REVIEW OF AVIATION SAFETY PERFORMANCE IN IRELAND

DURING 2018

IAA

This page: Photographer Jason Phelan.

Contents

Foreword

Welcome to the IAAs' 2018 Annual Safety Performance Review (ASPR). This is the tenth year that the Annual Safety Performance Review has been issued. The IAA continuously monitors safety performance as part of the safety risk management process it undertakes on behalf of the State. The IAA conducts reviews of safety performance with approved organisations on an on-going basis to ensure that safety issues are being addressed. The Annual Safety Performance Review provides an aggregated summary of the safety performance of organisations and persons, divided into aviation sectors, based on types of operation and level of activity.

Notwithstanding the level of uncertainty brought about by Brexit, the Irish civil aviation industry continued to grow in 2018. The IAA currently oversees over 1,400 registered aircraft, 16 air operators, 22 licensed aerodromes, 74 airworthiness organisations, 39 training organisations and over 14,000 licensed personnel.

At a global level the two fatal accidents involving the new Boeing B737-MAX8 dominated the headlines. The aircraft type remains grounded pending investigation into the cause of the accidents and implementation of the required fix.

In Ireland, whereas the main statistics for accidents and serious incidents show reducing trends in many areas, sadly there were two fatal accidents in the general aviation sector, with the loss of three lives. The staff of the IAA would like to extend our sincerest sympathies to their families and friends of the deceased. The accidents are under investigation by the Air Accident Investigation Unit (AAIU).

This safety performance review only serves to highlight the importance of continuing to improve safety risk management processes at both State and organisational level. One of the key pillars of safety management is safety occurrence reporting, which gives us the opportunity to learn from each other to improve safety. The IAA continues to promote and encourage persons involved in any aspect of civil aviation to report safety concerns to their organisation or to the IAA (https://www.iaa.ie/safety/safety-reporting).

Maurice O'Connor,
Acting Director Safety Regulation Division.

Executive summary

The Annual Safety Performance Review is compiled by the Safety Regulation Division (SRD) of the Irish Aviation Authority (IAA). This report examines the safety performance of Irish civil aviation and summarises the main safety issues identified by the IAA from this review, in conjunction with safety information provided at EU (e.g. EASA) and global (e.g. ICAO) level.

The safety performance review is divided into different sectors based on the types of operation and level of activity in the State. This review addresses the following four sectors of Irish civil aviation:

- 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 following infographics provide a top-level summary of the main performance statistics in each of these sectors. Further details on these statistics, along with the safety issues that emerge from the analysis of safety performance, are provided in the body of this document.

Irish Air Fixed-Wing Commercial Air Transport Sector

Between 2014 and 2018 Irish registered fixed-wing aircraft engaged in CAT were involved in 22 accidents, 3 of which occurred during 2018. The categories most commonly applied by the investigating Safety Investigation Authority (SIA) were:

Ground collision

Ground handling

Turbulence encounter

There were 72 serious incidents between 2014 and 2018, 14 of which occurred during 2018. The categories most commonly applied by the investigating SIA to serious incidents were:

Airprox / near midair collision

System failure of malfunction

Runway Incursion (non-animal)

During 2018 the Irish AOC holders submitted 8,572 MORs. Between 2016 and 2018 they submitted 22,378 MORs. The categories most commonly applied by the IAA to these MORs were:

System failure or malfunction

Medical

Cabin safety

Air Navigation Services and Aerodromes in Ireland

Between 2014 and 2018 there were 6 non-fatal accidents and 15 serious incidents involving CAT that occurred at Irish certificated/licenced aerodromes that provide ATC services. One of these non-fatal accidents and 2 of these serious incidents occurred during 2018.

The ATS providers submitted 2,662 MORs during 2018. Between 2016 and 2018 5,046 MORs were submitted. The three occurrences categories most commonly assigned by the IAA were:

Air traffic management

Navigation Errors

Other

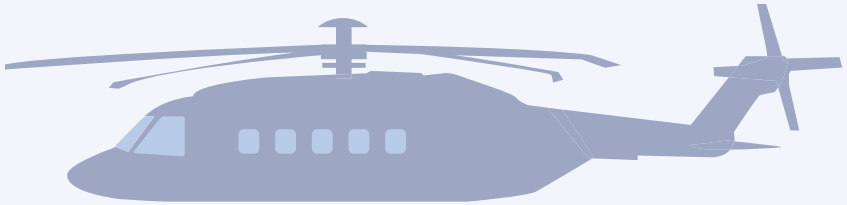
Between 2016 and 2018 Aerodrome managers submitted 1,284 MORs, 462 of which were submitted during 2018. The three most commonly assigned occurrences categories were:

Ground handling

Aerodromes

System failure or malfunction

The Irish Commercial Helicopter Sector



The accident and serious incident figures provided cover helicopter operators who hold an AOC issued by the IAA or 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 2014 and 2018 these operators experienced 1 fatal accident during 2017 and 1 non-fatal accident during 2015. The AAIU investigation is ongoing into the fatal accident which is presently categorised as 'Controlled flight into terrain'. The non-fatal accident was categorised as 'Abnormal runway contact' by the investigating Safety Investigation Authority (SIA).

Over the same timeframe there were 2 serious incidents, both of which were categorised as 'Other' by the investigating SIA.

During 2018 helicopter operators that hold an AOC issued by the IAA submitted 37 MORs. Between 2016 and 2018 there were 98 MORs submitted. The categories most commonly assigned by the IAA to these MORs were:

System failure or malfunction

Other

Security Related

General Aviation in Ireland 2014-2018

Aeroplanes under 2,250 kg
3 Fatal Accidents
25 Non-Fatal Accidents
10 Serious Incidents

Helicopters over 2,250 kg
0 Fatal Accidents
1 Non-Fatal Accident
0 Serious Incidents

Sailplanes and Powered Sailplanes
0 Fatal Accidents
0 Non-Fatal Accidents
0 Serious Incidents

Aeroplanes over 2,250 kg
2 Fatal Accident
1 Non-Fatal Accident
0 Serious Incidents

Microlight
1 Fatal Accidents
3 Non-Fatal Accidents
1 Serious Incident

Gyrocopters
0 Fatal Accidents
1 Non-Fatal Accident
0 Serious Incidents

Helicopters under 2,250 kg
0 Fatal Accidents
6 Non-Fatal Accidents
1 Serious Incident

Paragliders, Powered Paragliders and Powered Parachutes
1 Fatal Accident
1 Non-Fatal Accident
1 Serious Incidents

Hot Air Balloons
0 Fatal Accidents
0 Non-Fatal Accidents
0 Serious Incidents

SECTION A

Introduction

Red Arrows demonstration at the Bray International Airshow in July 2018. Photographer Crispin Rodwell

Introduction

The IAA Safety Regulation Division implements the safety risk management processes for Ireland in accordance with the State Safety Programme. As part of this process the IAA monitors the safety performance of the Irish civil aviation industry on an ongoing basis to identify safety risks and assess the performance of the industry in addressing them. One of the main pillars of this activity is occurrence reporting, whereby persons involved in civil aviation are required by regulation to report safety occurrences, and organisations and regulatory bodies are required to review and analyse these reports to identify safety issues of concern.

This report is produced on an annual basis and provides an aggregated summary of the main safety information derived from performance monitoring at State level. Detailed reviews of safety issues emerging from performance monitoring are conducted with individual regulated organisations as part of safety oversight activities.

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

Sadly, the report also addresses a small number of fatal accidents, 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.

Occurrence Reports

Aviation safety is supported by a robust regulatory framework that includes strict regulations on occurrence reporting. The purpose of occurrence reporting is to enable regulated organisations and regulatory authorities to continuously monitor safety performance and to take actions to address safety concerns. 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 assessment 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. Occurrence reports mainly address the type of events that may be part of the causal chain of a previous accident but in the specific circumstances of the report were prevented from escalating to an accident by remaining layers of safety barriers (including human and technological). The risk classification scheme is designed to highlight those occurrences with fewer remaining barriers.

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

As a completely independent function, the Irish Air Accident Investigation Unit is responsible for investigating the more serious occurrences that have resulted in an aviation accident or a serious incident as defined by Annex 13 of the Chicago Convention.

The AAIU investigates civil aviation accidents and serious incidents that take place in Ireland. Occurrences involving an Irish AOC holder or an Irish registered aircraft that took place 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.

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. A sector-based risk profile is then used 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 Safety Plan (see www.iaa.ie/statesafetyplan)

SECTION B

The Irish Fixed-Wing Commercial Air Transport Sector

A Boeing 737CL, one of 42 aircraft operated by Irish Airline ASL Ireland Ltd.
Photograph supplied by ASL Ireland Ltd.

Introduction

The Irish fixed-wing Commercial Air Transport (CAT) industry consists of two types of commercial organisations;

- operators who hold an Irish Air Operators Certificate (AOC) issued by the IAA (currently, there are 13)
- 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'.

Between the Irish lease fleet and the Irish AOC holders there were 884 aeroplanes on the Irish aircraft register that were engaged in CAT operations on the 31st December 2018. This is the largest number of aircraft in this category over the five-year period considered.

Eight of these aircraft are operated under recently developed Part-NCC regulations (non-commercial operations with complex aircraft) for private business jet activities and although such operations are not commercial, they are included within this section, as they are subject to similar risk exposure as commercial operators.

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 21 accidents (3 in 2018) and 72 serious incidents (14 in 2018) as summarised in Table B.1.

