

# Annual Safety Performance Review for Ireland



TO END OF 2020



## Contents

Foreword	2	1
Summary	3	
Section A: Introduction	9	
Section B: The Irish Fixed Wing Commercial Air Transport Sector	13	
Section C: The Irish Commercial Helicopter Sector	27	
Section D: Air Navigation Services and Aerodromes in Ireland	35	
Section E: General Aviation in Ireland	54	

## Foreword

The Irish Aviation Authority is happy to present the Annual Safety Performance Review (ASPR) for 2020, a year that started with normal expectations of growth and expansion patterns from previous years but quickly changed as the COVID-19 virus spread globally leaving a trail of personal and economic devastation in its wake. The severe disruption felt by all sectors of the aviation industry necessitated the agile implementation of Safety Management System (SMS) mechanisms to meet the challenge of quickly identifying emerging risks and the timely provision of risk mitigation guidelines to the management of such sudden changes.



2020's ASPR provides an aggregated summary of the safety performance of organisations divided into aviation sectors, based on types of operation and level of activity. It is in line with the layout of previous years to facilitate comparisons.

In line with global patterns the Irish civil aviation industry contracted significantly in 2020, with total flights handled down 57.6% on 2019. While the number of aircraft on the Irish register decreased, the IAA continued its oversight of 17 air operators, 22 licensed aerodromes, 78 airworthiness organisations and 32 training organisations in what have been challenging conditions for all parties. There was also a marked increase in the number of applications for pilot and engineer licences primarily due to Brexit.

Globally the accident rate involving Commercial Air Transport (CAT) large aeroplanes per million departures fell by 60% on 2019. EASA Member States' operators did not experi-

ence any CAT fatal accidents. In Ireland there were no fatalities in 2020 and the main statistics for accidents and serious incidents show reducing trends in many areas.

As the industry continues to manage the additional risks manifested because of this pandemic, it will also need to astutely prepare for the much-anticipated return to normal operations and the inherent risks that will entail. EASA's approval of a Return to Service strategy for the Boeing Max fleet at the start of 2021 has provided some optimism for the beleaguered aviation industry.

The insight gained from the safety performance data presented here forms one element of the safety intelligence inputs that are employed to ensure an ever-vigilant risk monitoring and management system that seeks to continuously improve for the benefit of the Irish state safety programme. As ever, a healthy safety occurrence reporting culture is required in order to gain the most accurate indication of how that sector or organisation is performing. The IAA encourages and welcomes the active participation of all involved in any aspect of civil aviation to report safety concerns to their organisation or to the IAA at (<https://www.iaa.ie/safety/safety-reporting>) so that lessons can be learnt and safety levels continuously improved.

A handwritten signature in black ink, appearing to read 'Diarmuid Ó Conghaile', followed by the text 'iew.'

**Diarmuid Ó Conghaile, Aviation Regulator and CEO Designate**

## Summary

Welcome to the Annual Safety Performance Review for Ireland for 2020, which is compiled by the Safety Regulation Division (SRD) of the Irish Aviation Authority (IAA). This is the 12th consecutive year of publication, where the safety performance of Irish civil aviation is presented, along with the main safety issues as identified by the IAA. This review is prepared in conjunction with safety information provided at EU (e.g. EASA) and global (e.g. ICAO) levels.

The report presents the safety performance information under the following four main sectors of Irish civil aviation, which are defined by their primary type of operation and consequent 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

The initial Infographics provide an overview of the main performance statistics for each of these sectors. Further details on the supporting information is presented within the associated chapters on a tiered basis, with Annex 13 data, occurrence reporting charts and analysis of the emerging safety issues. 2020 yields a unique picture of the industry due to the havoc wrought on it by the COVID-19 pandemic and so extra charts outlining 2020's performance vis-à-vis previous years have been included to enable independent evaluation and maximum learning from the year's events.



## Irish Air Fixed-Wing Commercial Air Transport Sector

Irish fixed-wing aircraft engaged in CAT were involved in 12 accidents between 2016 and 2020. During 2020 there was 1 non-fatal accident and no fatal accidents. The categories most commonly applied by the Safety Investigation Authority (SIA) over this 5 year period were:



Ground  
Handling



Turbulence  
Encounter



Ground  
Collision



During 2020 Irish AOC holders submitted 3,309 MORs. Between 2017 and 2020 they submitted 28,346 MORs. The categories most commonly assigned by the IAA to these MORs were:



System failure  
or malfunction



Cabin Safety



Medical

There were 54 serious incidents between 2016 and 2020, 3 of which occurred in 2020. The categories most commonly applied by investigating SIAs to serious incidents were:



Airprox/near  
midair collision



System failure  
or malfunction

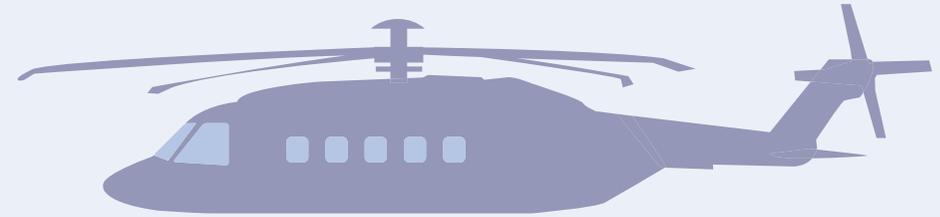


Runway Incursion  
(non-animal)

## The Irish Commercial Helicopter Sector

The accident and serious figures provided cover helicopter operators who hold an AOC issued by the IAA and helicopter aviation activity carried out in Irish territory by Operators conducting CAT and declared activities. The IAA monitors the latter type of aviation activity in accordance with Regulation (EU) 965/2012 requirements.

Between 2016 and 2020 these operators experienced 1 fatal accident during 2017. The AAIU investigation is ongoing into the fatal accident which is presently categorised as 'Controlled flight into terrain'.



During 2020 helicopter operators who hold an AOC issued by the IAA submitted 34 MORs, while between 2017 and 2020 there were 132 MORs submitted. The categories most commonly applied by SRD Inspectors to these MORs were:



System failure  
or malfunction



Other



Security  
Related



## Air Navigation Services and Aerodromes in Ireland

Between 2016 and 2020 there were 3 non-fatal accidents and 9 serious incidents involving CAT aircraft at Irish certified/licenced aerodromes that provide ATC services. During 2020 there was 1 non-fatal accident, no fatal accidents and no serious incidents.

The ATS providers submitted 5,653 MORs between 2017 and 2020 with 877 MORs submitted during 2020. The three occurrences categories most commonly assigned to the MORs were:



**Air traffic management**



**Navigation Errors**



**Other**

Between 2017 and 2020 Aerodrome operators submitted 1,913 MORs, 364 of which were submitted during 2020. The three most commonly assigned occurrence categories were:



**Other**



**Ground Handling**



**Aerodromes**

## General Aviation in Ireland 2016 - 2020



### Aeroplanes over 2,250 kg

1 Fatal Accident  
1 Non-Fatal Accident  
0 Serious Incidents



### Helicopters over 2,250 kg

0 Fatal Accidents  
0 Non-Fatal Accidents  
0 Serious Incidents



### Sailplanes and Powered Sailplanes

0 Fatal Accidents  
2 Non-Fatal Accidents  
1 Serious Incident



### Aeroplanes under 2,250 kg

4 Fatal Accidents (incl 2 homebuilt)  
22 Non-Fatal Accidents (incl 5 homebuilt)  
13 Serious Incidents (incl 1 homebuilt)



### Helicopters under 2,250 kg

0 Fatal Accidents  
4 Non-Fatal Accidents  
0 Serious Incidents



### Hot Air Balloons

0 Fatal Accidents  
0 Non-Fatal Accidents  
0 Serious Incidents



### Microlight

2 Fatal Accidents  
3 Non-Fatal Accidents  
1 Serious Incident



### Gyrocopters

0 Fatal Accidents  
0 Non-Fatal Accidents  
0 Serious Incidents

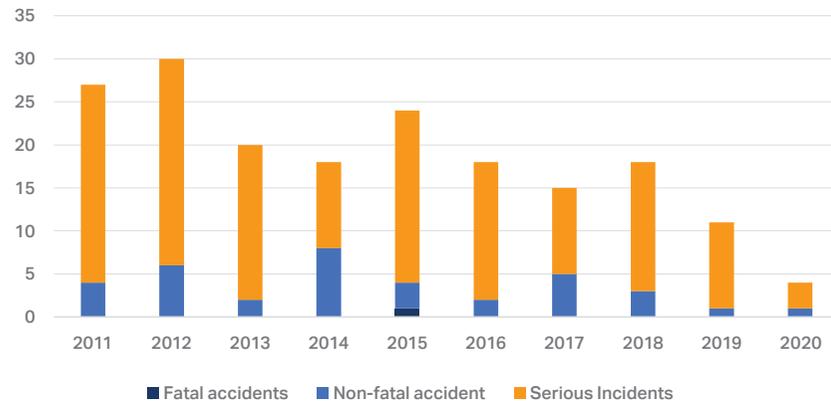


### Paragliders, Powered Paragliders and Powered Parachutes

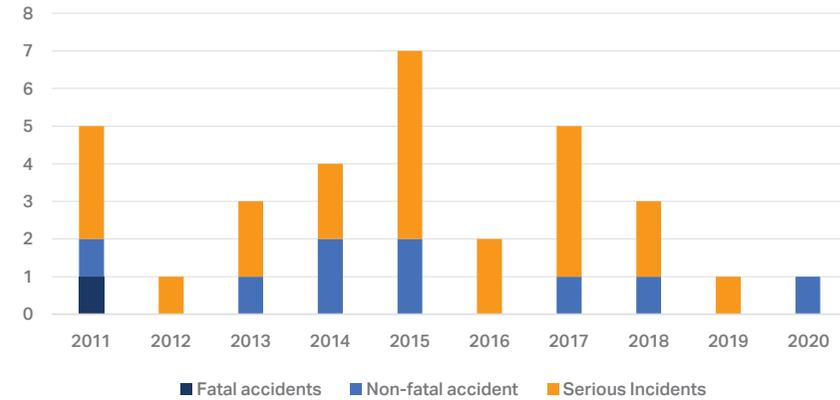
2 Fatal Accidents  
2 Non-Fatal Accidents  
1 Serious Incident

## Accidents and Serious Incidents per year 2011 - 2020

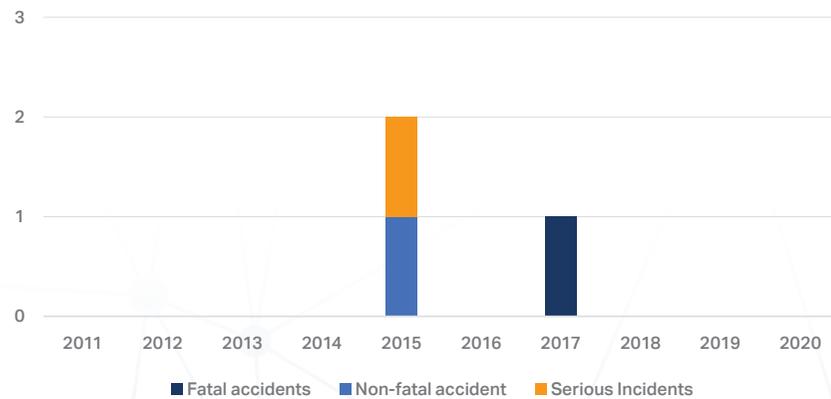
### Commercial Air Transport - Fixed Wing



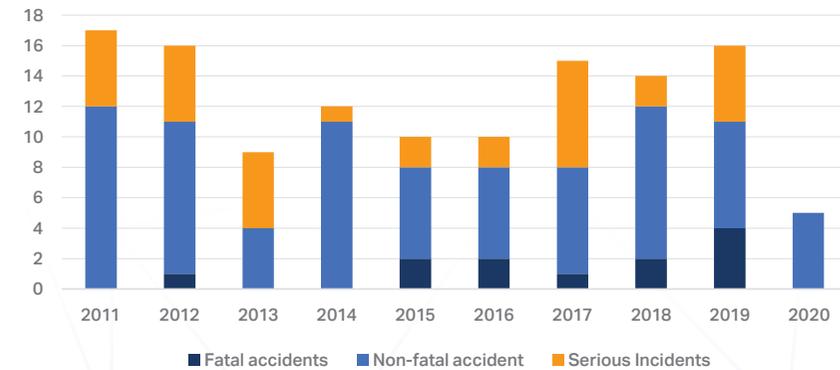
### Commercial Air Transport at Irish Certified/licenced Aerodromes with ATS



### Commercial Helicopter



### General Aviation



SECTION A  
INTRODUCTION



## Introduction

2020 was a unique year globally across all sectors of industry and society. The effects of the Covid19 virus and efforts to deal with the pandemic impacted heavily on the aviation industry, an industry founded on the needs and desires of human beings to travel and socialise. The lack of previous experience in dealing with this new reality has led to an increased focus on known data that offers insight into how the industry performed from a safety perspective.

The IAA Safety Regulatory Division (SRD) 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, SRD 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.

While there were no fatalities in Irish civil aviation in 2020, sadly, the report addresses a small number of fatal accidents in previous years and the IAA offers sincere sympathies to family and friends of the deceased in these cases. The IAA, in conjunction with all the stakeholders in the civil aviation sector in Ireland, has implemented safety risk management processes to try to prevent fatalities in aviation, and sharing the lessons learned from such tragic accidents is a vital part of the process.

## COVID-19

The COVID-19 pandemic has severely impacted the aviation industry with the total Irish air traffic levels falling in 2020 by 58% and commercial terminal movements falling 64% over the previous year. The initial financial impact has been significant, and the long-term repercussions are yet to be determined. This decreased level of activity has led to a consequent reduction in occurrence data and this has created an aberration in determining year on year trends. It has also created a new risk environment not seen heretofore. As part of the European Safety Risk Management (SRM) process EASA worked closely with Member State regulators and industry partners to identify new or emerging safety issues arising from the COVID-19 pandemic. The identified safety issues were published in the "Review of Aviation Safety Issues Arising from the COVID-19 Pandemic," which was updated in April 2021 and is available here: [https://www.easa.europa.eu/sites/default/files/dfu/review\\_of\\_aviation\\_safety\\_issues\\_from\\_COVID-19\\_final\\_-\\_v2\\_-\\_april\\_2021.pdf](https://www.easa.europa.eu/sites/default/files/dfu/review_of_aviation_safety_issues_from_COVID-19_final_-_v2_-_april_2021.pdf)

## 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.

The IAA uses an EU developed aviation risk classification methodology, Airline Risk Management Solutions (ARMS), that is used to assign a risk score to each individual occurrence. The methodology includes a risk matrix with associated traffic light colour scheme, whereby green represents low risk, amber represents medium risk and red represents high risk. Where relevant, statistical charts on occurrences provided in this review include this risk classification colour scheme. The vast majority of occurrence reports to IAA were classified as low risk, however it remains important to monitor these events to ensure they remain under control.

