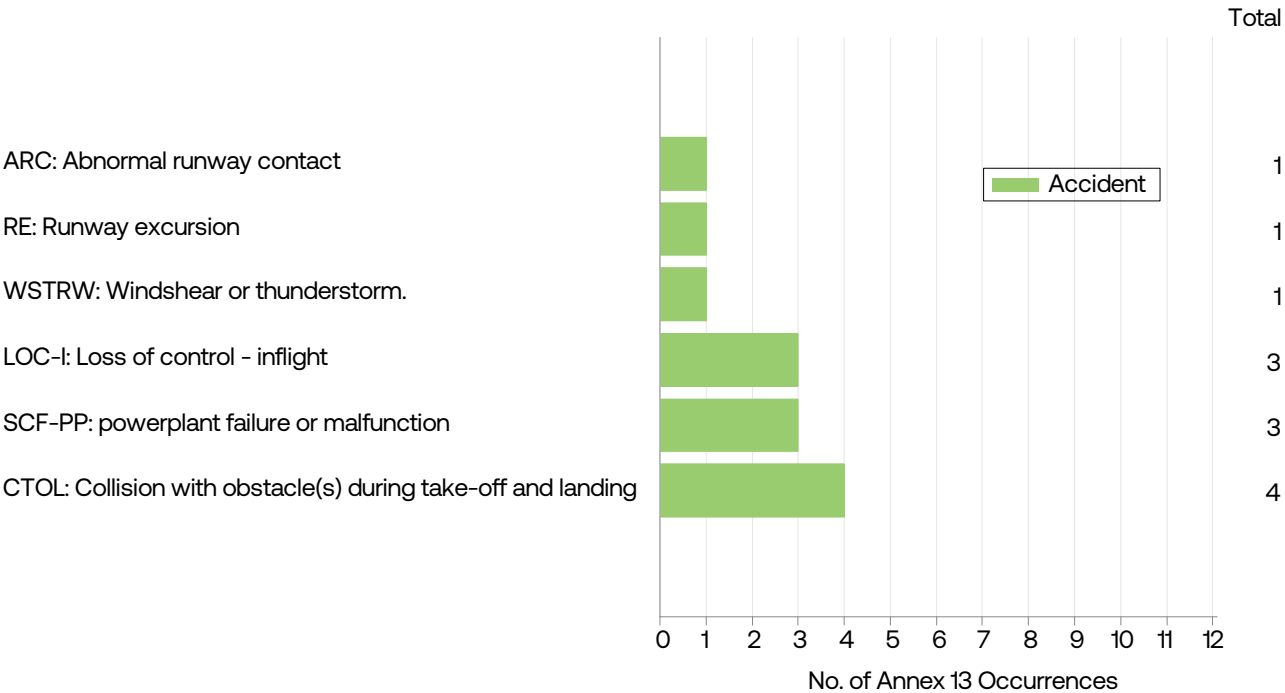


Figure E.4: Categories of accidents and serious incidents involving Annex I (e) Aeroplanes (2019–2023).

Note: some events have been assigned more than one categorisation.

Sailplanes (EASA and non-EASA certified)

There were 28 sailplanes, including 2 powered sailplanes and 1 homebuilt sailplane on the Irish aircraft register at the end of 2023.

There were no fatal accidents, non-fatal accidents, or serious incidents involving sailplanes in 2023.

Over the previous four years (2019-2022) there were no fatal accidents or serious incidents. There were 2 non-fatal accidents; 1 involving an Irish registered aircraft (EASA) and 1 related to a foreign registered aircraft (non-EASA), both were categorised as 'Collision with obstacles during take-off and landing' (CTOL), 'Glider towing related events' (GTOW) and 'Loss of lifting conditions en-route' (LOLI).

Gyroplanes - Annex I 1 (f)

At the end of 2023, there were 22 gyroplanes, including 2 homebuilt gyrocopters on the Irish aircraft register.

In 2023, there were no fatal accidents, non-fatal accidents, or serious incidents in this subsection. Over the previous four years (2019-2022) there were no fatal accidents or serious incidents. There was 1 non-fatal accident involving an Irish registered gyrocopter categorised as 'Loss of control on the ground' (LOC-G).

Paragliders, powered paragliders and powered parachutes

At the end of 2023 there were 32 powered paragliders registered in Ireland.

In 2023, there were no fatal accidents, non-fatal accidents, or serious incidents in this subsection.

During the previous four years (2019-2022) There were 2 fatal accidents, 6 non-fatal accidents and no serious incidents. 'Loss of Control – Inflight' (LOC-I), 'Controlled Flight into Terrain' (CFIT), 'Loss of control on the ground' (LOC-G), 'Collision with obstacle(s) during take-off and landing' (CTOL) and 'Unknown' (UNK) was each assigned once.