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	
2014	722	8	0	8	10
2015	740	3	1	4	20
2016	793	2	0	2	17
2017	881	5	0	5	11
2018	884	3	0	3	14
Total	-	21	1	22	72

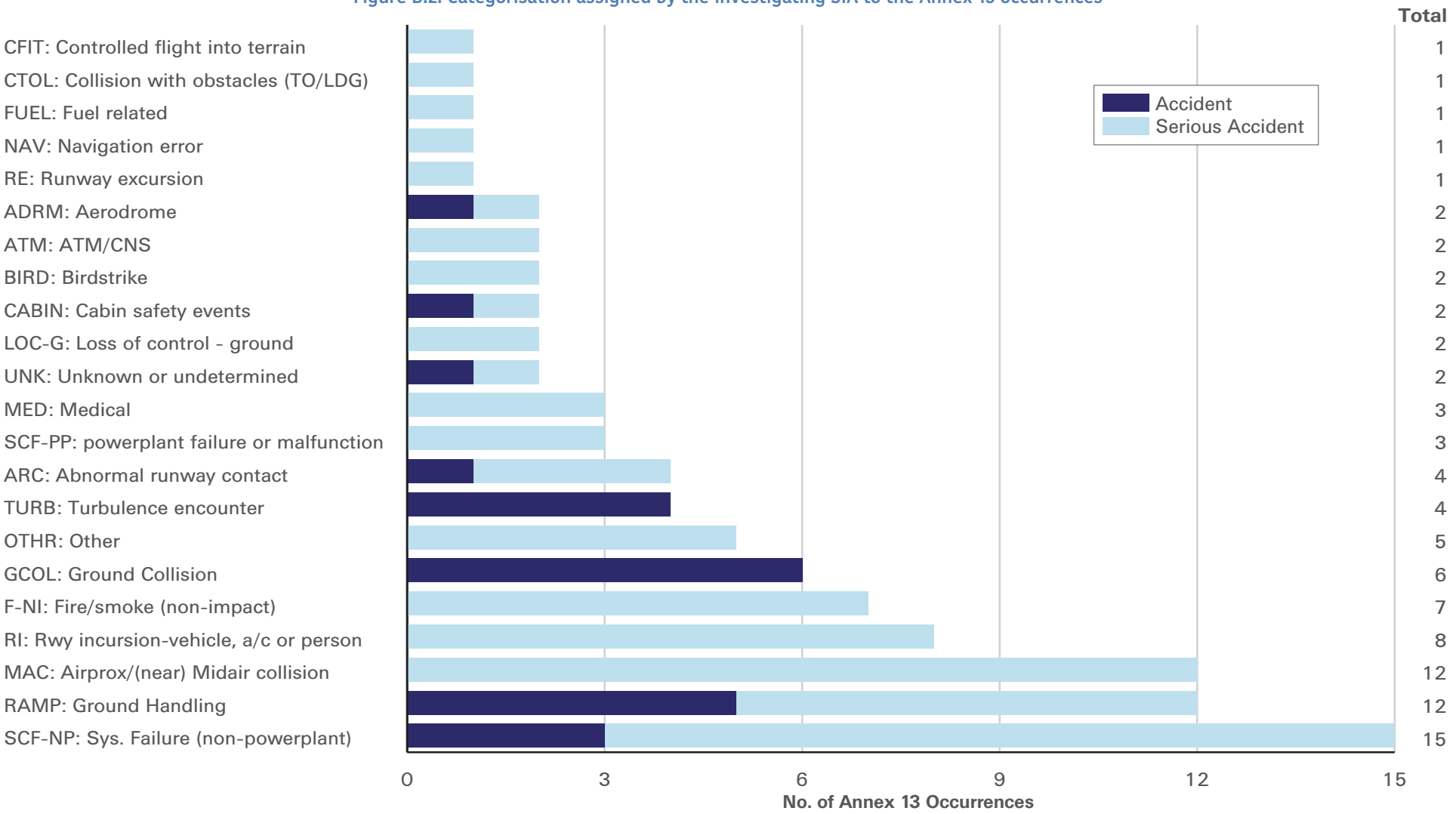
The fatal accident included in this table occurred during October 2015 and involved a foreign AOC holder operating an Irish registered aircraft which tragically resulted in the loss of 224 lives. It remains under investigation by the Egyptian Ministry of Civil Aviation who have advised that they are investigating suspected criminal activity as the cause of this accident.

The accidents in 2018 included:

- A passenger suffered a broken leg following an abrupt aircraft maneuver during flight
- An aircraft sustained damage to critical flight surfaces during ground operations
- A ground handler was seriously injured during aircraft pushback

Figure B.2 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.2: Categorisation assigned by the investigating SIA to the Annex 13 occurrences



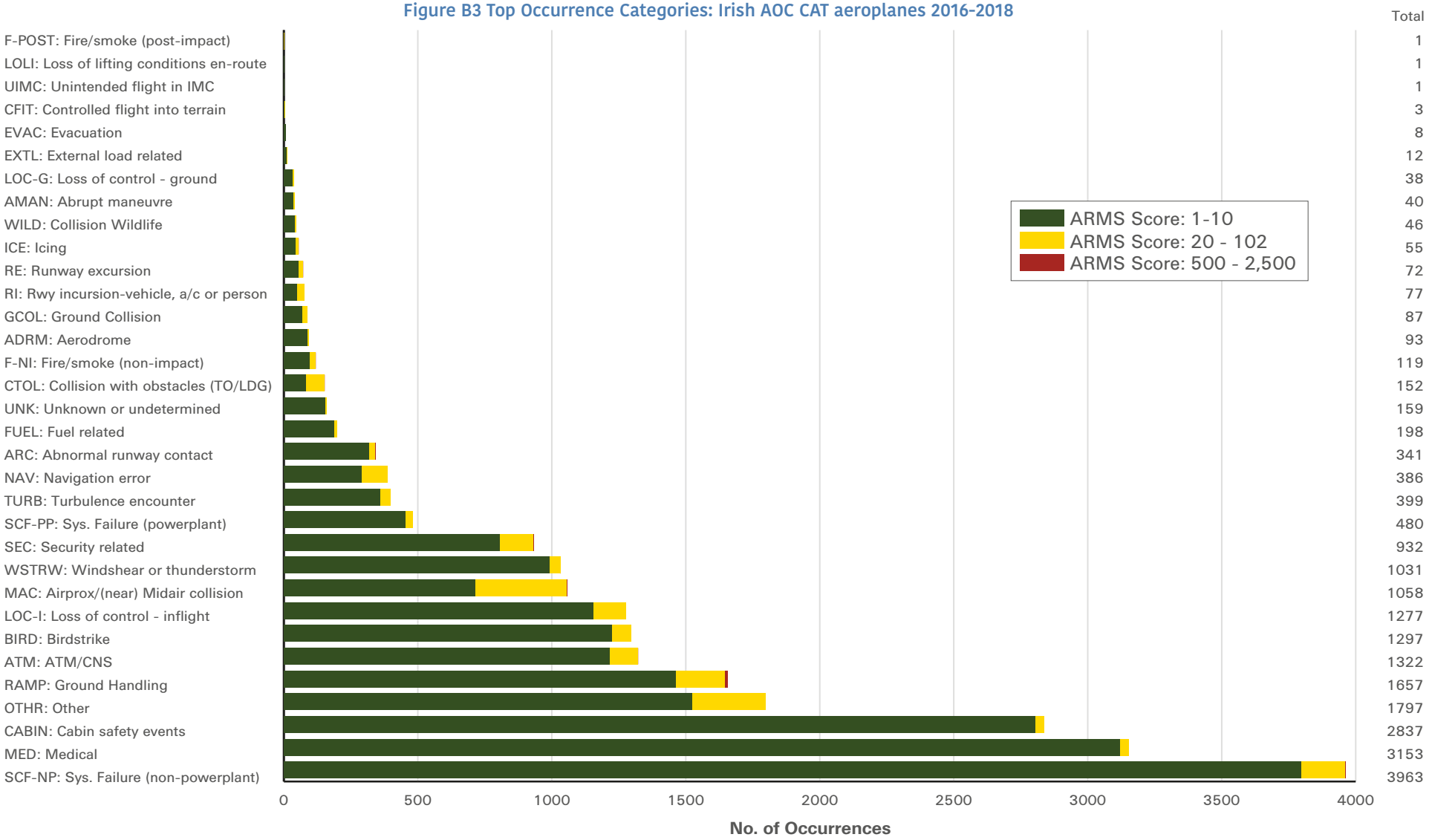
Occurrences

Accidents and serious incidents represent the tip of the iceberg when it comes to safety performance analysis. The analysis of safety occurrences provides a much greater wealth of information to help identify safety hazards and assess safety performance. The chances of being involved in a flight operated by an Irish AOC Holder that is involved in a safety occurrence remains very low. The Irish AOC Holders flew over 1,100,000 flights in 2018 and reported a little over 8,500 occurrences during this time. Therefore over 99% of these flights passed off without any safety occurrence that needed to be reported to the IAA and over 99.99% of these flights passed off without being involved in an accident or serious incident. There were also zero flights in 2018 that resulted in fatalities.

The IAA categorises (groups) occurrences using the same common taxonomy as used by the AAIU, however in the case of occurrences the analysis is of events that could be considered precursors to accidents and/or serious incidents.

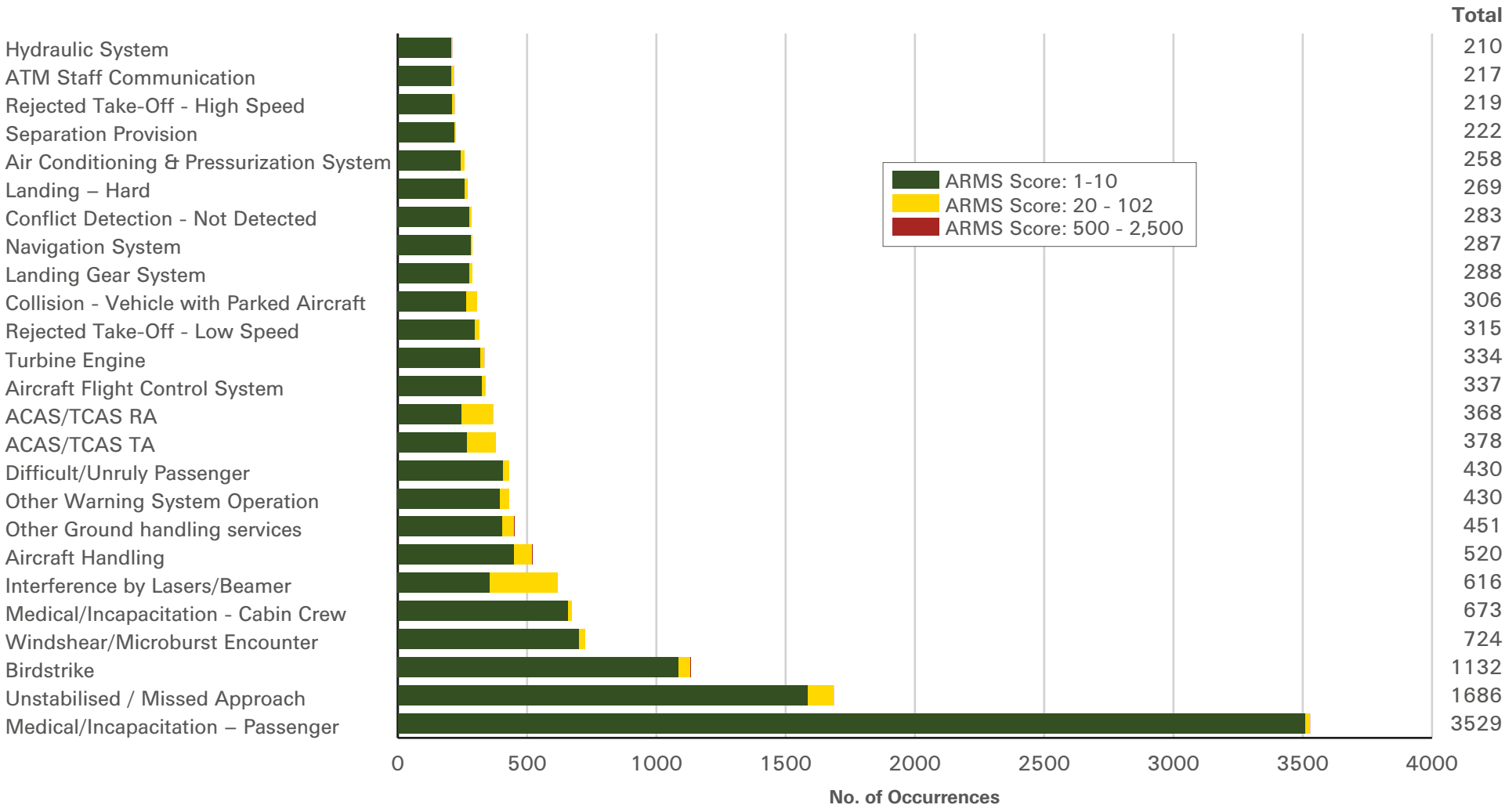
A breakdown of the top occurrences submitted by Irish AOC Holders involved in CAT operations by occurrence category and risk classification band (ref Section A) is shown in Figure B.3 below:

Figure B3 Top Occurrence Categories: Irish AOC CAT aeroplanes 2016-2018



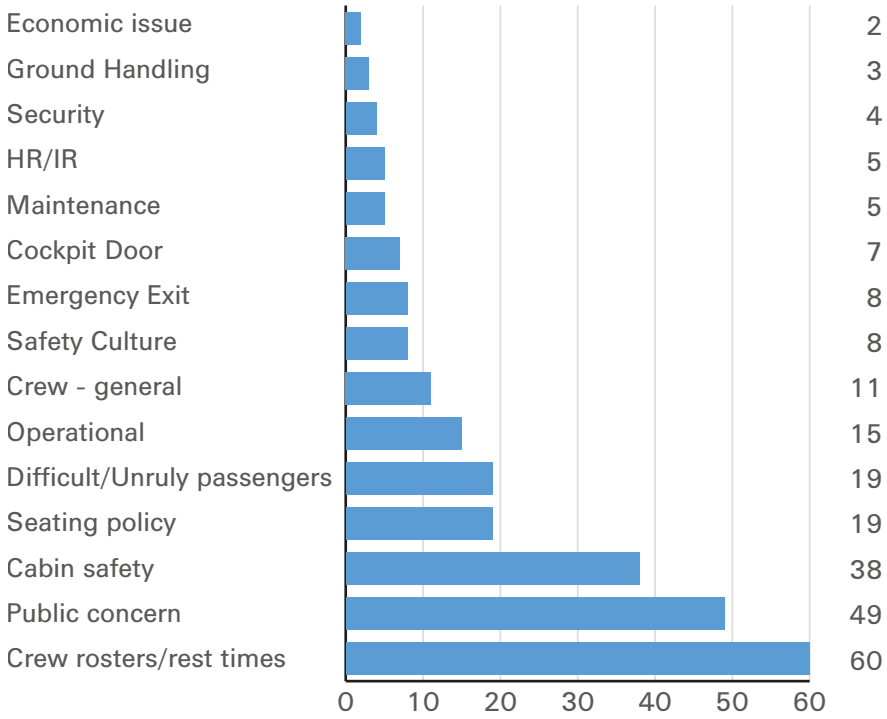
In addition to analysing the categories of occurrences, the IAA analyses the main event types that lie behind these figures. This analysis enables a deeper understanding of the actions involved that led to the occurrence report. Figure B.4 provides a list of the top event types reported to the IAA from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

Figure B.4 Top Event Types – CAT Aeroplanes 2016 – 2018



The IAA also provides an opportunity for members of the public to report safety concerns outside of the regulatory environment at https://www.iaa.ie/safety/safety-reporting . This site is mainly used by aircraft passengers and concerned citizens to report and it provides a very valuable source of information to the IAA. Although these reports are outside of the regulatory environment, the IAA applies the same protections of reporters, confidentiality of information and appropriate use of the data as contained in the occurrence reporting regulations. These reports are analysed to identify safety issues and are followed up with the organisations involved. Figure B.5 below provides a breakdown of the voluntary reports submitted to IAA between 2016 and 2018, concerning Irish AOC Holders.

Figure B.5 Voluntary Reports – Irish AOC Holders 2016 - 2018



Safety Issues

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

Key Safety Areas:

ICAO and EASA analysis of aviation safety data on a worldwide basis has identified that the main contributors to accidents with a high number of fatalities in commercial aeroplane operations include controlled flight into terrain (CFIT), loss of control-inflight (LOC-I), mid-air collision (MAC) and runway incursions (RI) and excursions (RE).

Figure B.2 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 21 serious incidents in these key safety areas; 12 categorised as MAC, 8 categorised as RI and 1 categorised as RE and CFIT. Although, thankfully there were no accidents or serious incidents categorised as LOC-I, it is noted that there were 5 accidents and 1 serious incident due to turbulence encounters and abrupt manoeuvres causing aircraft upset during flight.

Figure B.3 shows that occurrence reports of precursors events categorised as MAC and LOC-I are in the top 10 of the total list of occurrences reported in the past three years. This is not surprising, and it underlies the care that aviation professionals take to report events that could lead to one of these catastrophic outcomes. Although 80% of these occurrences were classified in the low risk (green) band the collection of these reports provides a solid database to analyse the underlying causes and trends to help identify weaknesses in the system. There are fewer CFIT related occurrences and most of these relate to activation of TAWS alerts due to momentary breach

of protection envelopes. Although there are only a small number of reports from CAT aeroplane operators in the occurrence categories of RI and RE, they are nevertheless important to investigate and analyse, not only in their own right, but because they also involve interaction between flight operations and other domains, such as aerodrome operators and air navigation services provision.

Figure B.4 gives more insight into the events that led to occurrence reports in these categories and some of the "Public Concern" issues reported in Figure B.5 reflected passenger anxiety over perceived occurrences in these areas (e.g. aircraft upset, proximity of other traffic, hard landing).

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)	• Airborne conflict with non-transponder equipped aircraft (e.g. airspace infringement into controlled airspace or flight by CAT aircraft in un-controlled airspace) • Integration of drone operations into air traffic system
Aircraft Upset (LOC-I/AMAN)	• Monitoring of flight parameters to prevent loss of situational awareness, and/or warning system activation, and/or aircraft upset, and/or unstable approach. • Management of technical failures to prevent aircraft upset • Avoidance of flight into convective weather or icing conditions which could cause aircraft upset • Management of Birdstrike or laser attack to prevent aircraft upset • Recognition and recovery from aircraft upset
Runway Excursion (RE)	• Management of approach path • Management of crosswind landings and unstable approach • Recognition of runway condition for take-off or landing • Reliability of critical equipment (e.g. landing gear, wheels and brakes)
Runway Incursion (RI)	• Awareness or response to unauthorised presence of other aircraft or vehicles on the runway • Deviation from ATC clearances by Flight Crew
Controlled Flight into Terrain (CFIT)	• Implementation of APV approach procedures to replace Non-Precision Approach • Implementation of advanced ATS services in terminal maneuvering area (ref SESAR Solutions Catalogue)

Additional Safety Areas:

The key safety areas discussed above address the main causes of fatalities in CAT operations, however there are other areas to consider, which although do not generally contribute to fatal accidents, 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.3 shows that ground operations related activities contributed to 11 accidents and 7 serious incidents during the past three years. These are normally low speed occurrences and although thankfully there were no casualties involved, it is likely that these occurrences caused anxiety to passengers and resulted in lengthy delays to their travel plans. Improper 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.

The risk of on-board fire is a constant threat to aviation and aircraft design and operational procedures include many defences to prevent fire from starting or from escalating to loss of control of the aircraft. There were 7 fire/smoke/fumes related serious incidents in the past three years all of which were resolved satisfactorily by the crews. Recent new threats in this area include the carriage of Lithium Batteries on board in cargo and in passenger baggage that must be carefully managed.

There was one accident and four serious incidents due to cabin safety or medical emergency.

Figure B.3 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. Although there are far fewer FIRE related reports they are highlighted in this report due to the risk they sustain. It must be emphasised that the vast majority of these occurrences were classified as low risk, indicating that there were robust barriers preventing the occurrence from reaching a severe outcome. Figure B.5 shows that cabin safety related events as the third highest group reported by passengers (e.g. passengers standing in the aisle while fasten seatbelt light was on, inaudible safety announcements, difficulties accessing safety equipment, minor injuries).

Figure B.4 gives more insight into the events that lead to occurrence reports in these categories. The top event type Medical Incapacitation Passenger is not something to cause alarm to passengers. These reports mainly relate to minor passenger illness or injury possibly involving use of first aid kits and passenger oxygen.

A more concerning event that emerges from the statistics (see Figs B.4 and B.5) is the reports of bad behaviour from difficult or unruly passengers, which can include, general annoyance/anxiety for other passengers, physical assault of passengers or crews, interference with crews in performance of safety functions, and interference with safety equipment. Because of the potential hazards that can result from this type of behaviour the aviation and judicial systems across Europe and beyond are taking a stricter approach. Passengers who have engaged in such behaviour have found themselves arrested upon landing and charged with criminal offence, leading to substantial fines and lengthy jail time. EASA has developed safety promotion campaign to highlight this issue for passengers - visit https://www.easa.europa.eu/notonmyflight

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

Safety Area	Safety Issues
Ground Operations	• Adherence to aircraft loading procedures (e.g. passengers, baggage and cargo, fuel) and accurate calculation of mass and balance • Adherence to aircraft ground handling procedures (incl. towing, de-icing, refueling etc.) • Reporting of damage to aircraft during ground operations • Oversight of ground operations subcontracted activities
FIRE	• Lithium batteries or other material presenting a fire hazard in cargo or cabin baggage • Placing of intended passenger carry-on baggage in the aircraft hold at the departure gate
CABIN/MED	• Management of difficult/unruly passengers

Figure B.5 shows that the voluntary reporting system is also used by aircraft crews (flight crews and cabin crews) to report issues of concern to them, notwithstanding the fact that these issues may also be reported under the regulated systems. The reports address concerns over crew rosters and rest periods and were often associated with the implementation of changes in working practices by individual airliners. The IAA participated in an EASA Rulemaking Working Group that developed practical guidance on how operators' safety management systems could capture specific hazards that could be introduced by new business models, including different contractual arrangements amongst crews – see https://www.easa.europa.eu/sites/default/files/dfu/Practical%20Guide%20New%20Business%20Models%20Hazards%20Mgt.pdf

Occurrence reporting rates

Recent EU studies have shown that the occurrence reporting culture among Irish AOC holders is amongst the highest in Europe. This is an important position we wish to maintain as it shows willingness among aviation professionals to report occurrences (including their own errors or omissions) to support the greater goal of improving safety.