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. The ICAO taxonomy for occurrence category is used throughout this report. The same occurrence category may

be assigned to an occurrence involving an actual accident e.g. LOC-I (Loss of Control – Inflight) or to a precursor event that has been identified previously as part of the chain of events leading to a LOC-I accident, such as aircraft stall warning.

## 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 investigates civil aviation accidents and serious incidents that occur in Ireland. Occurrences involving an Irish AOC holder or an Irish registered aircraft that occur outside of Ireland may be investigated by a foreign safety investigation authority (SIA) or that SIA may delegate the investigation fully or in part to the AAIU. 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 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. All accidents and serious incident investigations the AAIU have initiated, or have been notified of, are included in this report, even if the investigation itself is ongoing and the final investigation report has not been finalised. The classification of an occurrence (i.e. accident, serious incident, incident) is subject to change until the completion of the investigation, and consequently this may lead to minor differences in the details provided between consecutive Annual Safety Performance Reviews.

## 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 statistics 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.

Aviation is a global business and the IAA does not depend solely on the performance of the Irish civil aviation industry to identify safety issues. The European Aviation Safety Agency (EASA) produces an annual safety review of the safety performance of civil aviation across all EU Member States (including Ireland) and ICAO produces similar safety performance information on a global basis. The IAA takes due cognisance of the safety priorities identified at European and global level in the analysis of safety performance in this report.

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 [www.iaa.ie/statesafetyplan](http://www.iaa.ie/statesafetyplan))

## SECTION B

# THE IRISH FIXED WING COMMERCIAL AIR TRANSPORT SECTOR



## Introduction

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

- operators who hold an Irish Air Operators Certificate (AOC) issued by the IAA (14 fixed-wing operators at the end of 2020).
- 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'.

There were 686 land aeroplanes on the Irish aircraft register engaged in CAT operations for Irish AOC holders and foreign AOC operators on the Irish lease fleet, as of the 31st December 2020. This included 77 aircraft in storage, the highest number since 2015.

Eight aircraft operated throughout the year in accordance with Part-NCC (non-commercial operations with complex aircraft), primarily for private business jet activities. 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 downturn in CAT operations in 2020 was unforeseen and unprecedented. There was a 61.5% decline in CAT movements compared to 2019. The effects were not uniformly felt across the sector. Some operators elected to cease operations temporarily while huge demands were placed on cargo operators as dedicated freighters endeavoured to take up the capacity shortfall caused by grounded passenger jets. Heretofore unseen difficulties in the global supply chain and the uptake in ecommerce inflated these demands further. An urgent need for PPE and medicines led to the prompt development and implementation of an approval mechanism for the carriage of cargo in the passenger compartment for some of our operators.

EASA working with the European Centre for Disease Prevention and Control (ECDC), established the Aviation Health Safety Protocol, which set out coherent health safety measures to protect both passengers and aviation industry staff. This protocol was adopted by the Irish State and will continue to be monitored.

This novel changeable operating environment harbours new risks and EASA in conjunction with its safety partners, in particular the National Aviation Authorities of the EU Member States, has identified and captured these emerging risks in the Agency's safety risk registers. This collaborative approach also led to the publication of the COVID-19 Safety Risk Portfolio that outlined the identified risks together with appropriate mitigations. These risks are grouped into areas such as Management Systems, Human Performance, Financial Impacts on Safety, along with Training, Checking and Recency. Examples include; the rapid storage and de-storage of aircraft, the impact of maintenance practices during fleet groundings, the management of wildlife hazards due to the reduced amount of aviation activity, and the degradation of skills and knowledge of aviation personnel caused by their reduced activity.

It is worth noting that the reporting rate for Irish CAT operators in 2020 was in line with the previous 3 year average. There were 62.5% fewer reports in 2020 compared to 2019 for the Irish lease fleet. While there is currently no exposure data for this sector the percentage decline in reports appears to be in line with the decline in traffic numbers across the globe.

## Accidents and Serious Incidents

Over the last five years, aeroplanes operated by the Irish AOC holders or on the Irish lease fleet were involved in 12 accidents (1 in 2020) and 54 serious incidents (3 in 2020) as summarised in Table B.1 below.

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

Year	No. on Irish aircraft register	Accidents			Serious incidents
		Non-fatal	Fatal	Total	
2016	793	2	0	2	16
2017	881	5	0	5	10
2018	927	3	0	3	15
2019	815	1	0	1	10
2020	683	1	0	1	3
<b>Total</b>		12	0	12	54

There were no fatal accidents, 1 non-fatal accident and 3 serious incidents in 2020. The non-fatal accident related to a passenger suffering injury at the gate. The serious incidents were categorised as Runway Incursion (RI), Aerodrome (ADRM) and Air Traffic Management (ATM).

Figure B.1 summarises the categories assigned to the accidents and serious incidents that occurred in the past five years which gives a bit more insight into the type of occurrences involved.

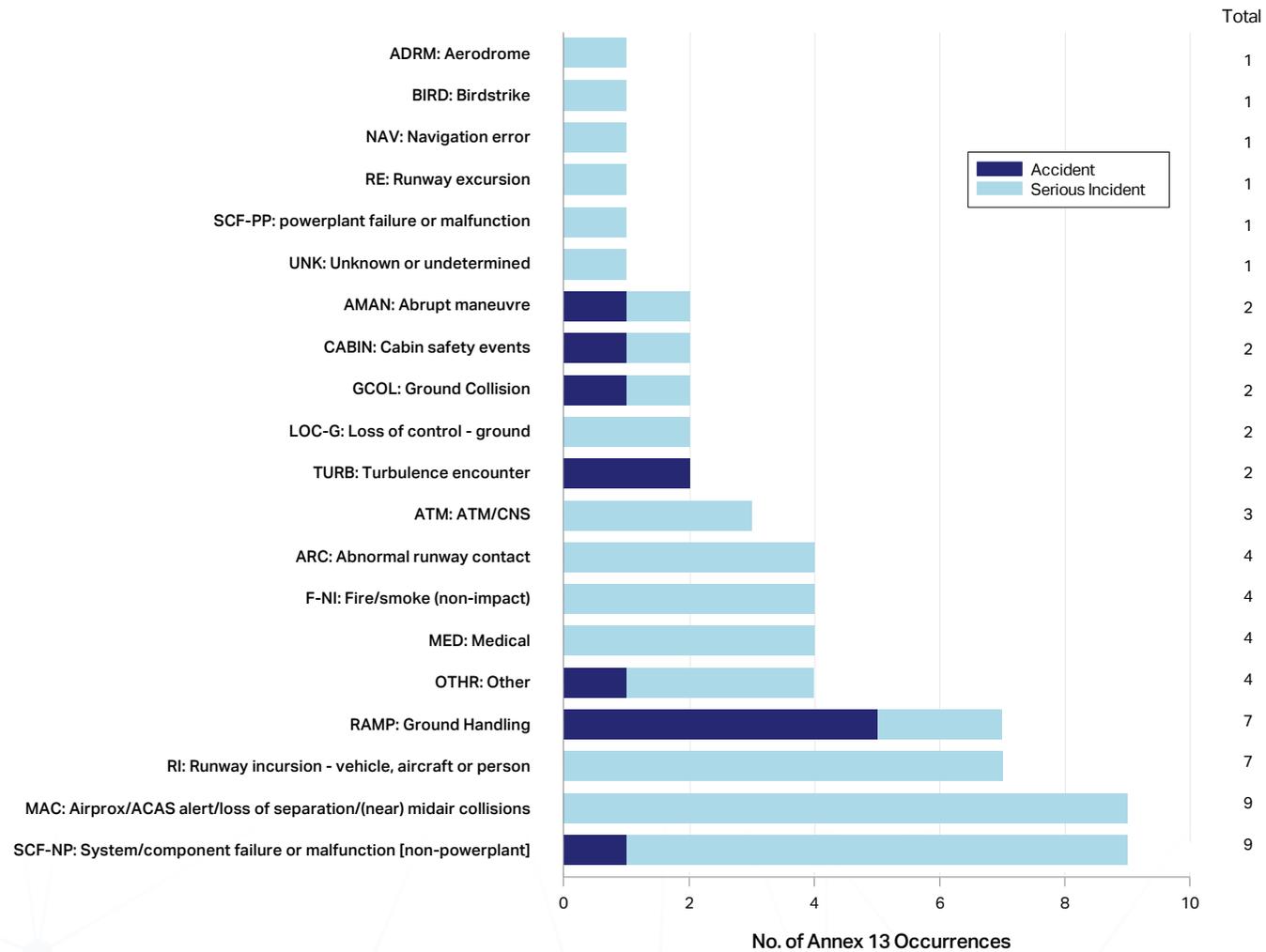


Figure B.1: Categorisation assigned by the investigating SIA to the Annex 13 occurrences

## Occurrences

The retrospective analysis of accidents and serious incidents while essential is really only the tip of the iceberg when seeking to evaluate safety performance. A more informed view is achieved by delving into the insight gained from safety occurrence reports. This helps move the safety analysis process from being purely reactive to a more proactive methodology that enables the timely detection of operational hazards and system deficiencies. This greater insight can inform more effective improvements in aviation safety.

Despite the pandemic the chances of being on a flight operated by an Irish AOC Holder that experienced a safety occurrence remained very low. In 2020 Irish AOC Holders flew just over 400,000 flights and submitted just over 3,000 occurrence reports. This represented a 62% drop in movements compared to 2019. Over 99% 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 2020 there were zero fatalities associated with Irish CAT operations.

The IAA categorises occurrences using the same common taxonomy as used by the AAIU, however in the case of reported mandatory occurrences the analysis includes consideration of factors that could be considered 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 (ref Section A) is shown in Figure B.2(a) below for 2017 to 2019. Data for 2020 has been produced separately this year in Figure B.2.(b) to enable a comparison with the pattern of predominant occurrence categories in the previous three years. Despite the pandemic the trends pre-Covid and during Covid in 2020 remain noticeably similar. The most commonly reported occurrence categories largely remain the same with the exception of MED (medical) and WSTRW (Windshear

or thunderstorm). MED was a far less frequent category in 2020 than the previous three years. This may in part be due to the decreased number of passengers travelling and only passengers without underlying health conditions may have felt confident enough to undertake such journeys. WSTRW was a relatively more frequent in 2020 than in the previously three years.

The emerging risks identified in EASA's COVID-19 Safety Risk Portfolio did not materialise significantly in the MOR data for 2020. An internal IAA analysis of disruptive passengers' reports indicated a tendency for the more aggressive instances of passenger reluctance to follow COVID-19 guidelines being reported than the anticipated lower level of resistance that did not require the intervention of flight crew or the police.

In addition to analysing the categories of occurrences, the IAA analyses the main event types that lie behind these figures. This analysis enables a deeper understanding of the actions that led to the occurrence report. Figure B.4 provides more granularity with the top event types reported to the IAA from the CAT aeroplane sector for 2017 to 2020.



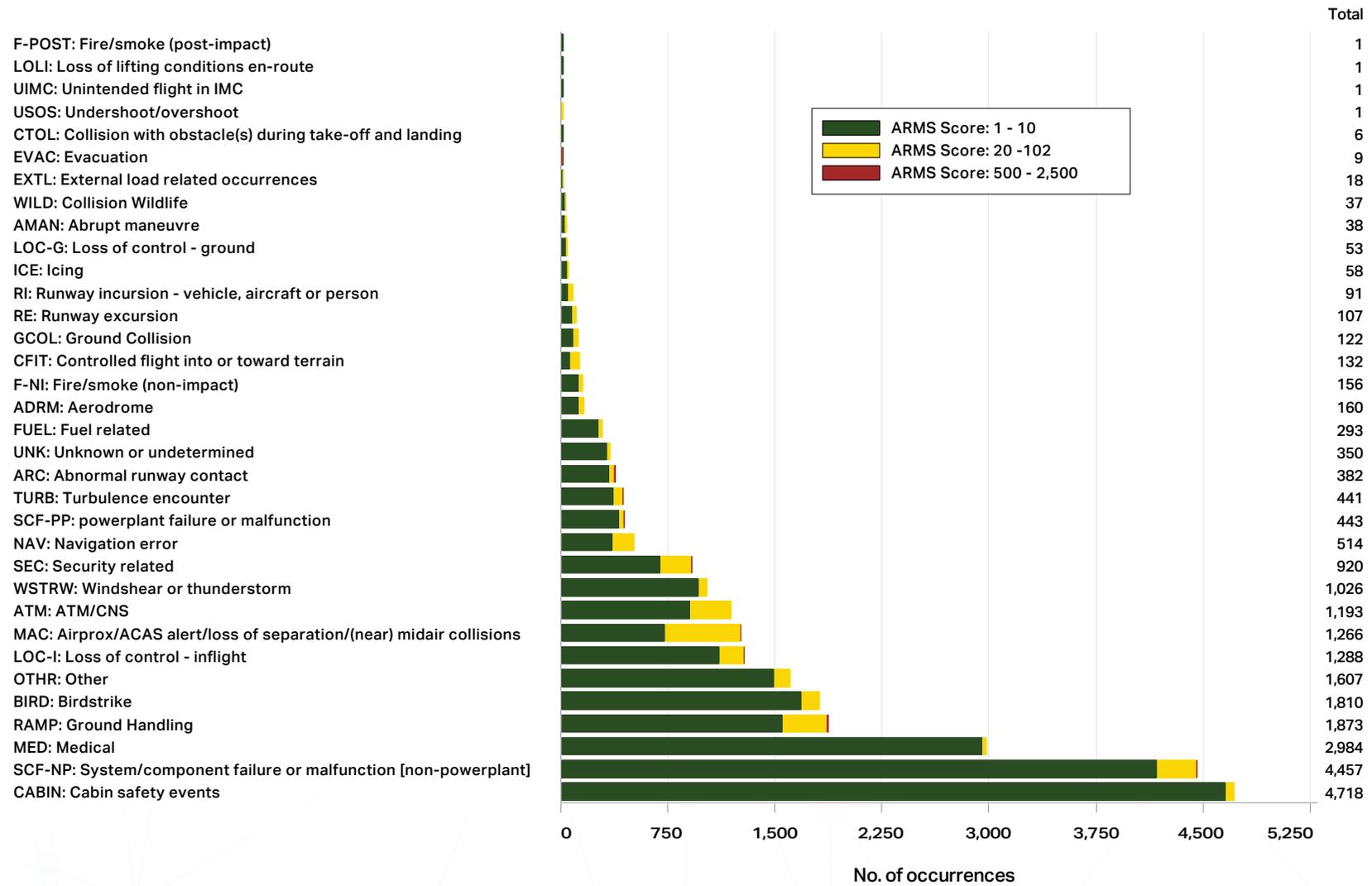


Figure B.2(a) Categorisation of MORs Involving Irish CAT Fixed-wing Aeroplanes during 2017-2019