GA Flight Training

Currently there are 23 organisations in Ireland providing flight training in general aviation. During 2023 there was 1 non-fatal accident involving flight training, categorised as 'Runway Excursion' (RE). Figure E.3 outlines the categories assigned to GA flight training incidents over the past five years. 'Abnormal Runway Contact' (ARC) was the most assigned categorisation followed by 'Runway Excursion' (RE). These results highlight the challenge of developing and maintaining critical aviation skills and proficiency in a dynamic operational and meteorological environment.

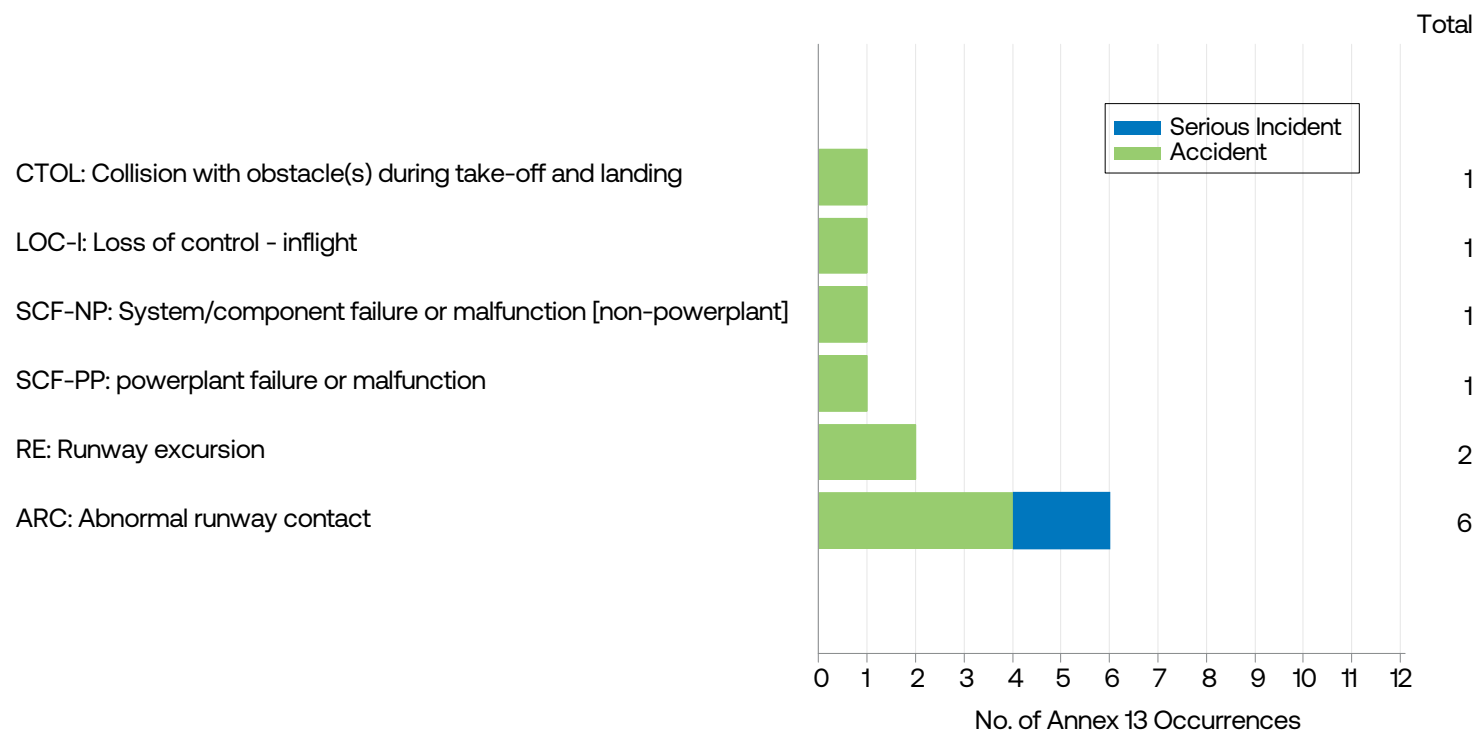


Figure E.5 Categories of accidents and serious incidents involving GA aeroplanes while flight training (2019-2023).

Note: some events have been assigned more than one categorisation.