The following table provides data on the number of sectors flown annually between 2013 and 2018 with the corresponding MOR rates.

Table B.3: 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
2013	696,491	6,022	86.46
2014	710,172	5,631	79.29
2015	762,855	5,731	75.13
2016	890,542	7,086	79.57
2017	1,018,827	6,720	65.96
2018	1,105,592	8,572	77.53
Total	4,078,887	31,652	77.60

SECTION C

The Irish Commercial Helicopter Sector

S92 taking part in a demonstration at the Bray International Airshow in July 2018. Photographer Jason Phelan.

Introduction

This section addresses the commercial helicopter services sector in Ireland. This is a relatively small sector in Ireland and like the commercial aeroplane sector, includes helicopter commercial air transport (CAT) operators and commercial specialised operators (SPO).

To undertake CAT flights a helicopter operator must hold an Air Operator Certificate (AOC), Ireland has three helicopter AOC holders operating 10 helicopters in CAT. One operator is approved to undertake helicopter emergency services (HEMS).

To undertake commercial SPO flights, such as surveying or photography, a helicopter operator must 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 8 of the above helicopters in the SPO role.

To undertake non-commercial air operations with complex motor-powered helicopter (NCC) flights a helicopter operator must declare its capabilities to the Irish Aviation Authority. Two operators have declared their capabilities to undertake NCC activities operating 3 helicopters.

The Irish lease fleet discussed in Section B above also includes 6 Irish registered helicopters that are operating on a foreign issued AOC using the provisions of Article 83 bis of the Chicago Convention.

NCC helicopter operations are assessed together in this section as they are exposed to many of the same risks, albeit different approval and oversight processes are involved.

Accidents and serious incidents

Over the last five years' helicopter operations in this sector were involved in 2 accidents and 2 serious incidents, none of which occurred in 2018 notwithstanding the growth in activity of declared operations. Table C.1 below provides the details.

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

Year	Total registered in Ireland	Accidents			Serious incidents
		Non-fatal	Fatal	Total	
2014	12	-	-	-	1
2015	10	1	-	1	1
2016	11	-	-	-	-
2017	14	-	1	1	-
2018	18	-	-	-	-
Total	-	1	1	2	2

The fatal accident involved the collision of the helicopter with terrain and the AAIU have published a preliminary report (Ref. No. 2017-006) and an interim report (Ref. No. 2018-004), which are available on their website www.aaiu.ie. There was one non-fatal accident in 2016 where the helicopter involved was severely damaged following a heavy landing. The two serious incidents related to a forced landing following engine failure and an occurrence during winching operation.

Occurrences

The IAA categorises (groups) helicopter occurrences using the same common taxonomy discussed in Section B above. A breakdown of the top occurrences submitted by Irish Helicopter operators between 2016 and 2018 by occurrence category and ARMS Risk Classification Band is shown in Figure C.2 below:

Figure C.2: Categorization of MORs - Commercial and Declared helicopter operations 2016-2018

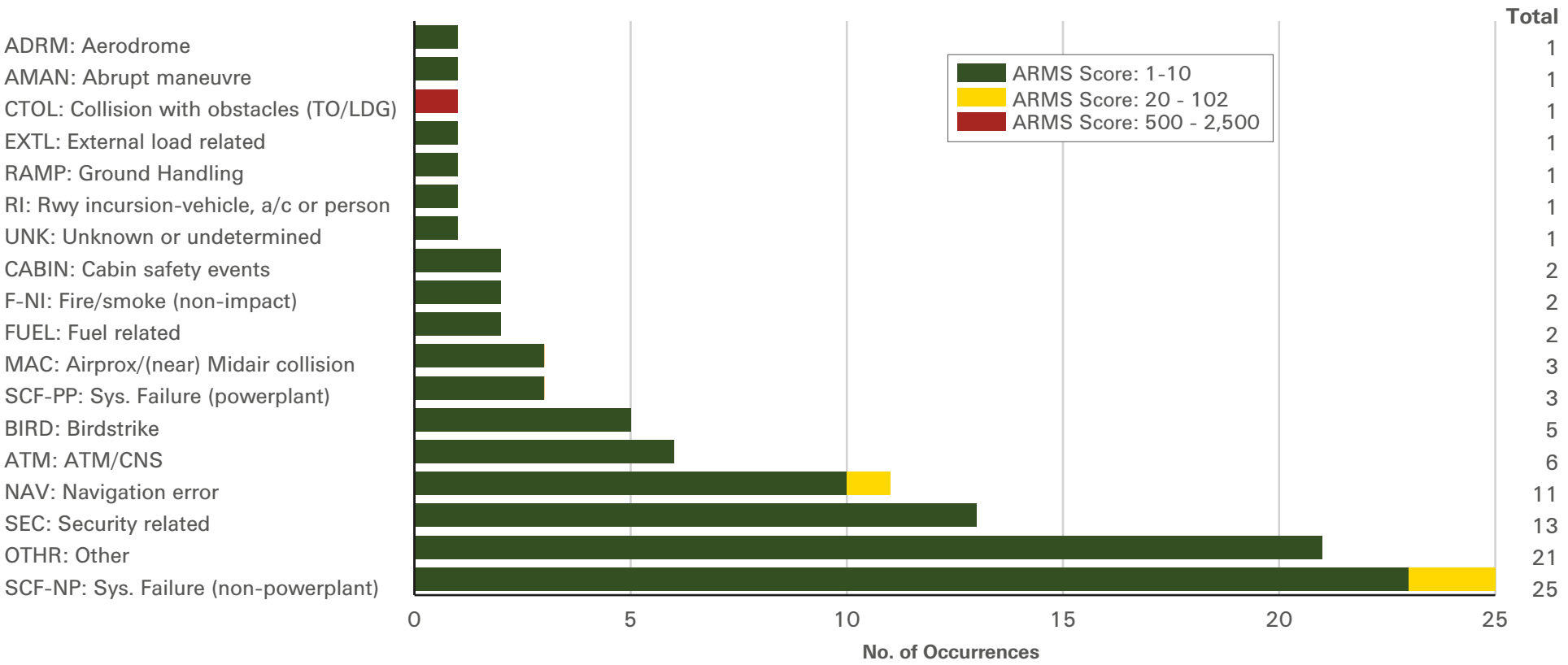
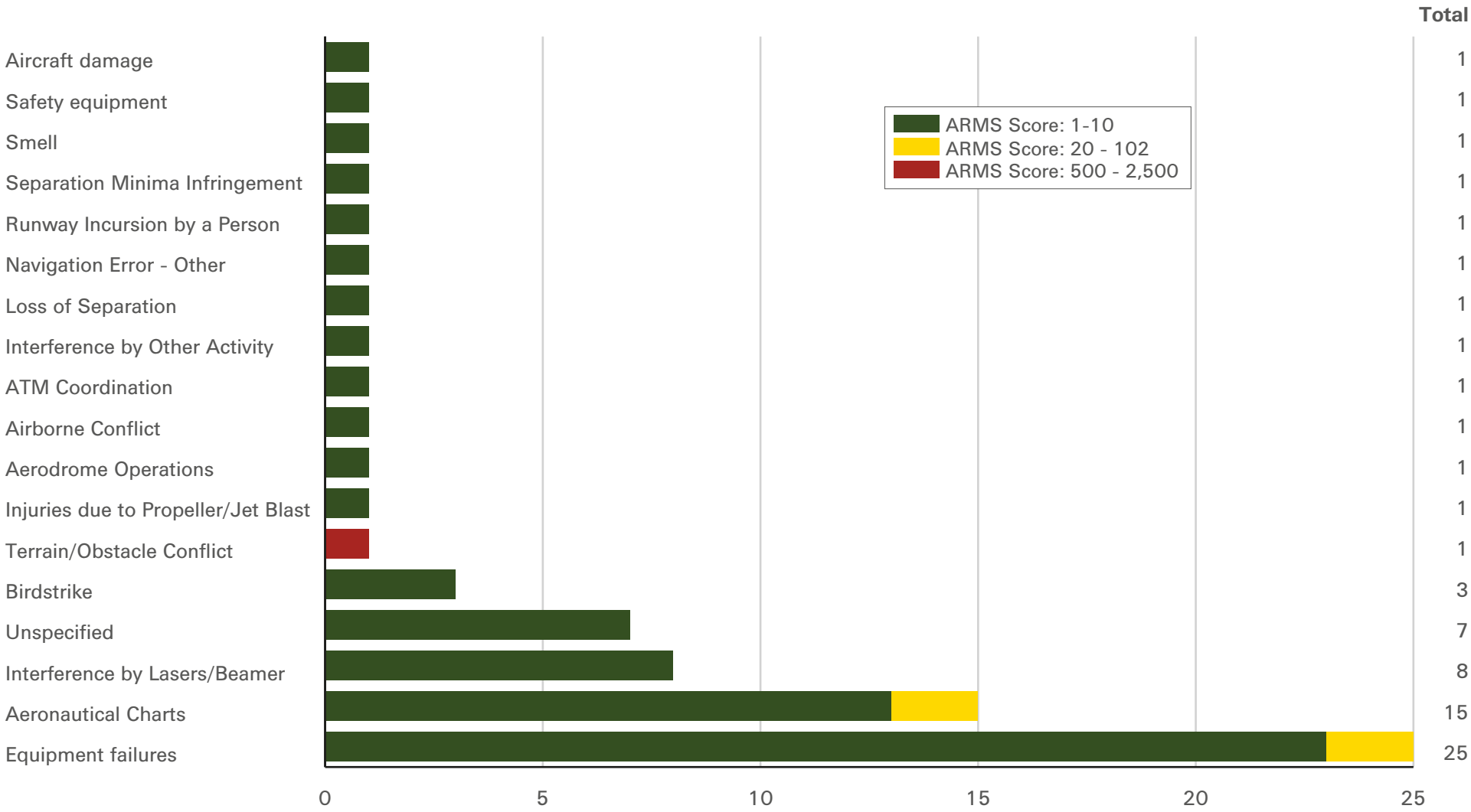


Figure C.3 provides a list of the top event types that provide more information on the events that lie behind these categories.