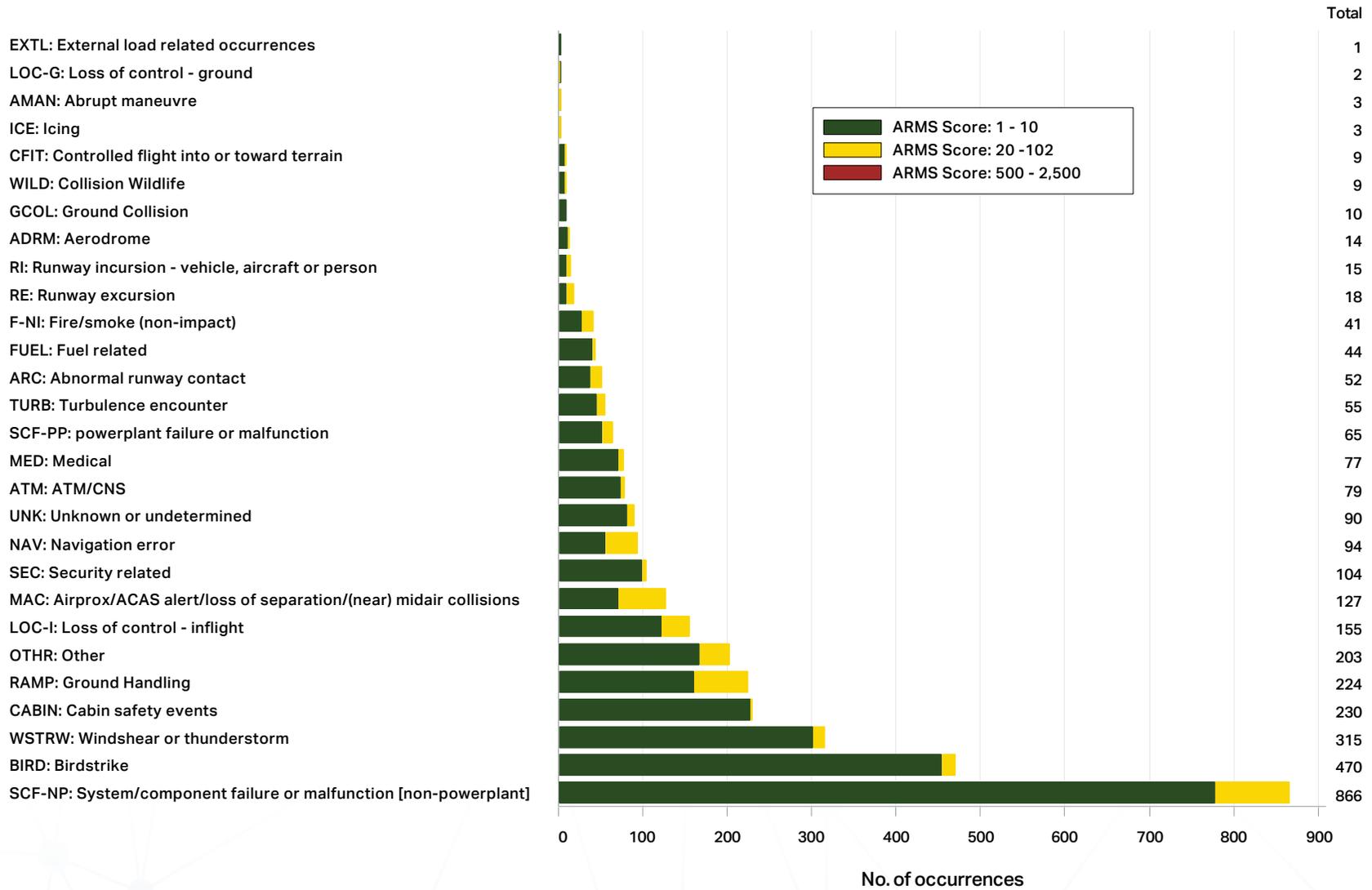


Figure B.2.(b) Categorisation of MORs Involving Irish CAT Aeroplanes 2020

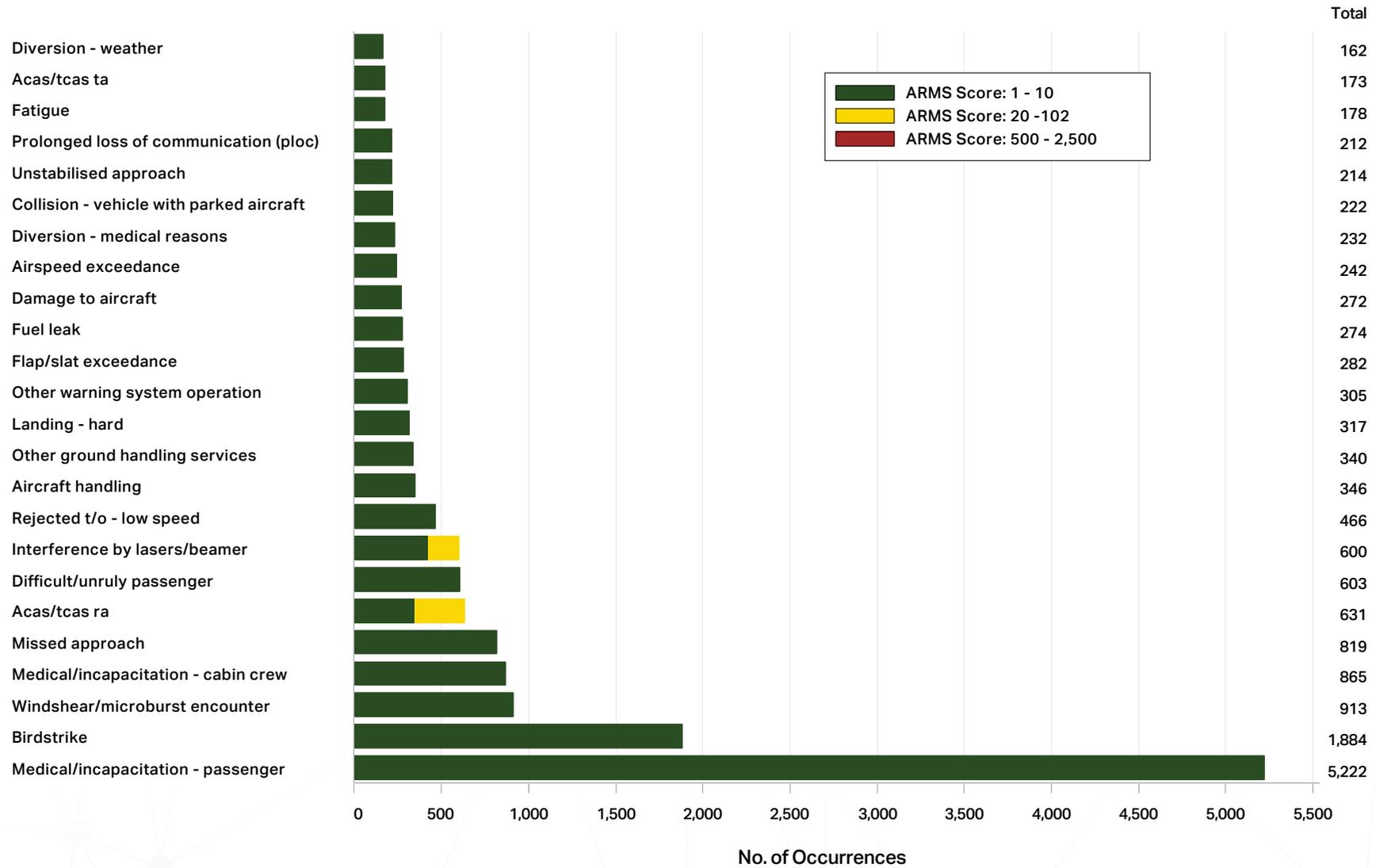


Figure B.3 Top Event Types Involving Irish CAT Fixed-wing Aeroplanes 2017 – 2020

## Safety Issues

This section was first introduced in last year's ASPR for 2019 and provides a summary of the main safety issues that emerge as a result of the analysis of the 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. Aside from the uniqueness in the characteristics of 2020's commercial aviation sector the key safety areas identified heretofore remain relevant. Given the scarcity of data during the pandemic it is worthwhile adopting a dual approach, keeping an eye on the previously identified knowns even as we search out for the emerging unknowns. The safety issues tabulated for the various key safety areas may also become even more relevant if and when the industry returns to operating in a new normal.

### Key Safety Areas:

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 there were no accidents in these categories in the past five years involving the Irish AOC holders and Irish lease fleet operators. In this period however, there were 17 serious incidents in these key safety areas; 9 categorised as MAC, 7 categorised as RI and 1 categorised as RE. Although there were no accidents or serious incidents categorised as LOC-I, it is noted that there were 2 accidents due to turbulence encounters causing aircraft upset during flight.

Figures B.2.(a) and B.2.(b) show that occurrence reports of precursor events categorised as MAC and LOC-I are in the top 10 of the most reported occurrence categories in the past four years. This highlights the awareness of operators to these key safety risk areas and the maturation of good reporting cultures. Analysis of these reports firstly shows that the majority were classified as being low risk (green band) and secondly 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. EASA's revised 'SIB No.: 2013-11R1 Issued: 20 January 2020 ACAS II – Manoeuvres Based on Visual Acquisition of Traffic' demonstrates the continued focus on this safety area. 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 fall into these occurrence categories.

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

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

### Additional Safety Areas:

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.

Figure B.1 shows that ground operations related activities contributed to 6 accidents and 3 serious incidents during the past five years. 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 4 fire/smoke/fumes related serious incidents in the past five years all of which were resolved satisfactorily by the crews. On-board fire is an event that must be dealt with promptly and effectively, using aircraft design and operational procedures to prevent a fire from starting in the first instance or 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 shows that there was 1 accident and 5 serious incidents due to cabin safety or medical emergency. Figure B.2.(a) shows that the RAMP (Ground Handling), CABIN (Cabin Safety) and MED (Medical) were numerically among the top five categories reported to IAA under the occurrence reporting system in previous years. RAMP (Ground Handling) and CABIN (Cabin Safety) continued to be significant categories in 2020. Although there are fewer FIRE related reports they are highlighted here due to the potential severity of their intrinsic risk. The majority of these occurrences were classified as low risk, indicating that there were robust barriers preventing the occurrence from resulting in a severe outcome.

As the number of MORs received from operators of the 'Irish lease fleet' decreased significantly and did not support the identification of any emerging trends for 2020 other than the likelihood of this reduction in reporting being linked to reduced levels of operations. The main categories reported were similar to those observed in the CAT Aeroplanes domain, with 'Significant component failure – non-powerplant' (SCF-NP) being the most common. As the State of Registry these were addressed by the Airworthiness Standards Department (AWS D) inspectorate with operational issues being referred to the State of Operation in accordance with the ICAO Article 83 bis agreement. In the main, the same key safety areas and safety issues previously outlined remain applicable to these operations in the long term.

A summary of the main safety issues identified from the analysis of the safety data in these safety areas is outlined below:

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



## COVID-19

As part of the European Safety Risk Management (SRM) process EASA worked closely with Member State regulators and industry partners to identify the new or emerging safety issues arising from COVID-19. The identified safety issues were published in the "Review of Aviation Safety Issues Arising from the COVID-19 Pandemic," which was updated in April 2021 and is available here: [https://www.easa.europa.eu/sites/default/files/dfu/review\\_of\\_aviation\\_safety\\_issues\\_from\\_COVID-19\\_final\\_-\\_v2\\_-\\_april\\_2021.pdf](https://www.easa.europa.eu/sites/default/files/dfu/review_of_aviation_safety_issues_from_COVID-19_final_-_v2_-_april_2021.pdf)

One of the new risks to emerge in the early stage of the pandemic was "the Carriage of cargo in the passenger cabin", necessitated by the urgent need for States to secure PPE quickly for frontline health workers. The sudden cessation of flights and the difficulties in safely transporting crews to training facilities lead to the need for an approved mechanism for licence extensions. The underlining risks in some pre-existing safety areas came under increased stress for example the "Prevention and treatment of unruly passengers in the context of COVID-19". System Component Failure (SCF) has been one of the more significant occurrence categories in recent years and the identification of "the rapid storage and de-storage of aircraft may lead to technical failures" as a COVID-19 risk further increases the likelihood of occurrences in this category.

During 2020 EASA and the European Centre for Disease Prevention and Control (ECDC) developed guidelines on an aviation health safety protocol to ensure the health and safety of passengers, as well as the staff and crew who serve them, by maintaining safe and secure operations whilst minimising the risk of virus transmission. In order to monitor the effectiveness of these measures the IAA launched a passenger COVID-19 related health survey which will continue to run during 2021, and results thus far suggest passenger experience in airports and on aircraft have been largely positive in respect of the way the operators are managing passenger health safety during the pandemic.