Unmanned Aerial Systems (UAS)

UAS and drone have been included in the general aviation domain. However, these operations for both commercial and leisure purposes have expanded rapidly in recent years. The following figures outline how quickly and significantly the sector has grown in a short space of time. In Ireland at the end of 2023 there were 7,271 UAS Operators, 17,429 Remote Pilots, 59 Operational Authorisations and 4 Light UAS Operator Certificates. In 2023, there was 1 non-fatal accident categorised as ‘Controlled Flight into Terrain’ (CFIT). During the previous year 2022, there was 1 non-fatal accident categorised as ‘System/Component Failure – Non-Powerplant’ (SCF-NP). The level of occurrence reports remains low. Reports as currently received through the VOR system and generally deal with concerns around security.

Occurrence Reports

Private pilots flying general aviation EASA type certified aircraft are required to submit mandatory occurrence reports in accordance with Regulation (EU) No 376/2014. Even though many of the aircraft involved in this sector are not type certified, it is possible for the pilots of these aircraft to report occurrences on a voluntary basis using the same systems. The IAA website <https://www.iaa.ie/safety/safety-reporting> provides guidance on occurrence reporting requirements as well as the links necessary to submit reports to the IAA. In support of the just culture principle, the regulations contain provisions concerning confidentiality, protection of reporters and appropriate use of information contained in occurrence reports.

Occurrence reporting levels from Flight Crew Training Organisations (FCTO) have increased over the past 6 years with 2023 recording the highest number so far. Other, System Component Failure and Navigational Error were the top 3 known categories identified in the submitted mandatory occurrence reports during that timeframe.

The number of reports from GA pilots continues to remain low. The accepted relationship between serious accidents, minor accidents and near misses known as Heinrich’s law or the accident pyramid supports the understanding that this lack of reports results in the awareness gained from lower-level occurrences that could later present as accidents and serious incidents (in other circumstances) is not being captured. Unfortunately, this also results in only high-risk accidents and serious incidents, normally very visible and with severe outcomes, are being reported and investigated. The IAA continues to promote safety occurrence reporting in general aviation with the sole objective to support the sharing of safety information among the GA community through safety promotion activities.

The General Aviation Safety Council of Ireland (GASCI), whose membership includes general aviation clubs, societies, training organisations, drone organisations, the IAA and the AAIU, provides the platform for many of the safety promotion activities in Ireland. Safety information derived from aviation occurrences in Ireland and abroad are reviewed by GASCI and the lessons learned form the basis for GASCI safety promotion actions. GASCI shares safety information on its website (gasci.weebly.com) and twitter account (@Gasci_ie) and hosts very informative and well attended safety evenings. GASCI has also established its own reporting site where those involved in GA activities can voluntarily share safety information <https://gasci.weebly.com/report-an-incidentcontact-us.html>

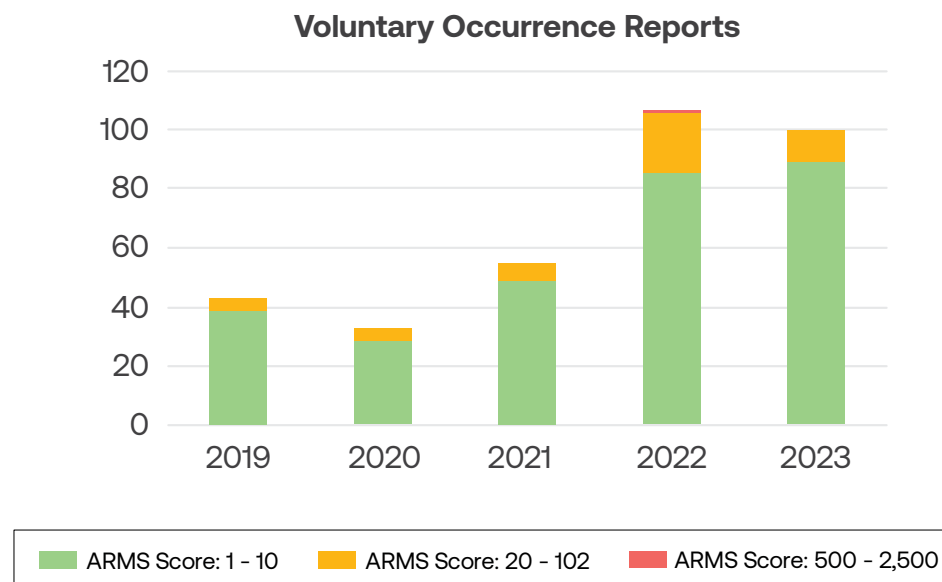
Voluntary Occurrence Reports

Regulation (EU) NO 376/2014 imposes a legal obligation on organisations and competent authorities (Article 5) to establish voluntary occurrence reporting systems (VORS), this enables the reporting of any occurrence or safety related information by individuals which are not subject to mandatory reporting and encourages the reporting of any safety relevant occurrence. This proactive process enables the collection of information about safety concerns, issues and hazards, which otherwise will not be revealed by the mandatory reporting system.