Figure C.3 Top Event Types – Commercial and Declared Helicopter Operations 2016 – 2018



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 and collision with obstacles or terrain.

There was one fatal accident in Ireland in the past five years involving collision with terrain. Figure C.2 shows that there was one aircraft upset related occurrence (i.e. abrupt manoeuvre) but no loss of control inflight related category events. Also, there were no obstacle collision related occurrence categories selected.

Figure C.4 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	Key Safety Area
Aircraft upset (e.g. LOC-I, AMAN)	• Monitoring of flight parameters to prevent loss of situational awareness, and/or warning system activation, and/or aircraft upset. • Management of flight path • Management of technical failures to prevent aircraft upset • Avoidance of flight into convective weather or icing conditions which could cause aircraft upset • Reaction to birdstrike or laser attack to prevent aircraft upset • Recognition and recovery from aircraft upset
Collision with terrain or obstacle	• Intentional low-level operations • Operations in degraded visual environments • Maintenance of situational awareness by crews • Use of helicopter see and avoid • Use of take-off and landing sites outside of airports/heliports • Accuracy and use of aeronautical charts and terrain and obstacle databases

Additional Safety Areas:

The highest number of reports submitted by this sector concern system component failure. Thankfully 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 (see https://www.easa.europa.eu/document-library/general-publications/european-plan-aviation-safety-2019-2023)

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 operators must rely on planning 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)	• Potential conflict with non-transponder equipped general aviation aircraft • Potential conflict with drones

Number and rate of MORs

The following table provides data on the number of sectors flown annually between 2013 and 2018 with the corresponding MOR rates per 1,000 flights.

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
2013	9,514	101	10.62
2014	9,974	105	10.53
2015	8,761	43	4.91
2016	6,752	26	4.15
2017	6,569	35	5.33
2018	6,871	37	5.38
Total	41,570	311	7.48

SECTION D

Air Navigation Services and Aerodromes in Ireland

Photograph supplied by Donegal Airport, which was voted the most scenic airport in the world in 2019 for the second year running. Photographer Owen Clarke Photography.

Introduction

In line with EU Regulation No. 139 of 2014, which lays down the requirements and administrative procedures related to aerodromes, those 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 certificated by the IAA. These are known as certificated 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, an aerodrome licence may be issued for the purposes of conducting general aviation flight training, and these are known as nationally licensed - private aerodromes.

Currently within Ireland, there are 8 certificated aerodromes and 14 nationally licensed aerodromes, 5 of which are nationally licensed - public aerodromes, and 9 of which are 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.

Accidents and Serious Incidents

This section discusses flight hours, departures, accidents and serious incidents involving aircraft engaged in 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 GA are not included unless there was a second aircraft involved in the same occurrence that was providing commercial services.

The number of flight hours rose in 2018. This includes traffic overflying Irish airspace as well as aircraft that land or depart from an Irish airport (terminal traffic). The number of flights describes the number of aircraft that land and depart at an Irish aerodrome. The number of flights fell slightly during 2018.

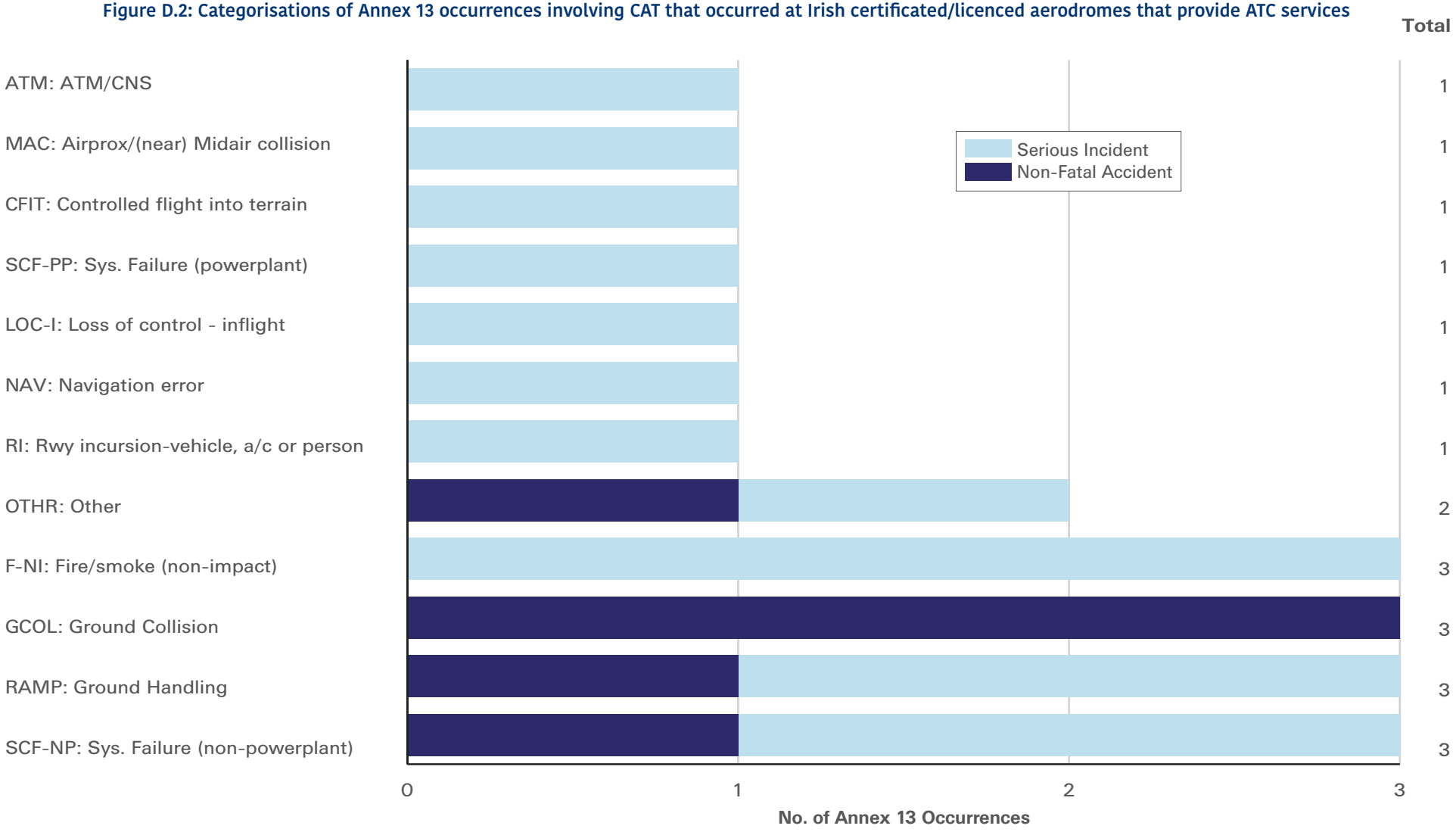
There were 6 accidents, none of which resulted in fatalities, and 15 serious incidents over the five-year period considered. The non-fatal accident that occurred in 2018 was due to aborted take-off following wheel damage.

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

Year	2014	2015	2016	2017	2018	Total
No. flights at Irish airports	240,728	253,223	274,058	273,440	293,961	-
No. flight hours in Irish airspace	276,584	287,659	309,693	311,715	315,776	-
Non-fatal accidents	2	2	0	1	1	6
Serious incidents	2	5	2	4	2	15

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.2 summarises the categories assigned to the 6 accidents and 15 serious incidents that took place between 2014 and 2018.

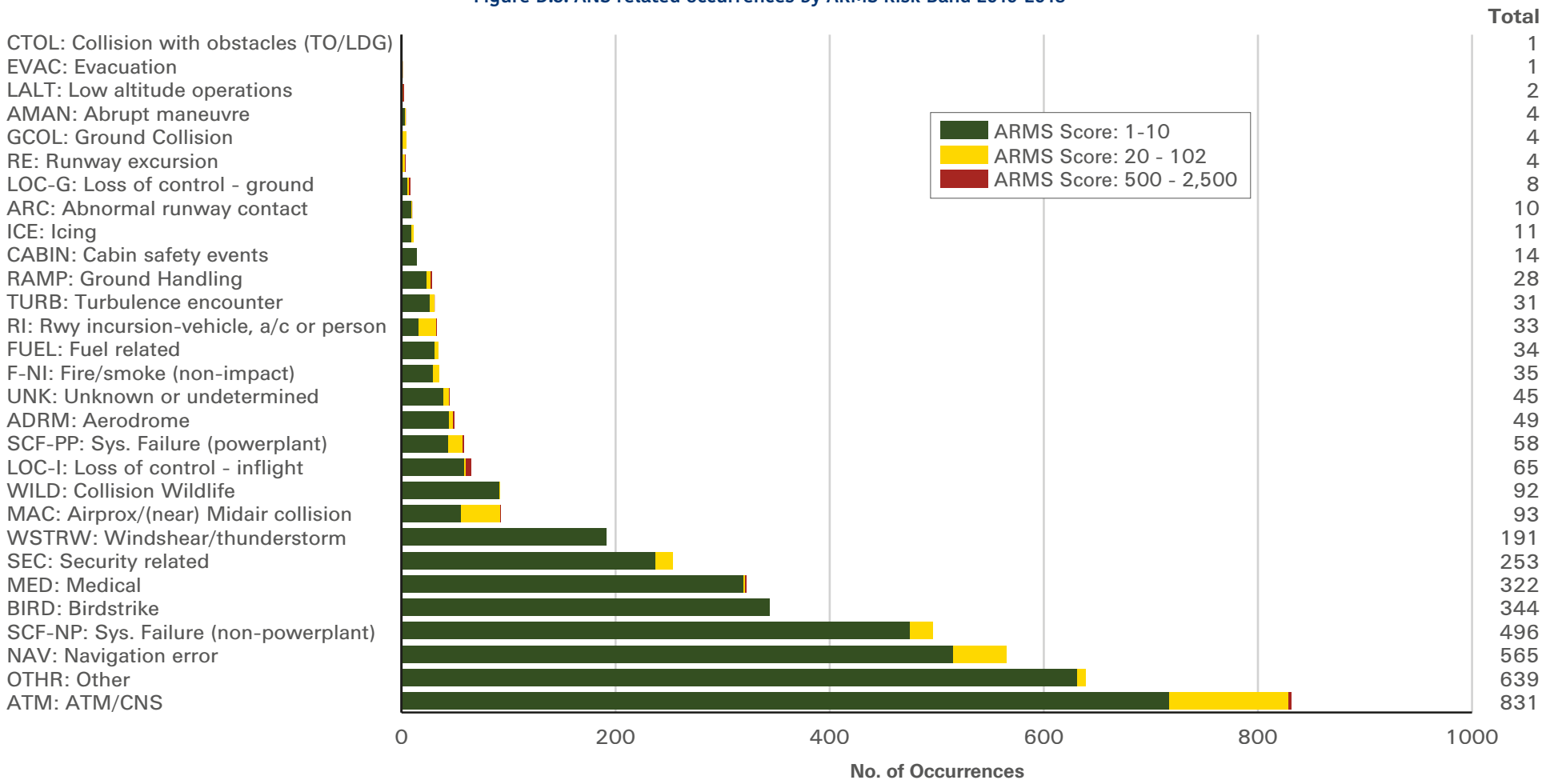
Figure D.2: Categorisations of Annex 13 occurrences involving CAT that occurred at Irish certificated/licenced aerodromes that provide ATC services



Occurrence Reports

The IAA received occurrence reports from ANS providers in respect of precursor events 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 2016 and 2018 by occurrence category and ARMS Risk Classification Band is shown in Figure D.3 below.