With the relentless onslaught of this pandemic across all sectors of society and industry, having no regard for geographical boundaries, the impact on the wellbeing of all individuals in every genre of society has been recognised as a significant factor and aviation professionals are no exception. There are many sources of stress in the current environment, they include the significant health risks presented by the virus itself, the consequent economic threat to livelihoods and/or the prolonged isolation from family, friends and colleagues. The requirement to perform to the highest of standards in a safety critical industry despite the stresses brought about by this global disease has been universally recognised. ICAO and EASA have outlined Human Performance considerations and risks. In response EASA in collaboration with other stakeholders have formed the Wellbeing hub <https://www.easa.europa.eu/community/content/wellbeing>

The purpose of this review is to assess the performance of aviation safety in Ireland in 2020 and while it does not present any evidence of accidents, incidents or occurrences directly caused by the pandemic, the impact of COVID-19 has become an overarching latent condition that has to be mitigated against in order to prevent the manifestation of any undesired outcomes. Due to its pervasive nature it has the potential to act as a contributing factor in all the safety areas and safety issues identified and discussed. This is all the more reason why all stakeholders should coordinate and maximise their efforts in every arena of the safety risk management system to offset any undesired consequences due to COVID-19.

## Occurrence reporting rates

Despite the downturn in CAT activity during 2020, the occurrence reporting rate remained in line with the average over the past 4 years as demonstrated in table B.2 below, which provides data on the number of sectors flown annually between 2017 and 2020 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	6,565	64.45
2018	1,105,310	8,538	77.25
2019	1,128,335	9,934	88.04
2020	434,203	3,309	76.21
<b>Total</b>	<b>3,686,536</b>	<b>28,346</b>	<b>76.89</b>

## Part NCC

NCC activity decreased in 2020 with only 8 aircraft engaged in NCC operations, some of these activities were of a short duration, such as ferry flights. The current level of NCC activity does not support insightful independent statistical analysis. EASA's ASR 2020, the latest publication available at this time states that, 'during 2019, there were no fatal accidents involving an EASA MS registered NCC business aeroplane. The number of non-fatal accidents has decreased but the number of serious incidents has increased in comparison with the average of the previous 10-year period (2009-2018).' It also takes note of the low number of lower risk occurrences and believes that this is likely due to the low reporting in this domain, where only high-risk accidents and serious incidents, normally very visible and with severe outcomes, are being reported and investigated. 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 relatively small in comparison to the level of fixed-wing CAT operations. 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 has four helicopter Air Operator Certificate (AOC) holders operating 11 helicopters in commercial air transport (CAT). One operator is approved to undertake helicopter emergency services (HEMS).

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 9 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. Three operators have declared their capabilities to undertake NCC activities operating 1 foreign registered and 3 Irish registered helicopters.

The Irish helicopter lease fleet are included here with the Irish CAT operators, as they are exposed to the same risks even though their approval and oversight regime differs. During 2020 there were 7 Irish registered helicopters operating on a foreign issued AOC using the provisions of Article 83 bis of the Chicago Convention.

## COVID-19

While commercial passenger transport services experienced a severe downturn, Search and Rescue (SAR), HEMS and SPO services continued to be as essential as ever throughout 2020. This is reflected in the 13% increase in sectors flown in 2020 compared to 2019. These activities had to be conducted with due consideration to the application of COVID-19 health control measures which have the potential to negatively affect operations. Other pertinent risks identified by EASA for this sector included areas such as the effect of disinfection (biocides) on aircraft systems and structural components, decreased wellbeing of aviation professionals during shutdown and aviation personnel fatigue.

In the initial stages of the pandemic 'Guidance for continued helicopter operations in relation to the SARS-CoV-2 pandemic' was promptly issued. In the meantime in an effort to tackle the many urgent issues revolving around various areas such as the hygienic safety of aircraft, application of existing rules around licensing and training and maintenance issues EASA has issued numerous Safety Information Bulletins (SIBs), guidelines and resource materials which are centrally located on the COVID-19 portal at <https://www.easa.europa.eu/the-agency/coronavirus-COVID-19>

## Accidents and serious incidents

Over the last five years helicopter operators in this sector were involved in 1 fatal accident which occurred in 2017. 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	NO. ON IRISH AIRCRAFT REGISTER	ACCIDENTS			SERIOUS INCIDENTS
		NON-FATAL	FATAL	TOTAL	
2016	11	-	-	-	-
2017	14	-	1	1	-
2018	16	-	-	-	-
2019	20	-	-	-	-
2020	20	-	-	-	-
<b>Total</b>	-	0	1	1	0

The fatal accident involved the collision of the helicopter with terrain. The AAIU have published a preliminary report (Ref. No. 2017-006) and four interim statements which are publicly available on their website [www.aaiu.ie](http://www.aaiu.ie).

## 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 between 2017 and 2020, according to occurrence category and ARMS Risk Classification Band is presented in Figure C.1 below:

The top reported categories were "SCF (system component failure or malfunction)", and "other". Many of these operations are undertaken in harsh environments which can affect on-board systems. Most of the SCF occurrences were low risk which indicates minor failures or failure of redundant systems that had little effect on operations. The high usage of category "other" in the helicopter domain reflects the fact that 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.

Owing to the small number of operators in this domain, providing a separate chart for 2020 could lead to the identification of individual operators which is in breach of confidentiality provisions in occurrence reporting regulations. In addition, the small number of reports for the year did not support independent statistical analysis.

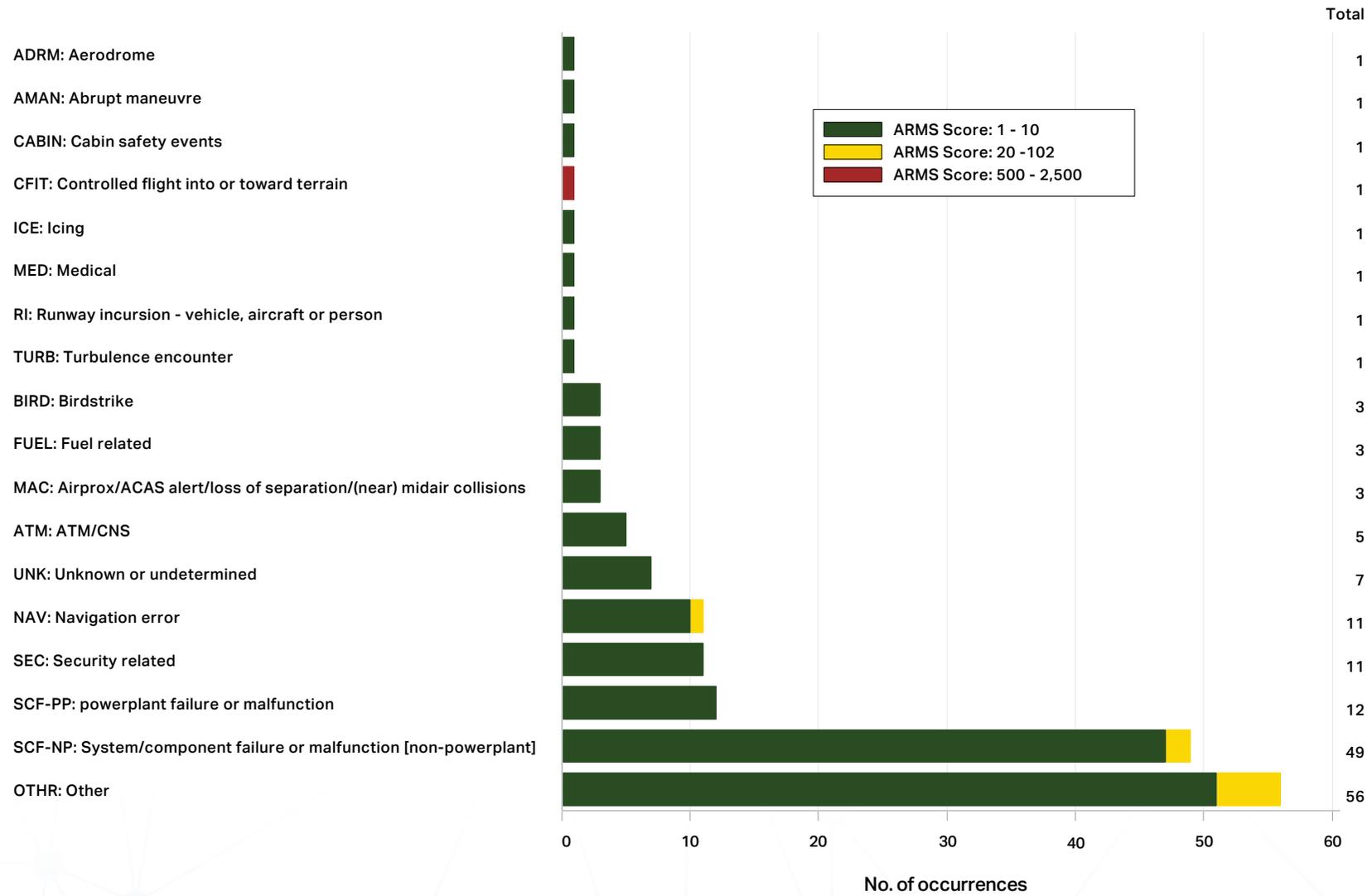


Figure C.1 Categorisation of MORs Commercial and Declared Helicopter Operation 2017-2020

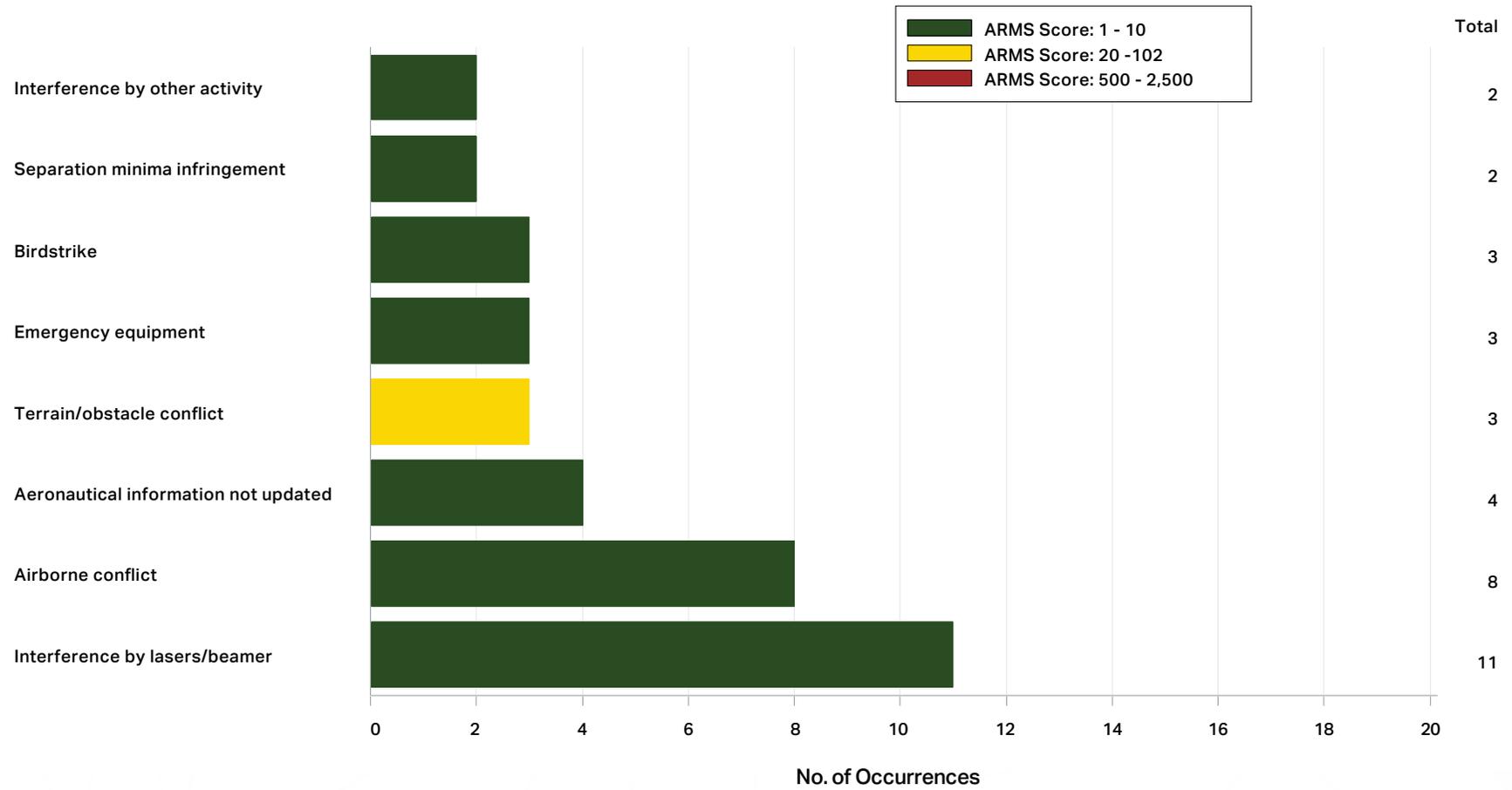


Figure C.2 Top Event Types – Commercial and Declared Helicopter Operations 2017 – 2020

## 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. The 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 or damage to helicopters.

### Key Safety Areas:

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.

There was one fatal accident in Ireland in the past five years involving collision into terrain. Figure C.1 shows that there was one aircraft upset related occurrence (i.e. abrupt manoeuvre) but no loss of control inflight related category events.

Figure C.2 gives more insight into the events that led to the occurrence reports and 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).

Detailed analysis of these 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"> <li>• Monitoring of flight parameters to prevent loss of situational awareness, and/or warning system activation, and/or aircraft upset.</li> <li>• Management of flight path</li> <li>• Management of technical failures to prevent aircraft upset</li> <li>• Avoidance of flight into convective weather or icing conditions which could cause aircraft upset</li> <li>• Reaction to birdstrike or laser attack to prevent aircraft upset</li> <li>• Recognition and recovery from aircraft upset</li> <li>• Optimum state of wellbeing and fitness for flight</li> </ul>
Collision with terrain or obstacle (e.g. CFIT, CTOL, LALT)	<ul style="list-style-type: none"> <li>• Intentional low-level operations</li> <li>• Operations in degraded visual environments</li> <li>• Maintenance of situational awareness by crews</li> <li>• Use of helicopter see and avoid</li> <li>• Use of take-off and landing sites outside of airports/heliports</li> <li>• Accuracy and use of aeronautical charts and terrain and obstacle databases</li> <li>• Increased number of Windfarms</li> <li>• Optimum state of wellbeing and fitness for flight</li> </ul>

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>

## Additional 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://www.easa.europa.eu/document-library/general-publications/european-plan-aviation-safety-2021-2025> for more details)

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 (i.e. three low risk reports in three years). 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.