Figure E.4 below outlines the numbers of VORs reported by individuals over the past five years according to totals and ARMS Risk Classification Band.

The top three types of events reported continue to be: RPAS/drone operations, reports from individuals on organisational management safety issues in their organisations, and aircraft related safety issues. These reports do not include VORs submitted by persons through their own organisational voluntary reporting systems, which are addressed by organisations themselves under their SMS. Persons who feel that their organisation is not sufficiently addressing their concerns, may report directly to the IAA.

Figure E.6



Safety Issues:

The detailed analysis of the main causes of the accidents and serious incidents helps identify the main safety areas and related safety issues for general aviation. The IAA is greatly assisted in this regard by GASCI, from their insight and interaction with membership across the sector. The promulgation of safety material from lessons learnt and the awareness of effective mitigations is instrumental in increasing the safety of activities and culture throughout the sector.

GA Specific Safety Issues

The following table outlines safety issues identified from the analysis of accidents and serious incidents and are included in the IAA GA sector-based risk register. The GA risk register is not only informed by the Irish experience, but it includes the pan-EU safety issues identified in the EASA Annual Safety Review and European Plan for Aviation Safety.

“Poor pre-flight planning and preparation”, “Damage tolerance to UAS collisions”, “Airborne separation”, “Engine system reliability” and “Approach path management on GA aeroplanes” are among the issues highlighted in both the European Plan for Aviation Safety [[European Plan for Aviation Safety \(EPAS\) 2024 - 13th edition | EASA \(europa.eu\)](#)] and the Irish State Plan for Aviation Safety [[State Plan for Aviation Safety \(iaa.ie\)](#)].

According to the EASA ASR 2023 (the most recent publication available) statistics for non-commercial operations conducted by EASA MS registered non-complex aeroplanes, having a maximum take-off mass below 5700 kg, there was a decrease in fatal and non-fatal accidents in 2022 compared to the previous 10-year average. It also outlines the top 6 occurrence categories assigned to serious incidents and accidents in the past five years (2018-2022) were ARC, RE, SCF-PP, LOC-I, SCF-NP and MAC. In Ireland the top 6 occurrence categories over the 5 years (2019-2023) were ARC, RE, SCF-PP, SCF-NP, LOC-I and LOC-G (see Figure E.2). The highest Key Risk Area (KRAs) for GA aeroplanes are aircraft upset, terrain collision and airborne collision. While acknowledging that the diversity of general aviation exceeds EASA’s regulatory remit, the EASA ASR 2023 notes that EASA member state registered microlights were involved in 109 accidents in 2022, 32 of which were fatal. Further insight is available here: [Annual Safety Review 2023 | EASA \(europa.eu\)](#)

The EASA ASR 2024 is scheduled for publication later this summer.

Safety Area	Safety Issues
Loss of Control -Inflight	<ul style="list-style-type: none"> • Recognition and recovery from aircraft upset • Awareness of flight attitude • Decision making and control of aircraft, following engine failure • Recognition of, and response to, carburetor icing • Operations of light aircraft within recommended mass and balance limits • Proficiency in practiced forced landings • Awareness of performance differences between different GA aircraft types
Collision with terrain or obstacle	<ul style="list-style-type: none"> • Inadvertent flight into degraded visual environments • Flight below minimum safe altitude (e.g. for weather avoidance) • Pre-flight planning • Situational awareness during flight • Use of advanced technologies • Use of aeronautical charts and terrain and obstacle databases
Mid-Air Collision	<ul style="list-style-type: none"> • Use of see and avoid • Good communications to aid in overall situational awareness • Safety Management at Club fly-ins and airshows • Conflict with Drones • Use of advanced technologies
Take-off and Landing	<ul style="list-style-type: none"> • Runway excursion or heavy landing following aircraft handling or environmental issues • Take-off and landing from hard/soft airstrips • Collision with obstacles
Specialised Operations	<ul style="list-style-type: none"> • Aircraft upset caused by system failure or a lapse in perception and situational awareness • The intrinsic risks of intentional low flying require mitigations such as training, experience and competence
Human Factors	<ul style="list-style-type: none"> • Threat and error management for GA • Decision Making Single Pilot CRM
Other	<ul style="list-style-type: none"> • Safety of ground operations during club fly-ins • Overall, an awareness of and mitigation against degraded proficiency after prolonged spells of inactivity such as the return to VFR flying after the winter

In contrast to the CAT environment, private pilots do not have the benefit of a safety management system (SMS) in their day to day flying once they leave the environs of training organisations (ATOs and DTOs). Strong safety promotion networks are the most readily available safety tool that can assist GA pilots in strengthening their resilience by better equipping them to address the challenges of identifying hazards and developing the ability to mitigate against the associated risks. The General Aviation Safety Council of Ireland (GASCI) continued to provide excellent safety promotional material throughout 2023 primarily through it's in-person safety evenings. A wide range of topics presented on and discussed included, navigation risks, military airspace, strip flying, sea survival, aircraft turnback after engine failure, RT communications.