Figure D.3: ANS related occurrences by ARMS Risk Band 2016-2018



The top three occurrence categories include events related to ATC clearances, air traffic flow control, pilot initiated missed approach (e.g. weather/aircraft operations related) and ATC equipment failures.

As part of the EU Single European Sky ATM performance scheme for air navigation service provision, the IAA monitors the national safety performance with respect to five Safety Performance Indicators (SPIs), which are five of the event types that contribute largely to the top reported occurrences to the IAA.

These SPIs are:

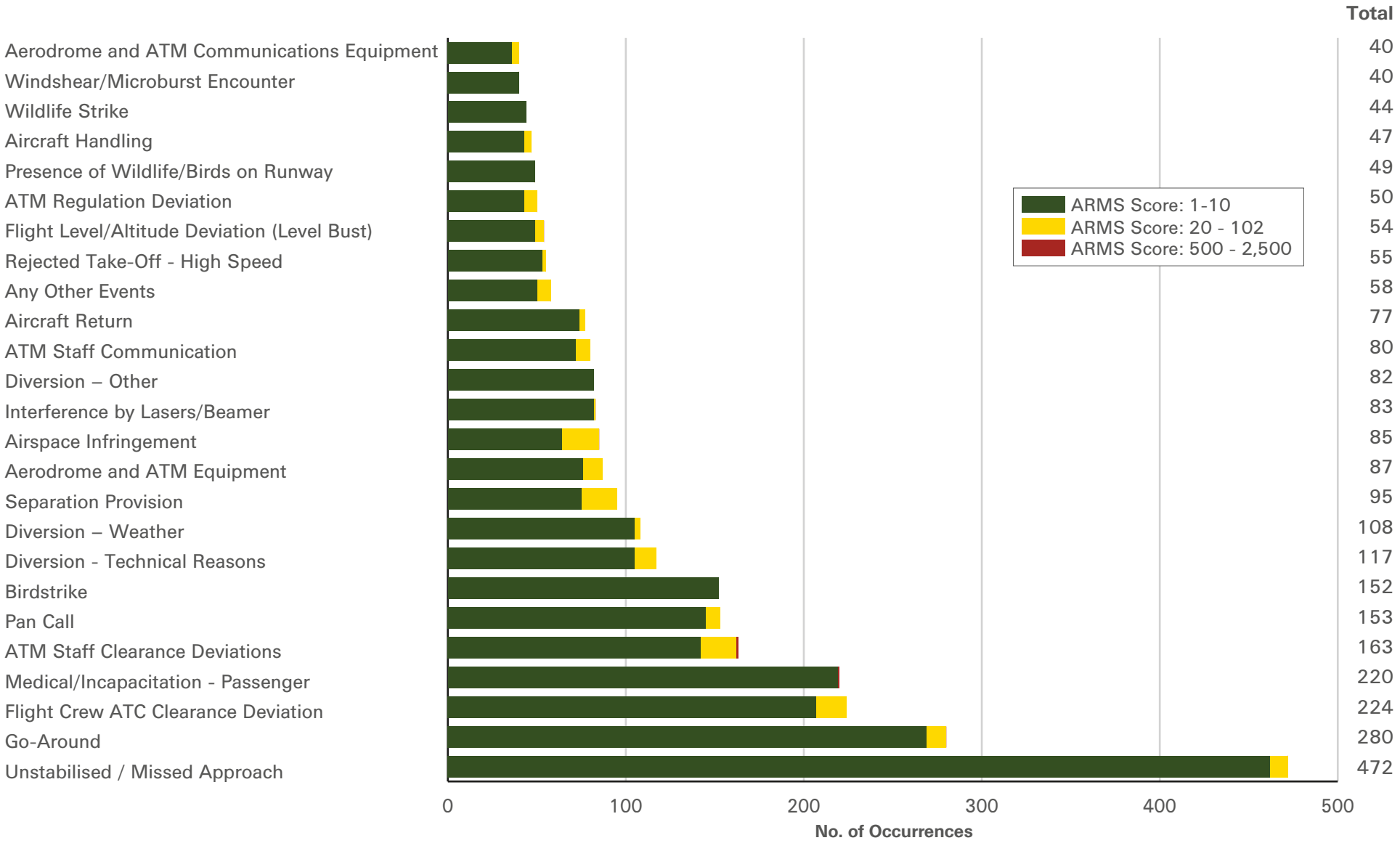
- Separation Minima Infringements (SMI) – failure to adhere to minimum distances between aircraft as specified
- Runway Incursions (RI) – incorrect presence of aircraft or vehicle on the runway
- Deviations from ATC Clearance (AD) – failure to follow ATC clearance
- Level Busts (LB) – failure to capture or maintain assigned altitude in controlled airspace
- Airspace Infringements (AI) – aircraft entering controlled airspace without obtaining ATC clearance

The 4-year trends for these SPI's in respect of all ANS providers in Ireland are shown in Table D.4 below. Additionally Figure D.5 shows the top event types reported by ANS providers between 2016 and 2018, which include some of these SPI's.

Table D.4 ATM performance Monitoring Rates

Standardised Rates (SMI, AD, LB, AI rates per 100,000 flight hours) (RI rate per 100,000 movements)					
Year	Separation Minima Infringement	Runway Incursion	Deviation from ATC Clearance	Level Bust	Airspace Infringement
2015	4.85	5.79	51.25	15.58	9.70
2016	3.22	5.90	58.88	17.37	8.69
2017	2.88	5.46	44.49	16.00	10.24
2018	2.54	2.66	50.45	17.77	10.15
4-year Average Rate	3.37	4.95	51.27	16.68	9.69

Figure D.5 Top Event Types-ATC 2016-2018



The IAA also received occurrence reports from aerodrome operators mainly concerning ground operations involving aircraft and ground vehicles and equipment. A breakdown of the occurrences submitted between 2016 and 2018 by occurrence category and ARMS Risk Classification Band is shown in Figure D.6 below.