SAFETY AREA	SAFETY ISSUES
Mid-Air Collision (MAC)	<ul style="list-style-type: none"> <li>Potential conflict with non-transponder equipped general aviation aircraft</li> <li>Potential conflict with drones</li> </ul>

## Occurrence Reporting Rates

The following table provides data on the number of sectors flown annually over the last four years with the corresponding MOR rates per 1,000 flights. While the number of movements increased by 13% in 2020 the occurrence reporting rate in this sector decreased by 50%, with all reports being assigned a low risk score.

**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	36	5.00
2019	8,144	61	7.49
2020	9,176	34	3.71
<b>Total</b>	<b>31,413</b>	<b>166</b>	<b>5.28</b>

## 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 landing or departure by aircraft carrying passengers or goods for hire or reward is being undertaken. Generally, these are known as nationally licensed – public aerodromes.

Additionally, under national aviation law, where flight training is being undertaken, there is a requirement for under S.I. 355 of 2008 – Aerodromes and Visual Ground Aids Order. Generally, where flight training is being undertaken, there is a requirement for licensing, and these are known as nationally licensed – private aerodromes.

Currently, there are 8 certified aerodromes within Ireland, 5 nationally licensed public aerodromes and 9 nationally licensed private aerodromes. Details of the current certificated and licensed aerodromes are published in AIP Ireland, AD Section 1.5 – Status of Certification of Aerodromes. In limited circumstances, a declaration can also be made to the Authority to allow for the use of an unlicensed aerodrome by aircraft engaged in instruction in flying, there are currently 5 airfields where such a declaration is in place.

## COVID-19

The starkness of the pandemic's effect on the aviation industry continues to be reflected in the Air Navigation and Aerodrome sector where the level of ATC controlled flight hours in 2020 dropped to 41% of the level of activity recorded in 2019. This includes traffic overflying Irish airspace as well as aircraft that land or depart from an Irish airport (terminal traffic). The number of flights at Irish airports similarly dropped to 40% of the activity observed in 2019. A flight in this instance refers to an aircraft movement be it a landing or a departure at an Irish aerodrome.

As in other domains this new reality continues to produce new risks and accentuate some existing risks. At a macro level there is the reduced availability of financial resources and the postponement of emergency response plan exercises which may lead to ineffective handling of emergencies. The malfunction or failure of communication, navigation and surveillance (CNS) equipment after low usage is an example of one of the predicted risks.

At an individual level there may be a skills and knowledge degradation due to lack of recent practice, increased periods between licence/ validation checks may be required and roster adaptations to reduce transmission of illness may create different team behaviours.

There are various operational challenges arising for Aerodrome personnel from the pandemic, such as the implementation of new health measures, the long-term storage of aircraft, ULDs and ground support equipment (GSE). In some instances, the hiatus has afforded the opportunity to conduct construction / maintenance works on the movement area, a risk that needs to be safely managed.

Hazards associated with aerodromes being closed or partially closed for long periods will need mitigations against risks such as GSE malfunctions due to long periods of disuse and a lack of maintenance or technical issues relating to the recommencement of aircraft fuelling after a long break.

The longed-for return to normal operations may necessitate the rapid de-storage of aircraft which will require the careful management of the interfacing between operators, ground handling companies and ground controllers. Enhanced aircraft cleaning and disinfection is one of the key factors helping restore passenger confidence to fly and again will require robust coordination.

## 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 unless there was a second aircraft involved in the same occurrence that was providing commercial services.

There were 3 accidents, none of which resulted in fatalities, and 9 serious incidents over the five-year period considered. The 1 non-fatal accident that occurred in 2020 involved foreign registered B767 experiencing a hard landing that was categorised as 'Abnormal Runway Contact' (ARC).

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

YEAR	2016	2017	2018	2019	2020	TOTAL
No. flights at Irish airports	274,058	283,374	293,961	284,555	114,483	1,250,431
No. flight hours in Irish airspace	309,693	311,715	315,776	319,775	131,296	1,388,255
Non-fatal accidents	0	1	1	0	1	3
Serious incidents	2	4	2	1	0	9

Based on the findings of their investigation the AAIU assigns one of the CAST/ICAO common taxonomy categories (the same taxonomy as discussed in Sections B and C above) to the occurrence. Figure D.1 summarises the categories assigned to the 3 accidents and 9 serious incidents that took place between 2016 and 2020.

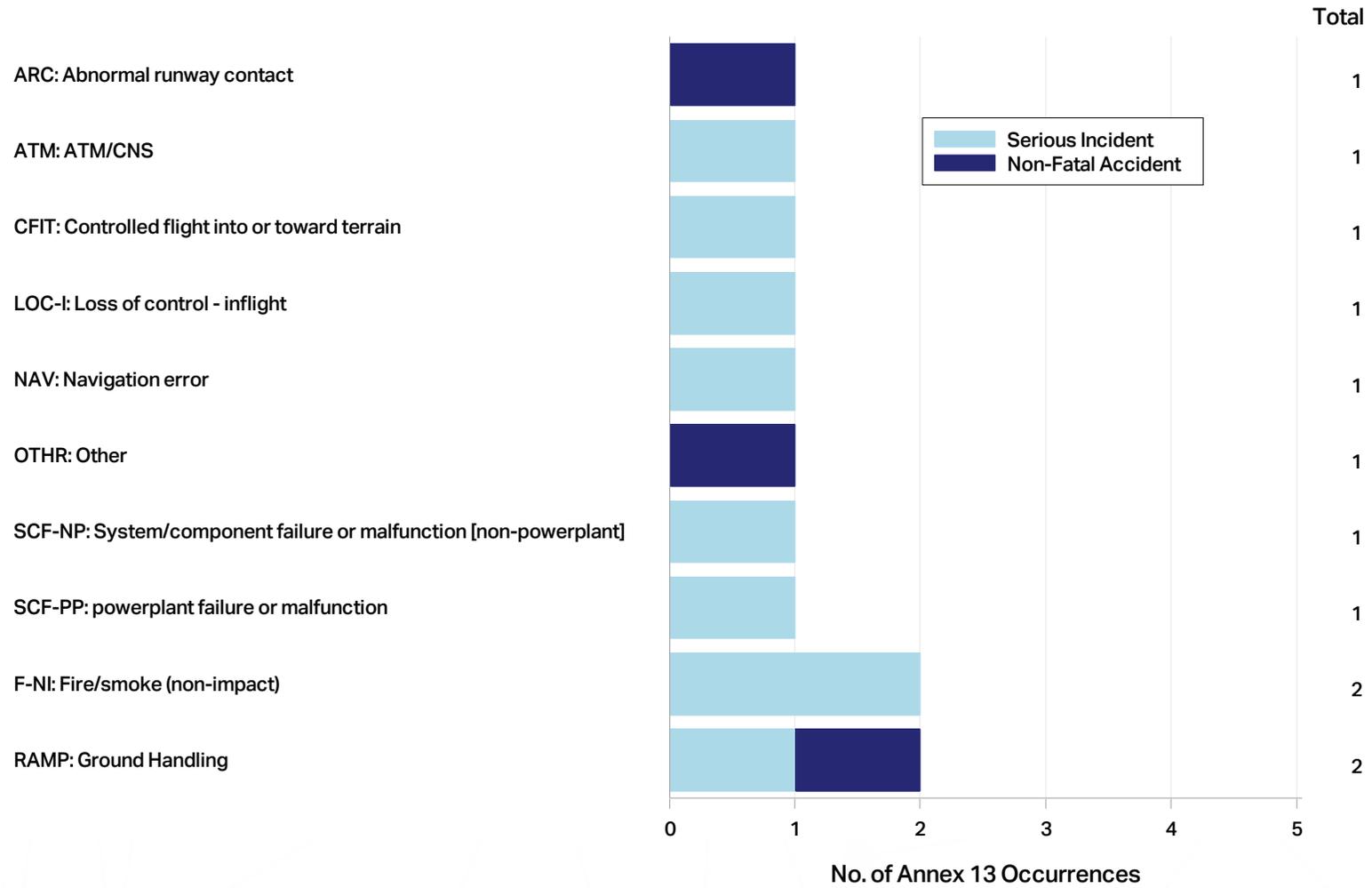


Figure D.1: Categorisations of Annex 13 occurrences involving CAT that occurred at Irish certificated/licenced aerodromes that provide ATC services

## 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. Both domains can be quite interlinked, as in many cases a single occurrence at an aerodrome may be reported by both the air navigation services provider and the aerodrome operator. However, it is important to review and assess the occurrence in both domains separately, as the impact and available risk mitigation strategies will be different.

## Sub-section 1: Air Navigation Service Provision

The IAA received occurrence reports from ANS providers that occur in Irish airspace, including enroute operations, terminal operations and ground operations where ATC services are provided. A breakdown of the occurrences submitted between 2017 and 2019 by occurrence category and ARMS Risk Classification Band is given in Figure D.2.(a) below, with a comparative chart for 2020 provided at Figure D.2.(b) Figure D.3 provides a breakdown of the top event types reported that underlie these occurrence categories and in some instances are precursor events to the more high-profile occurrence categories.

The top occurrence categories in 2020 largely remained unchanged from the previous years. The 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) remained the most common categories.