This compliments the State Plan for Aviation Safety in Ireland specific actions to develop safety promotion material for general aviation in conjunction with GASCI. The following websites contain existing safety promotion guidance that may be of interest to those involved in general aviation:

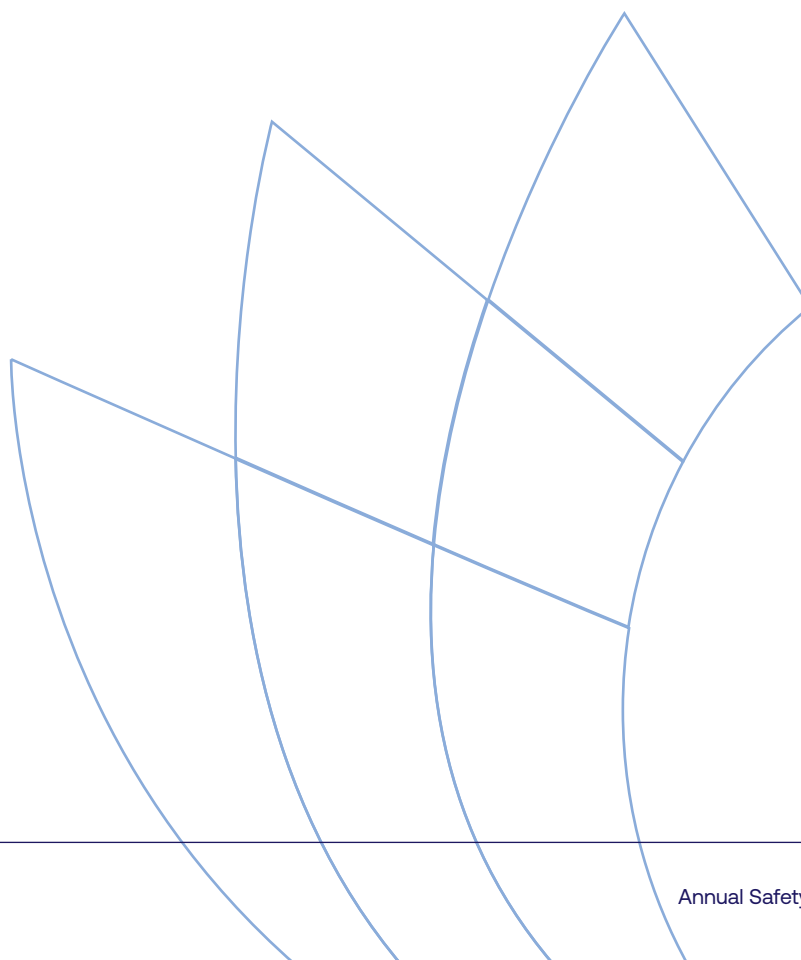
<https://www.iaa.ie/general-aviation/safety-information>

<https://gasci.weebly.com/>

<https://www.easa.europa.eu/easa-and-you/safety-management/safety-promotion>

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

<https://www.easa.europa.eu/community/ga>



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Disclaimer

The data presented in this document is strictly for information purposes only. It is obtained from a number of different sources and, whilst every care has been taken to ensure the accuracy of the data and to avoid errors in the content, the IAA makes no warranty as to the accuracy, completeness or currency of the content.

Scope and Content of the Report

The Annual Safety Review provides statistics on safety in the Irish aviation industry. Information relating to the safety activity the IAA has undertaken or intends to undertake is presented in the IAA's State Safety Plan. The IAA has published its 2023-2025 State Safety Plan which is available on the IAA website www.iaa.ie along with previous editions of the State Safety Plan.

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Special thanks to those who gave kind permission for the use of their photos; Atlantic Aviation Group, Hangar 2, Shannon Airport, Co Clare (page 10), Aer Arran Islands (Islander on finals Inis Mór, page 14), Dennis Horgan and CHC Ireland (page 28) and Paul O'Connor (Pereira Osprey 2 page 56).

Data Sources

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