Figure D.6: Aerodrome related occurrences by ARMS Risk Band 2016-2018

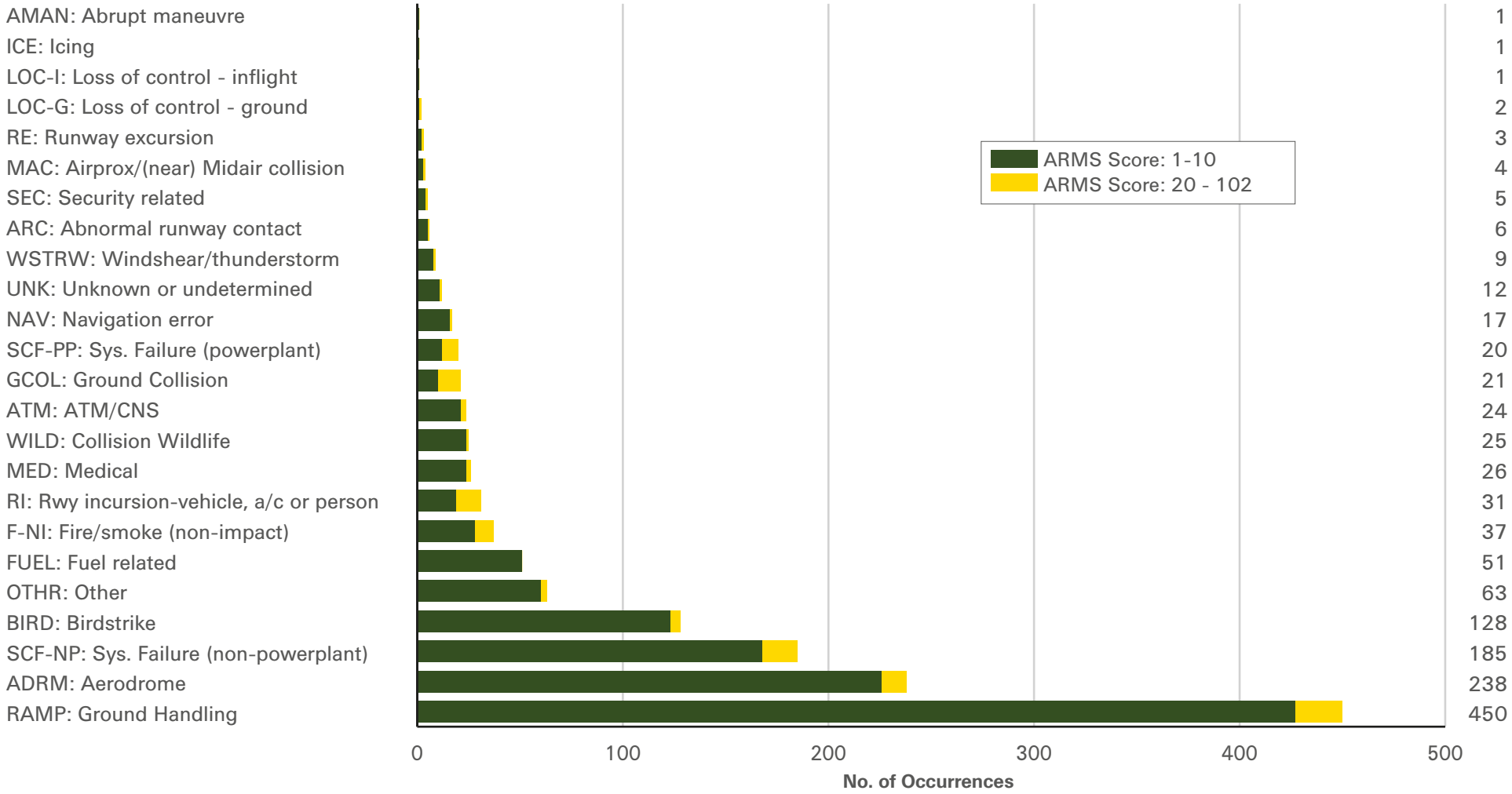
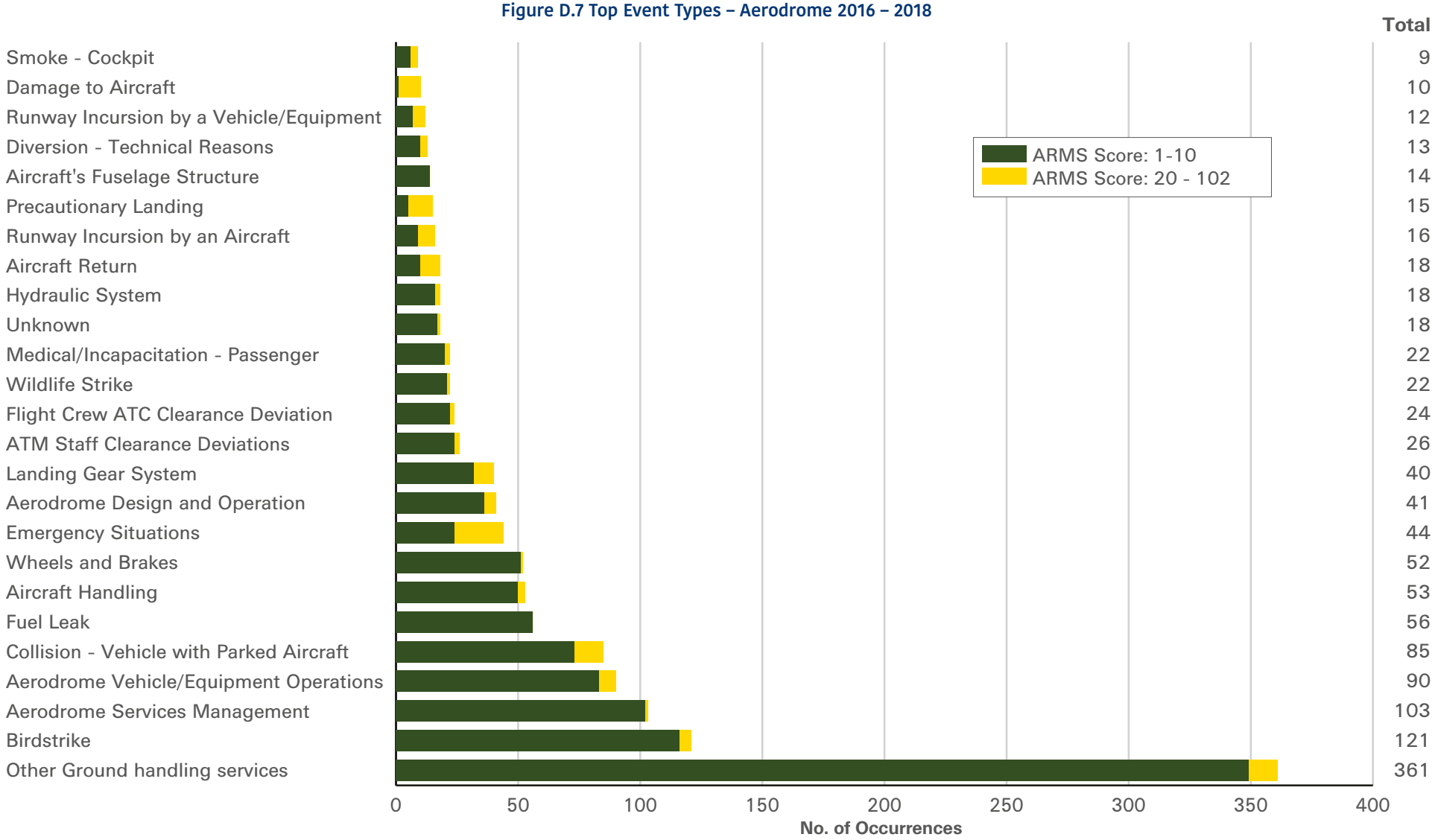


Figure D.7 provides a list of the top event types that provide more information on the actions that lie behind these categories.

Figure D.7 Top Event Types – Aerodrome 2016 – 2018



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 air traffic services (sub-section 1) and aerodrome operations (sub-section 2).

Sub-section 1: Air Traffic Services

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.2 shows 3 three serious incidents (air traffic management, mid-air collision and runway incursion) in these key safety areas. Figure D.3 shows that in the past three years ANS providers reported 94 MAC related occurrences and 32 runway incursion related occurrences. Table D.4 shows the 4-years rate trends for key ANS related safety performance indicators while Figure D.5 provides a list of the top event types for 2016-2018. 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. The 4-year average trends for these indicators from Irish ANS providers are generally reducing.

Detailed analysis of the safety information in the ANS domain 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)	• Identification and response to airspace infringement • Control of traffic flow to prevent separation minima infringement • Recognition and response to deviation from ATC clearance • Adherence to standard phraseology in ATC communications • Adherence to ATC communication procedures (e.g. readback/hearback) • Management of declared emergencies • Anticipation and response to aircraft go-around • Reaction to drone infringements into controlled airspace
Runway Incursion	• Control of ground movements in low visibility operations • Recognition and response to deviation from ATC clearance by aircraft and ground vehicles • Adherence to standard phraseology in ATC communications • Adherence to ATC communication procedures (e.g. readback/hearback)

Additional Safety areas:

The top occurrence category (ATM) includes over 80 reports of degradation or loss of services or functions in the past three years. This includes failures to equipment necessary to support communications, navigation and surveillance function and failure of data processing and distribution to support air traffic flow management. The highest risk failures can lead to temporary loss of air traffic services with consequential delays and diversions to aircraft. Whereas high level of equipment reliability and redundancy are built into the system, a safety issue to be addressed is the elimination of common mode failures (e.g. software related) that have the potential to impact on service provision.

Sub-section 2: Aerodromes

Key Safety Areas:

Among the key safety areas identified globally, the areas 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.2 shows that one accident and 2 serious incidents were attributed to ground handling activities in the past five years and one serious incident was categorised as a runway incursion. Fig D.5 shows that the top two occurrence categories reported by aerodrome operators were 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). Fig D.5 also shows that there were 31 runway incursions reported by aerodrome operators in the past three years, 11 of these were due to unauthorised presence of ground vehicles on the runway. Figure D.6 shows that the top four event types reported were other ground handling services (i.e. ground handling services except aircraft marshalling), aerodrome services management, collision between ground vehicle and parked aircraft and aerodrome vehicle/equipment operations (such as removal of foreign objects from aerodrome).

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)	• Removal of runway contamination (e.g. snow, ice, foreign objects) • Maintenance of runway surface condition • Reporting on runway surface condition
Runway Incursion (RI)	• Management of ground movements in low visibility conditions • Deviation from ATC clearance by ground vehicles • Adherence to standard phraseology in ATC communications • Adherence to ATC communication procedures (e.g. readback/hearback)
Aircraft Upset (LOC-I)	• Adherence to aircraft loading procedures (e.g. passengers, baggage and cargo, fuel) and accurate completion of aircraft loadsheets • Adherence to aircraft ground handling procedures (e.g. de-icing, dangerous goods) • Reporting of damage to aircraft during ground operations • Wildlife strike hazard management in the vicinity of airports • Awareness of LOC-I risk among ground handling agents

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. There were four reports of drone infringement into Irish aerodromes between 2016 and 2018, however none of these occurrences required the suspension of operations.

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

Safety Area	Safety Issues
Safety of persons on the apron	• Routing of passengers from gate to aircraft steps • Condition of aircraft steps • Movement of ground operations personnel on the apron • Management of ground vehicle traffic in proximity to aircraft • Protection of personnel from jet-blast or propeller wash
Prevention of aircraft damage	• Ground vehicles approaching and positioning around aircraft and different aircraft types • Adherence to aircraft marshalling, pushback and towing procedures • Management of ground movements in low visibility conditions • Adherence to positioning, securing and decongestion procedures for ground service equipment on the apron
Drone infringements	• Management of aerodromes operations in the event of drone infringement, including suspension and re-activation of flight operations as required • Prohibition of drone flying in close proximity to an aerodrome

Number and Rate of ANS MORs: 2016 to 2018

The following table provides a comparison between the number of flight hours flown and the corresponding MOR rates per 10,000 flight hours from 2016 to 2018.

Table D.3: No. and rate of MORs according to flight hours from 2016 to 2018

Year	Flight hours	Total	
		Number	Rate
2016	309,693	1,036	33.5
2017	311,715	1,348	43.25
2018	315,776	1,711	54.18

Number and rate of aerodromes MORs from 2016 to 2018

The following table provides a comparison between the number of movements and the corresponding MOR rates per 10,000 movements from 2016 to 2018.

Table D.5: No. and rate of MORs according to movements from 2016 to 2018

Year	Movements	Total	
		Number	Rate
2016	274,058	316	11.53
2017	273,440	506	18.50
2018	293,961	462	15.72

SECTION E

General Aviation in Ireland

A Russian built aerobatic Sukhoi Su-31. Photographer Noel Carrigy.

Introduction

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

- non-commercial operations using complex aircraft (Part NCC);
- 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.

Additionally, it includes aviation activities subject to Irish national law such as private flying of microlights, homebuilt aircraft, and gyrocopters.

There is a diverse range of General Aviation activities in Ireland and this section reviews the safety performance of the sector using the following aircraft categories:

- Aeroplanes with a maximum take-off mass (MTOM) of 2,250 kg and above.
- Aeroplanes with an MTOM less than 2,250 kg.
- Microlight aircraft – typically aeroplanes with MTOM less than 450 kg and flex-wing aircraft.
- Helicopters – with an MTOM of 2,250 kg and above.
- Helicopters – with an MTOM of less than 2,250 kg.
- Gyrocopters.
- Sailplanes and powered sailplanes - with rigid wings and undercarriage.
- Paragliders, powered paragliders (paramotors) and powered parachutes.
- Hot Air Balloons.
- Specialised Operations e.g. Parachute support operations, banner towing, and aerial photography

Note: Data analysis for aircraft operated under Part-NCC has been included within Section B: The Irish Fixed-Wing Commercial Air Transport Sector, as these aircraft are subject to similar risk exposure as commercial operators.

Accidents and Serious Incidents:

Table E.1 provides a summary of the safety performance of this sector in respect of accidents and serious incidents. The accident and serious incidents 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).

Further details are provided below in table E.1.