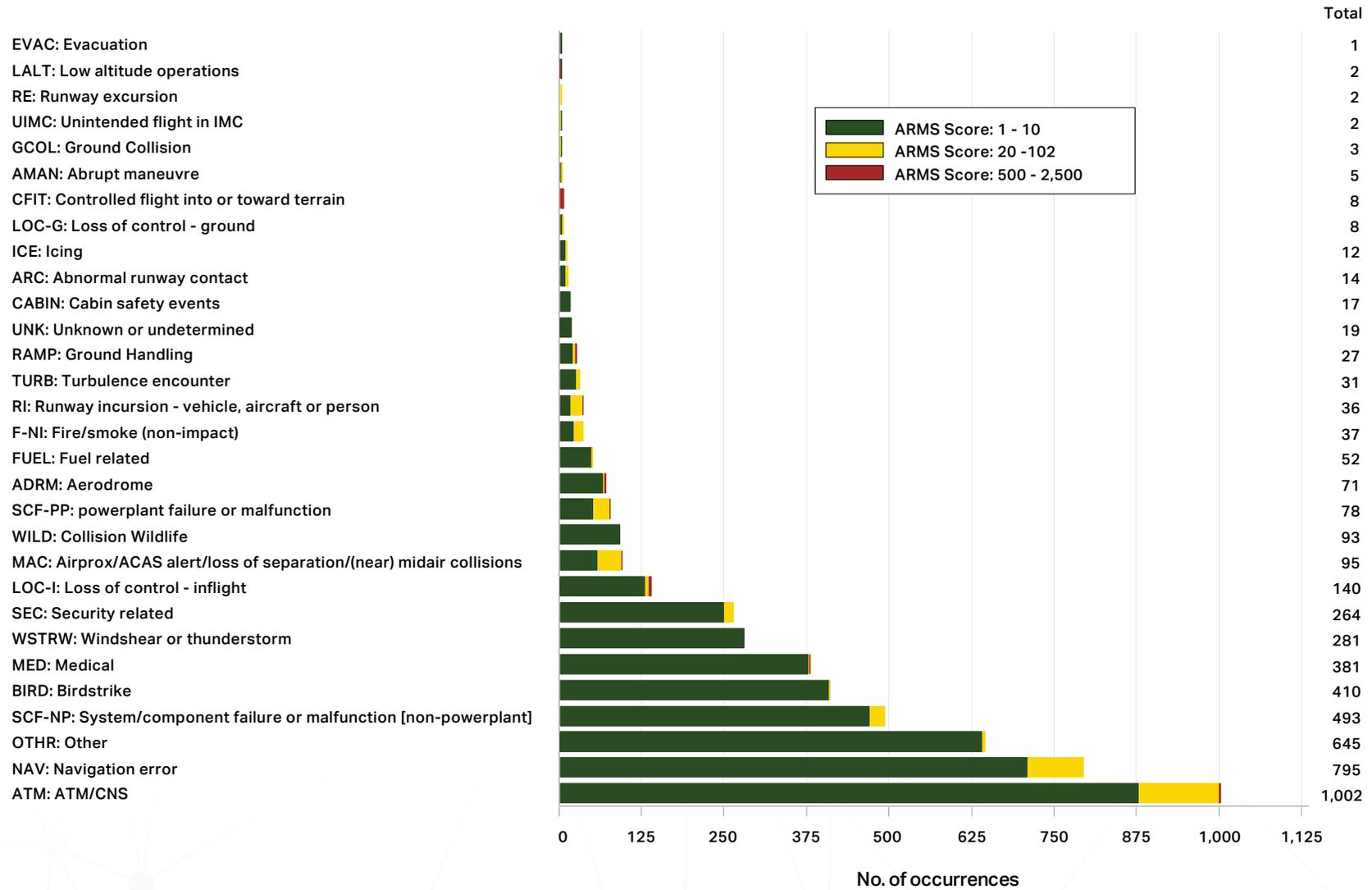


Figure D.2.(a) ATC Occurrence Reports 2017 - 2019

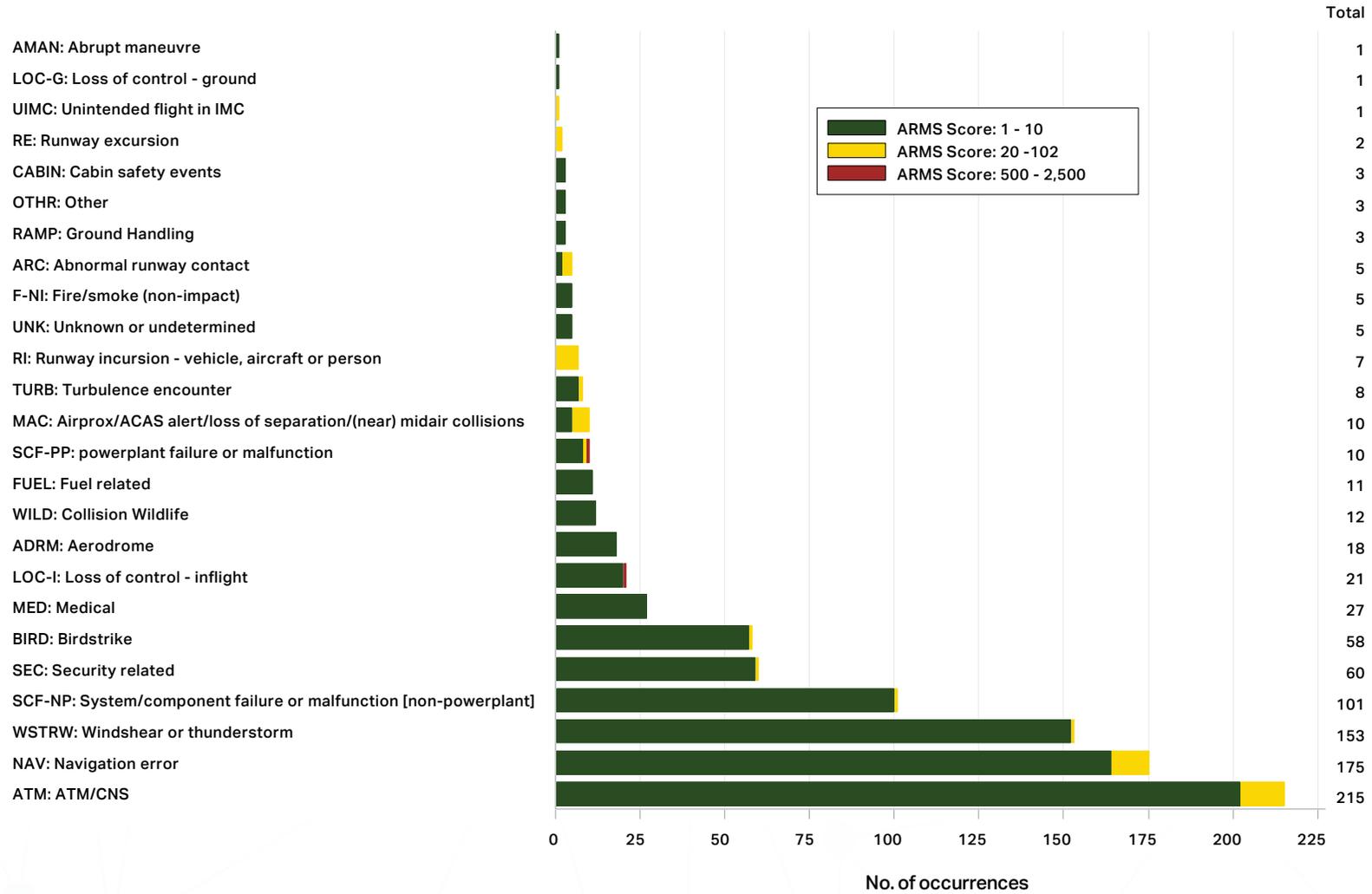


Figure D.2.(b) ATC Occurrence Reports 2020

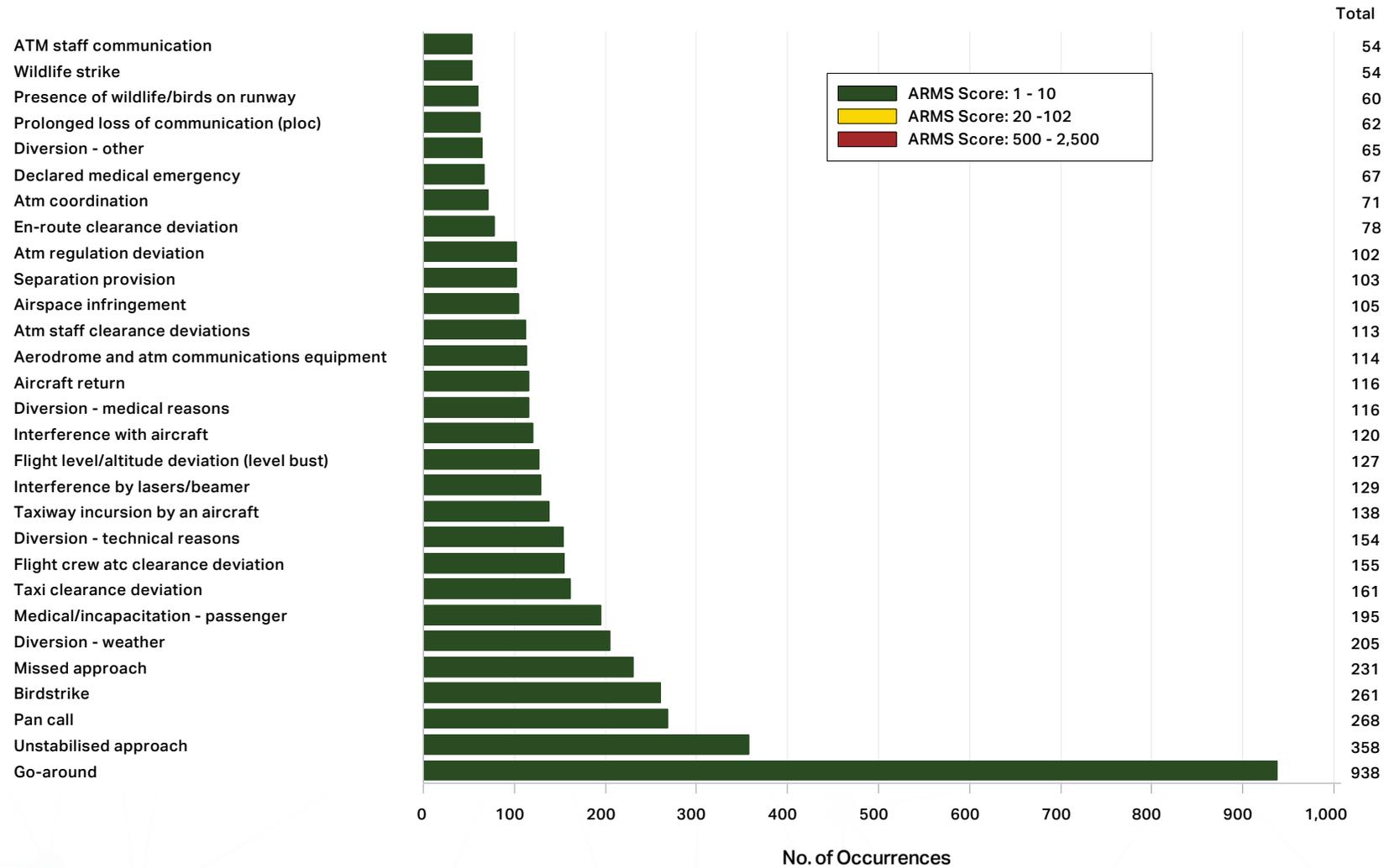


Figure D.3 Top Event Types – ATC 2017-2020

As required by Implementing Regulation (EU) 2017/373, the Competent Authority (CA) monitors and assesses the safety performance of service providers under its oversight. National and ANSP level safety performance has been monitored through a set of safety performance indicators (SPIs) which have historically been aligned with the EU Single European Sky performance scheme as it has evolved, and with additional SPIs put in place.

The CA monitors the national safety performance through the following SPIs:

#### SI-1; SMI - Separation Minima Infringement

#### SI-2; RI - Runway Incursion

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

Sub-categorised as:

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

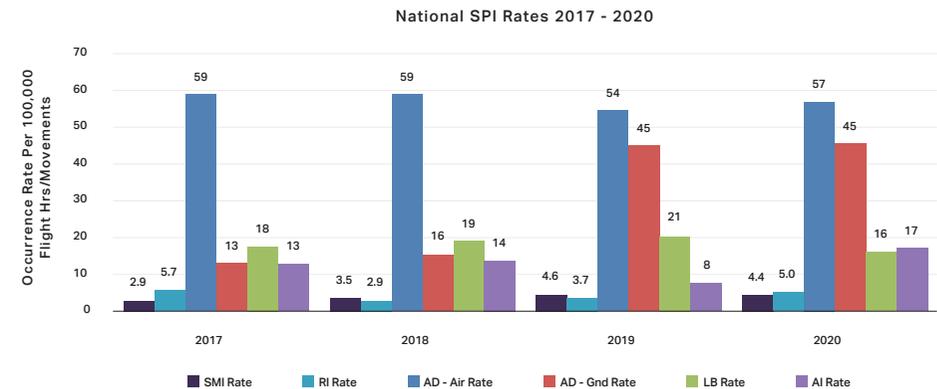
#### SI-4; LB - Level Bust

#### SI-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.

Of most significance is the continued annual increase in the rate of ground-based aircraft deviations. The national trend is primarily driven by a near fivefold increase in the annual rate of taxiway deviations and taxiway incursions at Dublin since 2017, from 13.6 to 67 per 100,000 movements. This in itself has generated targeted activities across the aviation domains; however, based on current trend monitoring, it cannot yet be stated that the mitigations applied to reduce ground-based deviations have been effective. Airborne and ground-based deviations are considered as precursors to more significant occurrences, although for the same period, the national rates of SMI and RI and have remained relatively low

Table D.2 ATM Annual National SPI Rates, 2017 - 2020



## 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 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. In 2020 there was 1 non-fatal accident categorised as 'Abnormal Runway Contact (ARC). Figures D.2.(a) and D.2.(b) combined show that in the past four years ANS providers reported 105 MAC related occurrences and 43 RI related

occurrences. Table D.2 shows the 4-years rate trends 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.

Over recent years the ECCAIRS reporting format in the ANS domain has improved data quality and enabled a more informed insight through the more transparent mapping that exists to event types. Detailed analysis of the safety information in conjunction with follow-up information from the reporting organisations has identified the following safety issues that are included in the ANS sector-based risk register.

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

## Occurrence reporting rates - ANS

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 2020. This table shows an increase in the reporting rate in 2020 despite the significantly lower number of flights which may indicate a greater awareness of the need to remain vigilant by maintaining a positive safety reporting culture in these challenging times.

**Table D.3: No. and rate of MORs according to flight hours from 2017 to 2020**

YEAR	FLIGHT HOURS	TOTAL	
		NUMBER	RATE
2017	311,715	1,358	43.57
2018	315,776	1,732	54.85
2019	319,775	1,686	52.73
2020	131,296	877	66.80

## Sub-section 2: Aerodrome Operations

A breakdown of the occurrences submitted between 2017 and 2019 by occurrence category and ARMS Risk Classification Band is shown in Figure D.4 (a) below, followed by a comparative chart for 2020 in Figure D.4 (b).

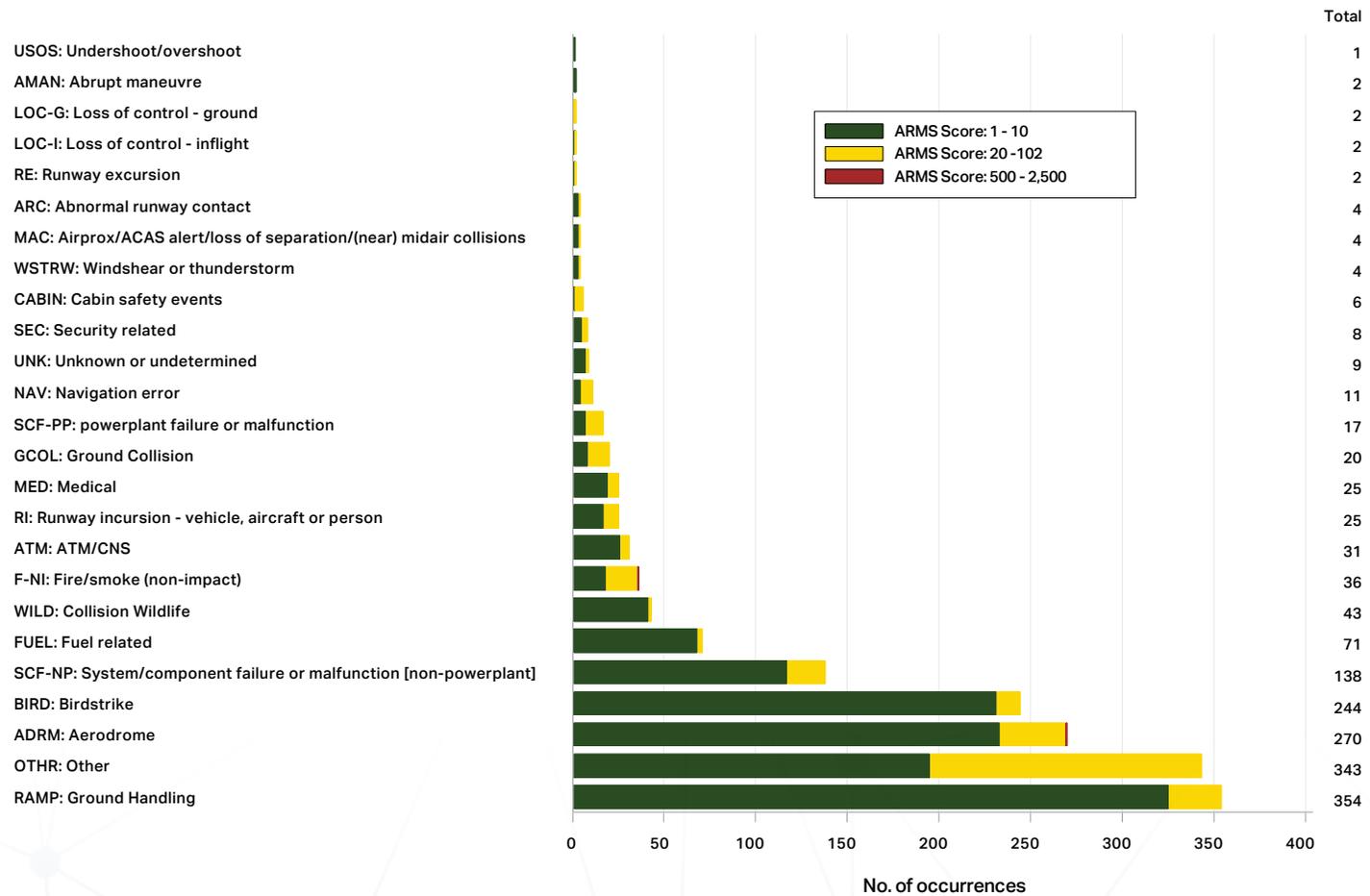


Figure D.4 (a) Aerodrome Occurrence Reports 2017-2019

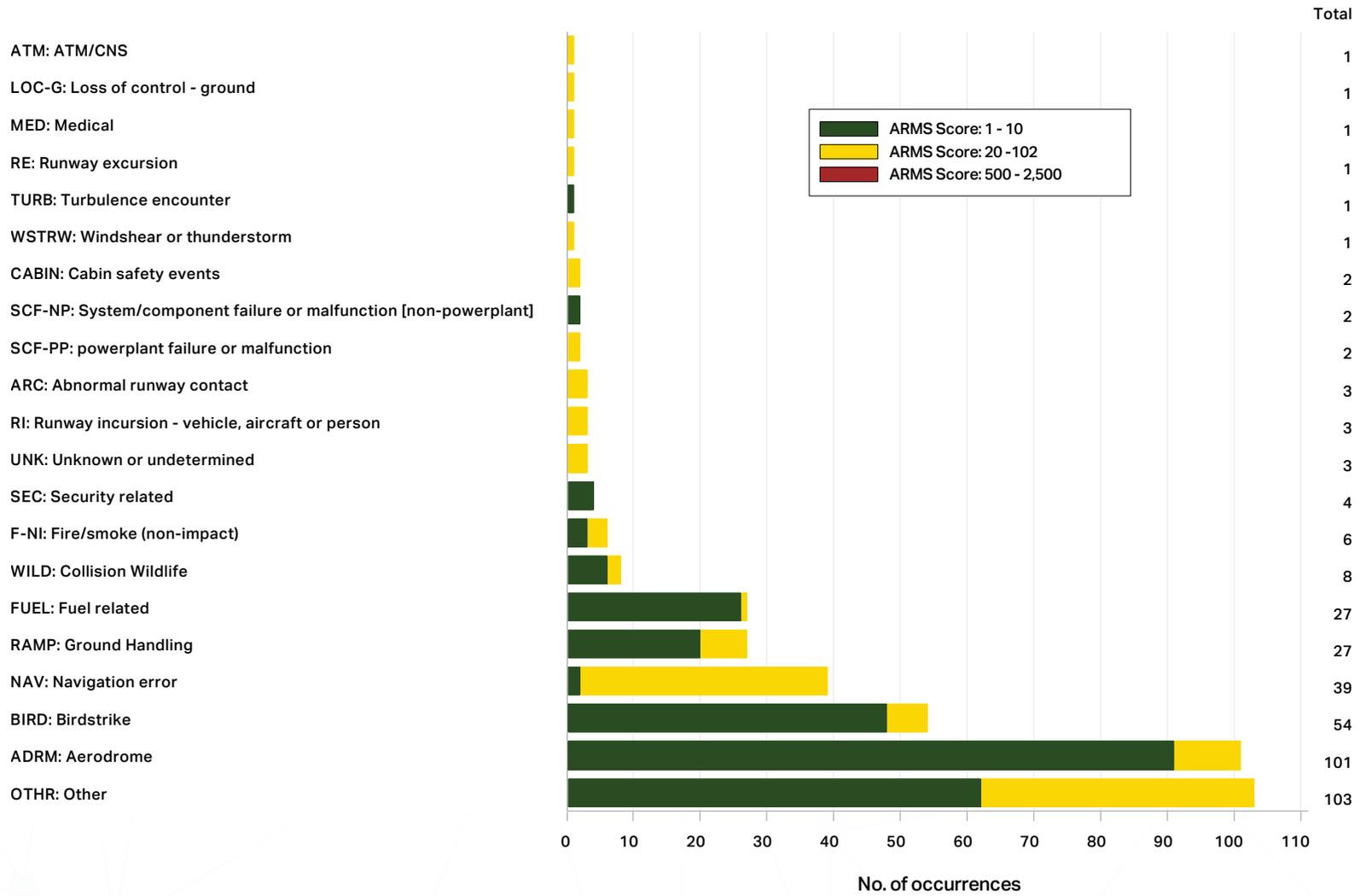


Figure D.4 (b) Aerodrome Occurrence Reports 2020

The top occurrence categories largely remained the same with some slight changes in the order. RAMP: Ground Handling (e.g. ground vehicle operations, aircraft pushback/towing etc) and MED were less frequent in 2020 compared to previous years, this could possibly be due to the lower level of aircraft movements and decreased number of passengers. NAV and SEC were relatively more commonly reported categories in 2020 than in previous years.

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.

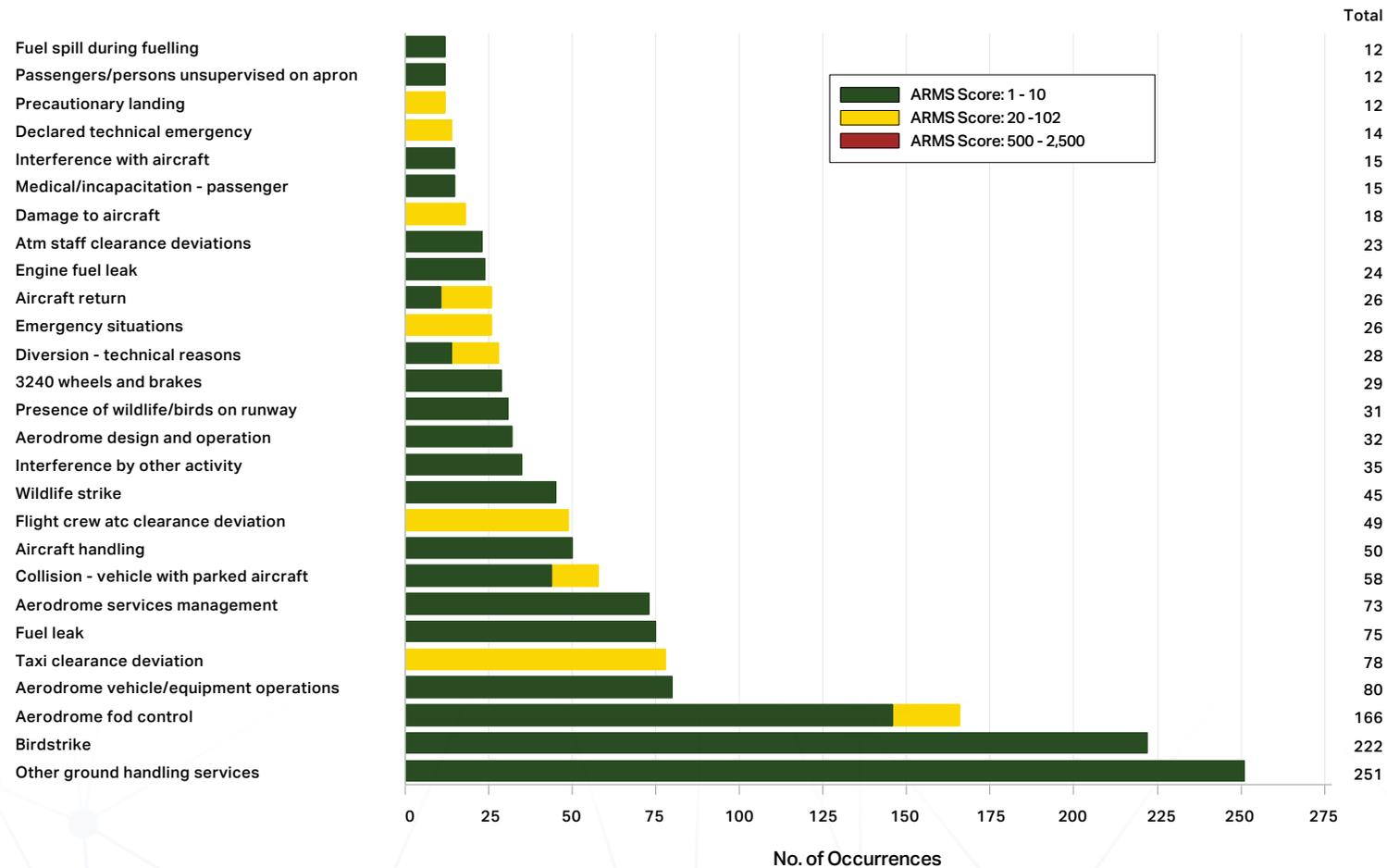


Figure D.5 Top Event Types – Aerodrome 2017- 2020

## 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.

### Key Safety Areas:

Among the key safety areas identified globally where aerodrome operations could have an impact, are runway incursion (RI), runway excursion (RE) and aircraft upset/loss of control - inflight (LOC-I). 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.

Figure D.1 shows that 1 accident and 1 serious incident were attributed to ground handling activities in the past five years. Figures D.4.(a) and (b) combined show that ground handling (e.g. loading, towing, fuelling of aircraft etc) and aerodrome related (including occurrences relating to the design and servicing of aerodrome facilities and equipment) were among the most common occurrence categories reported by aerodrome operators. While there was no accident or serious incident categorised as runway incursion Figures D.4. (a) and (b) show that there were 28 runway incursions reported by aerodrome operators in the past four years, 13 of these were due to unauthorised presence of ground vehicles on the runway. Figure D.5 shows that the top event types reported were other ground handling services (i.e. ground handling services except aircraft marshalling), aerodrome ser-

vices management, collision between ground vehicle and parked aircraft and aerodrome vehicle/equipment operations (such as removal of foreign objects from aerodrome). The second highest assigned occurrence category in Figures D.4.(a) and D.4.(b) combined is 'Other', which is allocated when the precise classification is not known. Further analysis determined that this category included aerodrome events that don't meet the strict criteria for ADRM categorisation.

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

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

## Occurrence reporting rates - Aerodromes

The following table provides a comparison between the number of movements and the corresponding MOR rates per 10,000 movements from 2017 to 2020. While the number of actual movements decreased the reporting rate in this domain increased. This may be due to increased efforts in maintaining alertness for the outcome events of the expected emerging risks posed by the COVID-19 pandemic. It may also reflect a greater maturation of Safety Management Systems and their reporting cultures.

Table D.9: No. and rate of MORs according to movements from 2017 to 2020

YEAR	MOVEMENTS	TOTAL	
		NUMBER	RATE
2017	283,374	510	18.00
2018	293,961	462	15.72
2019	284,555	577	20.28
2020	114,483	364	31.80



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.

It also includes 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. 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 grouped these activities into two sub-sections; EASA certified and non-EASA certified (Annex I), followed by a more detailed review on the safety performance of each activity.

## GA EASA Regulated Aircraft

All aircraft, certified and non-certified, which are not included in Annex 1 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.

*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.*

## GA Non-EASA Regulated Aircraft; Aircraft subject to Irish national legislation (Annex I Aircraft)

- Historic Aircraft
- Amateur Built (Homebuilt) Aircraft
- Microlight aircraft – typically aeroplanes with MTOM less than 450 kg and flex-wing aircraft.
- Gyrocopters.
- Paragliders, powered paragliders (paramotors) and powered parachutes.

## COVID-19

The universal nature of the COVID-19 pandemic extended its reach into the GA community in 2020. While exposure data isn't readily available there is reason to believe that the level of activity was down on previous years. The traditional mid-Spring return to VFR (Visual Flight Rules) was delayed due to the stricter level of Government imposed lockdowns in place at that time. Awareness of the increased risk from a prolonged spell of inactivity lead to some excellent safety promotional work by the General Aviation Safety Council of Ireland (GASCI) and the UK General Aviation Safety Council (GASCo). Flying schools and clubs adopted the Government issued guidance on the phased easing of restrictions and appeared to successfully address the risk of "Restarting operations without spreading COVID-19".

Some of the pertinent COVID-19 risks identified by EASA included "Skills and knowledge degradation due to lack of recent practice", "Reduced availability of aviation medical examiners (AMEs)" and a "Backlog in training limiting available personnel". Organisations like ATOs and DTOs have the benefit of SMSs in risk monitoring and managing these challenges, however the private pilot needs the support of a robust safety promotion network in order to strengthen their resilience to these challenges.

## Accidents and Serious Incidents:

The composition of the Accident and Serious Incidents categories recorded in 2020 differed to other years. Firstly, there were no fatal accidents. There were four non-fatal accidents, three of which involved an ATO (Approved Training Organisation) activity. There was one Serious Incident involving a foreign registered private fixed wing aeroplane.

Table E.1 provides an overall summary of the safety performance of this sector in respect of accidents and serious incidents in 2020 compared to the previous 4 years (2016-2019). It has been subdivided into EASA Regulated aircraft and Annex I aircraft) as these categories are subject to differing regulatory regimes and oversight procedures.

Charts detailing 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 Summary of GA Accidents and Serious Incidents.

	GA SUB-SECTOR	NO. OF FATAL ACCIDENTS (FATALITIES) 2020	TOTAL NO. OF FATAL ACCIDENTS 2016-2019 WITH (TOTAL FATALITIES)	NO. OF NON-FATAL ACCIDENTS 2020	TOTAL NO. OF NON-FATAL ACCIDENTS 2016-2019	NO OF SERIOUS INCIDENTS 2020	TOTAL NO. OF SERIOUS INCIDENTS 2016-2019
EASA Certified Aircraft	Aeroplanes >2250 ≤5700 kg	0 (0)	1 (2)	0	1	0	0
	Aeroplanes ≤2250 kg	0 (0)	1 (1)	4	8	0	9
	Helicopters > 2250 kg	0 (0)	0 (0)	0	0	0	0
	Helicopters ≤ 2250 kg	0 (0)	0 (0)	0	4	0	0
	Sailplanes *	0 (0)	0 (0)	0	2	0	1
	Balloons **	0 (0)	0 (0)	0	0	0	0
Annex I Aircraft	Annex 1 Aeroplanes ≤2250 kg	0 (0)	2 (3)	0	4	0	2
	Homebuilt ≤2250 kg	0(0)	1 (2)	0	5	0	1
	Microlight aircraft	0 (0)	2 (2)	0	4	0	1
	Gyrocopters	0 (0)	0 (0)	0	0	0	0
	Powered paragliders, paragliders, and powered parachutes	0 (0)	2 (2)	1	1	0	1

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

The Irish aircraft register had 5 land aeroplanes with an MTOM > 2,250 kg ≤ 5,700kg at the end of 2020.

There were no fatal accidents, non-fatal accidents, or serious incidents in 2020 involving land aeroplanes in this category.

Over the past five years there was 1 fatal accident and 1 non-fatal accident. The fatal accident occurred in 2018, involving a foreign registered aircraft while operating in accordance with Part-SPO (Specialised Operations), with two fatalities, which was categorised as 'Loss of Control - Inflight' (LOC-I). The non-fatal accident occurred in 2019 involving an Irish registered aircraft and was categorised as 'Abnormal Runway Contact' (ARC).