GA Sub-Sector	No. of fatal accidents (fatalities) 2018	Total No. of fatal accidents 2013-2017 with (total fatalities)	No. of accidents 2018	Total No. of accidents 2013-2017	No. of Serious Incidents 2018	Total No. of serious incidents 2013-2017
Aeroplanes ≥ 2250 kg	0 (0)	1 (2)	0	1	0	0
Aeroplanes < 2250 kg	0 (0)	3 (3)	7	21	2	10
Microlight aircraft	1 (1)	0(0)	0	4	0	1
Helicopters > 2250 kg	0 (0)	0 (0)	0	1	0	0
Helicopters < 2250 kg	0 (0)	0 (0)	1	4	0	1
Gyrocopters	0 (0)	0 (0)	0	1	0	0
Sailplanes	0 (0)	0(0)	1	0	0	0
Paragliders	0 (0)	1 (1)	0	1	0	0
Balloons	0 (0)	0	0	0	0	0
Specialised Operations	1 (2)	0	0	1	0	0

Aeroplanes - with an MTOM 2,250 kg and above

There were 8 aeroplanes on the Irish aircraft register at end of 2018 in this sub-sector. None of these aircraft were involved in an accident or serious incident over the past six years.

A fatal accident occurred in 2018 with two fatalities involving a foreign registered aircraft. The AAIU investigation of this accident is ongoing.

In the past five years foreign registered aircraft in this sub-sector were also involved in a non-fatal accident in 2014, categorised as 'Runway excursion' (RE) and a fatal accident in 2015 categorised as 'Controlled flight into terrain' (CFIT), with two fatalities.

Aeroplanes - with an MTOM below 2,250 kg

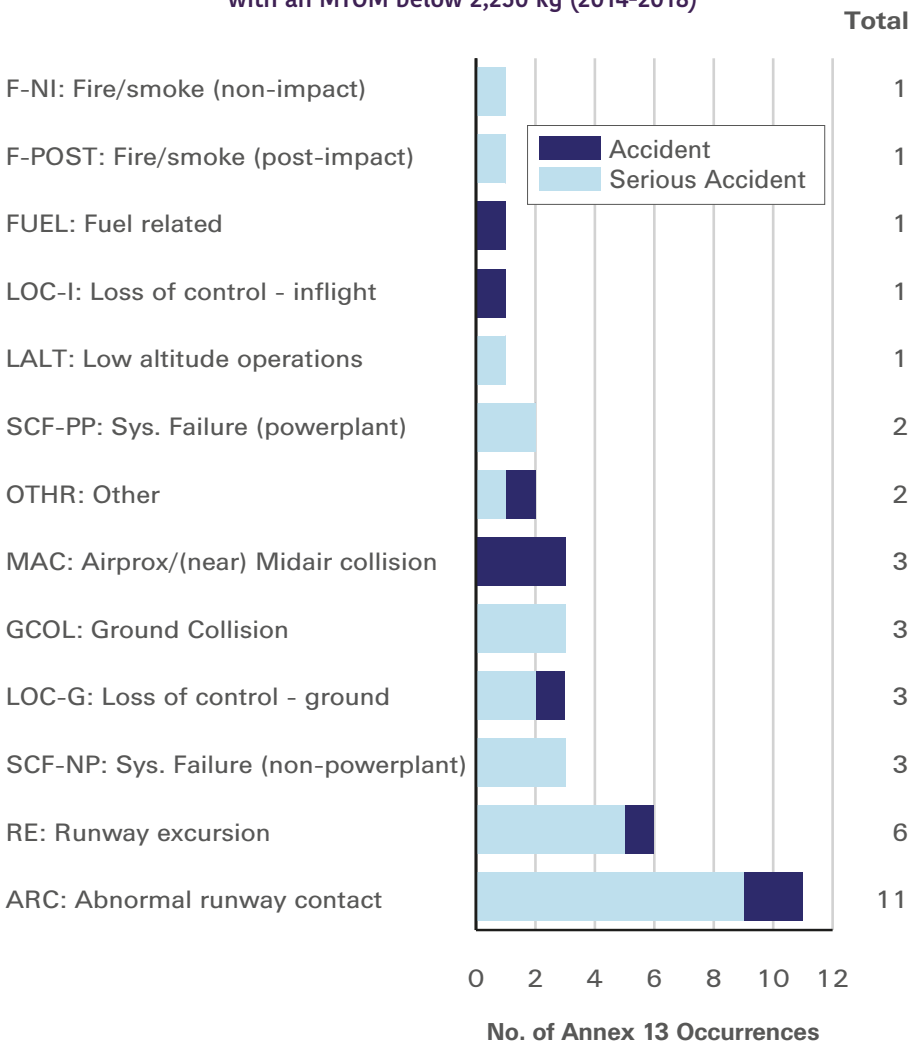
There were 228 aeroplanes on the Irish aircraft register at end of 2018 in this sub-sector.

Over the past five years, aeroplanes in this sub-sector were involved in three fatal accidents resulting in three fatalities, in 2015, 2016, and 2017. Two of these fatal accidents involved Irish registered aircraft and one was foreign registered. There were no fatal accidents in 2018.

During this period there were 25 non-fatal accidents, 9 of which involved aeroplanes on a foreign aircraft register and there were 10 serious incidents, 5 of which involved foreign registered aircraft.

The categories assigned by the AAIU to the accidents and serious incidents in this sub-sector is shown in Figure E.2 below.

Figure E.2: Categories of accidents and serious incidents involving GA aeroplanes with an MTOM below 2,250 kg (2014-2018)



Microlight aircraft

There were 150 microlights on the Irish aircraft register at end of 2018.

A fatal accident occurred in 2018 involving an Irish registered microlight with one fatality. The AAIU investigation of this accident is ongoing.

In addition, over the past five years in this sub-sector, there were 3 accidents, two of which involved foreign registered microlights and one serious incident involving an Irish registered microlight. The categories assigned to these accidents were Abnormal Runway Contact (ARC), Fuel Related (FUEL), and Loss of Control - Inflight (LOC-I) and the serious incident was categorised as 'Engine Failure or Malfunction' (SCF-PP).

Rotorcraft

At the end of 2018 there were 5 Complex helicopters and 19 non-complex helicopters registered in Ireland.

There were no fatal accidents involving GA helicopter operations in the past five years. During this period there were 7 accidents involving GA helicopters, 6 involving non-complex helicopters and 1 involving a complex helicopter. There was one serious incident involving a non-complex helicopter. All the helicopters involved were foreign registered.

The accidents were categorised by the AAIU as 'Collision with obstacles during take-off and landing' (CTOL, 2 accidents), 'Loss of control in flight' (LOC-I, 2 accidents), 'Loss of control on the ground' (LOC-G, 1 accident), and Controlled Flight into Terrain (CFIT, 1 accident). The serious incident was categorised as 'Airprox / near midair collision' (MAC, 1 serious incident).

At the end of 2018 there were 15 gyrocopters on the Irish aircraft register. Gyrocopters were involved in 1 non-fatal accident, categorised as 'Loss of control in flight' (LOC-I), during 2014.

Sailplanes

At the end of 2018 there were 22 sailplanes / powered sailplanes on the Irish aircraft register. There was one accident in 2018 involving a collision between two gliders on the runway.

There is no requirement in Ireland to register paragliders and powered parachutes, however powered paragliders are required to be registered since 2016. At the end of 2018 there were 14 powered paragliders registered in Ireland.

There were 2 accidents and one serious incident involving paragliders, powered paragliders and powered parachutes in the past five years in Ireland. One of these accidents resulted in a fatality. The AAIU categorised both accidents as 'Loss of control in flight' (LOC-I) and the serious incident as 'Controlled Flight into Terrain' (CFIT).

In addition, there was 1 accident involving parachuting support operations during this period. It occurred during 2015 when the main parachute became entangled around the right-hand side horizontal stabiliser of the aircraft involved. Thankfully, there were no fatalities in this accident.

Occurrence Reports

The regulations pertaining to mandatory occurrence reporting include general aircraft pilots flying type certified aircraft. Many of the aircraft involved in this sector are not type certified however 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. The regulations include provisions concerning confidentiality, protection of reporters and appropriate use of information contained in occurrences.

The level of occurrence reports received from those involved in general aviation is very low and does not currently 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 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.

The General Aviation Safety Council of Ireland (GASCI) was established in 2012 and its members include general aviation clubs, societies and training organisations representing many of the activities in this sector. The IAA and AAIU are also members of GASCI. GASCI hosts frequent safety evenings (typically 4 per year) around Ireland which gives the general aviation community an opportunity to review latest safety promotion material and discuss safety concerns. GASCI has 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, which meets about four times per year to review and discuss latest safety concerns across the sector.

Conflict between GA aircraft with Commercial Air Traffic

From a risk perspective the greatest concern is that a GA aircraft may conflict with passenger carrying commercial aircraft. This may occur if GA aircraft enter controlled airspace without the necessary ATC clearance to do so (ie an airspace infringement.) The problem is exacerbated if the GA aircraft involved is not fitted with transponder equipment, as the electronic safety nets that can alert pilots and ATC of their presence are not available. Airspace infringement is a key safety issue for GA.

GA Specific Safety Issues

In addition to airspace infringement, the following safety issues that emerge from the analysis of accidents and serious incidents are included in the GA sector-based risk register.

Safety Area	Safety Issues
Loss of Control -Inflight	• Recognition and recovery from aircraft upset • Awareness of flight attitude • Decision making and control of aircraft, following engine failure • Recognition of, and response to, carburetor icing • Operations of light aircraft within recommended mass and balance limits • Proficiency in practiced forced landings • Awareness of performance differences between different GA aircraft types
Collision with terrain or obstacle	• Inadvertent flight into degraded visual environments • Flight below minimum safe altitude (e.g. for weather avoidance) • Pre-flight planning • Situational awareness during flight • Use of advanced technologies • Use of aeronautical charts and terrain and obstacle databases
Mid-Air Collision	• Use of see and avoid • Safety Management at Club fly-ins and airshows • Conflict with Drones
Take-off and Landing	• Runway excursion or heavy landing following aircraft handling or environmental issues • Take-off and landing from hard/soft airstrips
Other	• Safety of ground operations during club fly-ins

Many of the risk mitigation actions for general aviation involve safety promotion to improve the awareness of the safety issues and provide guidance on how to avoid them. The State Safety Plan for 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

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 2019-2022 State Safety Plan during Q2 2019. Previous editions of the State safety Plan are available on the IAA website www.iaa.ie.

Irish Aviation Authority
Registered Office: The Times Building, 11 – 12 D'Olier Street, Dublin 2
Registered Number: 211082. Place of Registration: Ireland
A Limited liability company