## EASA Regulated Land Aeroplanes - MTOM ≤ 2,250 kg

There were 99 EASA certified land aeroplanes with an MTOM ≤ 2,250 kg on the Irish aircraft register at end of 2020.

In 2020 there were no fatal accidents, 4 non-fatal accidents and no serious incidents in this sub-sector. All of these non-fatal accidents involved Irish registered aircraft and were categorised by the AAIU as; Abnormal Runway Contact (ARC), Runway Excursion (RE), and Significant Component Failure Powerplant (SCF-PP).

During the previous 4 years (2016-2019) there were 8 non-fatal accidents, 2 of which related to foreign registered aircraft. The categorisations assigned to these accidents were 'Abnormal Runway Contact' (ARC), 'Runway Excursion' (RE), 'Significant Component Failure – Powerplant' (SCF-PP), 'Loss of Control - Inflight' (LOC-I), 'Collision with obstacles during take-off and landing' (CTOL), 'Ground Collision' (GCOL), 'Loss of control on the ground' LOC-G and 'Significant Component Failure – Non Powerplant' (SCF-NP). There were 9 serious incidents involving 5 foreign aircraft.

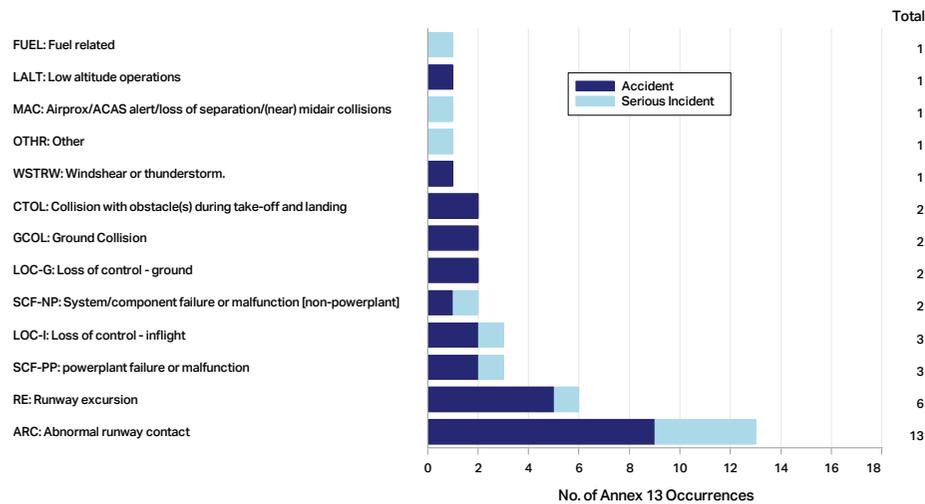
## Annex I Land Aeroplanes MTOW ≤ 2250 kgs.

In 2020 there were no fatal accidents, non-fatal accidents or serious incidents involving aircraft in this sub-sector.

Over the previous four years (2016-2019), aeroplanes in this sub-sector were involved in 2 fatal accidents resulting in 3 fatalities. Both fatal accidents involved Irish registered aircraft. There was 1 fatal accident with 2 fatalities in 2019, initially categorised as 'Significant Component Failure - Non-Powerplant' (SCF-NP) The AAIU investigation of this accident is ongoing. There was 1 fatal accident in 2017 with 1 fatality, involving an Irish registered aircraft, categorised as 'Ground Collision' (GCOL) There were 4 non-fatal accidents and 2 serious incidents in this four-year period involving two foreign registered aircraft. The categorisations assigned to these accidents were 'Abnormal Runway Contact' (ARC), 'Fire/smoke post-impact' (F-POST) and 'Runway Excursion' (RE).

The categories assigned by the AAIU to the accidents and serious incidents in Land Aeroplanes MTOM ≤ 2,250 kg (EASA Regulated and Annex 1 aircraft) are shown in Figure E.2.

Figure E.2: Categories of accidents and serious incidents involving GA aeroplanes with an MTOM below 2,250 kg (2016-2020)



## Rotorcraft

At the end of 2020 there were 6 complex rotorcraft and 20 non-complex rotorcraft registered in Ireland.

There were no fatal accidents, non-fatal accidents or serious incidents involving GA rotorcraft operations in 2020.

During the past five years there were 4 non-fatal accidents involving GA helicopters, all non-complex helicopters and all foreign registered.

The accidents were categorised by the AAIU as, 'Loss of control on the ground' (LOC-G, 2 accidents), 'Loss of control in flight' (LOC-I, 1 accident) and Controlled Flight into Terrain (CFIT, 1 accident).

## Homebuilt aeroplanes

There were 69 homebuilt aeroplanes on the Irish aircraft register at end of 2020 in this sub-sector.

There were no fatal accidents, non-fatal accidents or serious incidents involving homebuilt aeroplanes in 2020.

Over the past five years there were 2 fatal accident. There was 1 fatal accident in 2019, with 2 fatalities involving a foreign registered aircraft, categorised as 'Loss of Control- Inflight' (LOC-I). The second fatal accident which resulted in 1 fatality, occurred to a foreign registered aircraft in 2016 and was categorised as 'Low Altitude Operations' (LALT). In addition, there have been 5 non-fatal accidents involving 4 Irish registered aircraft and 1 foreign registered aircraft. The non-fatal accidents were categorised by the AAIU as; 'Abnormal Runway Contact' (ARC), 'Runway Excursion' (RE), 'Collision with obstacles during take-off and landing' (CTOL), 'Ground Collision' (GCOL), 'Loss of control on the ground' (LOC-G) and Windshear or thunderstorm (WSTRW). There was 1 serious incident involving a foreign registered aircraft.

## Microlight aircraft

There were 164 microlights on the Irish aircraft register at the end of 2020.

There were no fatal accidents, non-fatal accidents or serious incidents involving Microlight aircraft in 2020.

Over the past five years there were 2 fatal accidents, 4 non-fatal accidents and 1 serious incident, involving 3 Irish registered aircraft and 4 foreign registered aircraft. These accidents were categorised as 'Abnormal Runway Contact' (ARC), 'Loss of Control- Inflight' (LOC-I), 'Collision with obstacles during take-off and landing' (CTOL), 'Runway Excursion' (RE) and 'Fuel Related' (FUEL). Regarding the 2 fatal accidents; 1 occurred in 2019 involving a foreign registered microlight with 1 fatality, categorised as 'Collision with obstacles during take-off and landing' (CTOL) and 1 occurred in 2018 involving an Irish registered microlight with 1 fatality, categorised as 'Loss of Control – Inflight' (LOC-I).

## Sailplanes

At the end of 2020 there were 30 sailplanes, including 2 powered sailplanes and 1 home-built sailplane on the Irish aircraft register.

There were no fatal accidents, non-fatal accidents, or serious incidents involving sailplanes in 2020.

Over the past five years there were 2 non-fatal accidents, 1 accident involved an Irish registered aircraft, categorised as 'Collision with obstacles during take-off and landing' (CTOL) and 1 accident involved a foreign registered aircraft, categorised 'Glider Towing related event' (GTOW). There was 1 serious incident involving an Irish registered aircraft categorised as 'Abnormal Runway Contact' (ARC).

## Gyrocopters

At the end of 2020 there were 22 gyrocopters, including 3 homebuilt gyrocopters on the Irish aircraft register.

There were no fatal accidents, non-fatal accidents or serious incidents involving Gyrocopters over the past five years.

## Paragliders, powered paragliders and powered parachutes

At the end of 2020 there were 15 powered paragliders registered in Ireland.

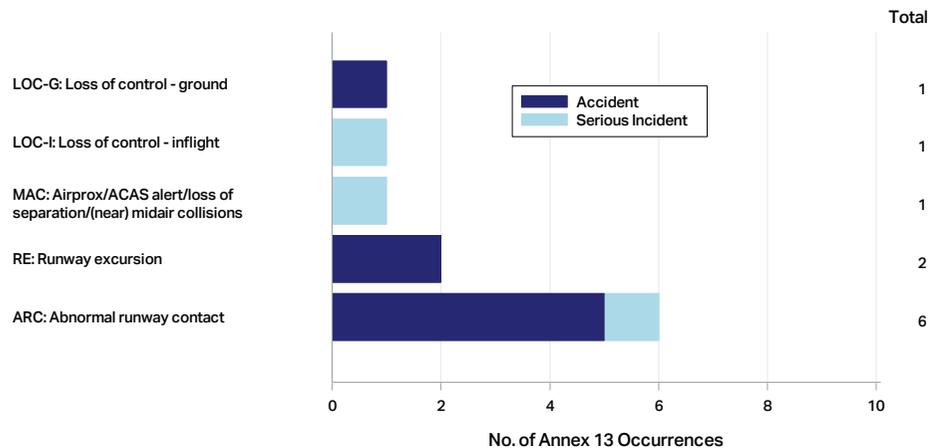
In 2020 there was 1 non-fatal accident categorised as 'Loss of control in flight' (LOC-I), no fatal accidents, and no serious incidents involving powered paragliders.

During the previous four years (2016-2019) there were 2 fatal accidents. One of these accidents involved an Irish registered paraglider, with 1 fatality was classified as 'Unknown' (UNK). The second fatal accident involved an unregistered powered paraglider, which resulted in 1 fatality and was categorised as 'Loss of control in flight' (LOC-I). In addition, there was 1 non-fatal accident categorised as 'Collision with obstacle(s) during take-off and landing' (CTOL) and 1 serious incident categorised as 'Controlled Flight into Terrain' (CFIT).

## GA Flight Training

There are currently 25 organisations in Ireland providing flight training in general aviation. Some of the accidents and serious accidents discussed above occurred during flight training. The main categories assigned to these events over the past five years are presented in Figure E.3 below.

**Figure E.3 Categories of accidents and serious incidents involving GA aeroplanes while flight training (2016-2020)**



## Occurrence Reports

In accordance with Regulation (EU) No 376/2014 private pilots flying general aviation type certified aircraft are required to submit mandatory occurrence reports. However, many of the aircraft involved in this sector are not type certified, nevertheless the pilots of these aircraft may 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.

Despite the impact of the COVID-19 pandemic on operations the level of occurrence reporting from Flight Crew Training Organisations (FCTO) in 2020 was comparable with previous years. Navigational error, Abnormal Runway Contact, Aerodrome, Turbulence Encounter and Component System Failure – Powerplant were the top 5 known categories identified in the submitted mandatory occurrence reports.

There was an increase in the number of occurrence reports received from those involved in general aviation for leisure flying in 2020 however the reporting level still remains too low to support statistical analysis, which means that the opportunity to learn from past mistakes is limited to accidents and serious incidents. The occurrence reporting culture evident in commercial aviation is more difficult to achieve in general aviation, even though many of the personnel involved in general aviation are also involved in commercial aviation. This lack of a good reporting culture means that the lower level occurrences that could lead to accidents and serious incidents (in other circumstances) are not being reported by this sector.

Safety Promotion continues to be the primary means of improving the safety culture in General Aviation which lacks the more formal safety management system components available to commercial organisations. GASCI, whose membership includes general aviation clubs, societies, training organisations, the IAA and AAIU, succeeded in hosting a very informative virtual safety evening despite the current socially restrictive COVID-19 environment and had over 300 attendees. 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>

## 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.

### COVID-19

The rapid escalation in the spread of the SARS-CoV-2 virus in Spring 2020 resulted in a prolonged delay to the tradition resumption of VFR flying post the winter until June. In addition to the efforts and resources required for the implementation of the "Recommendations for General Aviation Operations during the COVID-19 Pandemic", this hiatus carried with it other inherent risks, such as the increased likelihood of technical difficulties from aircraft being parked up for long periods of time and the retention of pilot skill competency. The data to date does not indicate any failings in these efforts.

In common with all other sectors of aviation, individuals involved in General Aviation activities may be feeling stressed and distracted for any number of reasons. These stressors may be due in part to the significant health risks presented by the virus itself, the consequent economic threat to their livelihoods and/or the prolonged isolation from family, friends, colleagues and fellow enthusiasts.

It is difficult to determine with certainty if the increased focus on hazard identification and risk management by various agencies in these unprecedented times lead to better than expected outcomes or if there were other factors at play, for instance reduced levels of activity. Irrespective of the absence of evidence of a direct correlation, it remains essential in these most unpredictable of times that a collaborative vigilance is maintained in the areas of risk monitoring, mitigation and information sharing. It may be that the "return to normal" operations phase will prove to be more challenging, when previously unidentified risks may manifest their hazards. Attentive anticipation and close monitoring will have to be the new strategies to enable prompt response and agile shared learning in this new environment. The prompt sharing of lessons learnt will be another key component in our safety defences.

### GA Specific Safety Issues

The following table outlines safety issues identified from the analysis of accidents and serious incidents and are included in the GA sector-based risk register. These fundamental issues remain relevant notwithstanding the status of the COVID-19 pandemic. It is worth noting that according to EASA's ASR 2020 approximately a fifth of non-commercially operated small aeroplane accident and serious incident reports identify human factors (HF) or human performance (HP) issues. The report identifies the following HP related safety issues; decision making and planning, perception and situational awareness, and flight planning and preparation. The safety issue of "system reliability" is the highest both in terms of number of occurrences and risk, but it has strong links to another safety issue the 'handling of technical failures', which focuses on the pilot's actions after the engine failure.

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

Safety Promotion continues to be the primary means of highlighting awareness around safety issues and providing guidelines on how best to mitigate against the risks concerned. The State Plan for Aviation Safety in Ireland includes 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>



## Acknowledgements

The author wishes to acknowledge the contribution made by the AAIU, Irish aviation industry, Irish aviation community and IAA personnel in the preparation of this report and thanks them for their support.

## 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 Performance 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 IAAs State Safety Plan. The IAAs intends to publish its 2021-2024 State Safety Plan during Q2 2021. Previous editions of the State Safety Plan are available on the IAA website [www.iaa.ie](http://www.iaa.ie).

## Photo Credits

Special thanks to those who gave kind permission for the use of their photos; Mr Alec Elliott, IAA (cover page), Captain Tim Atkinson, ASL Ireland (page 13), CHCI and Lukasz Gancarz (CHC Ireland S-92 Helicopter lifting from its Dublin base page 27), AFTA, Professional Pilot Training Organisation, Cork International Airport (page 54) and Manna Aero (page 66).

