

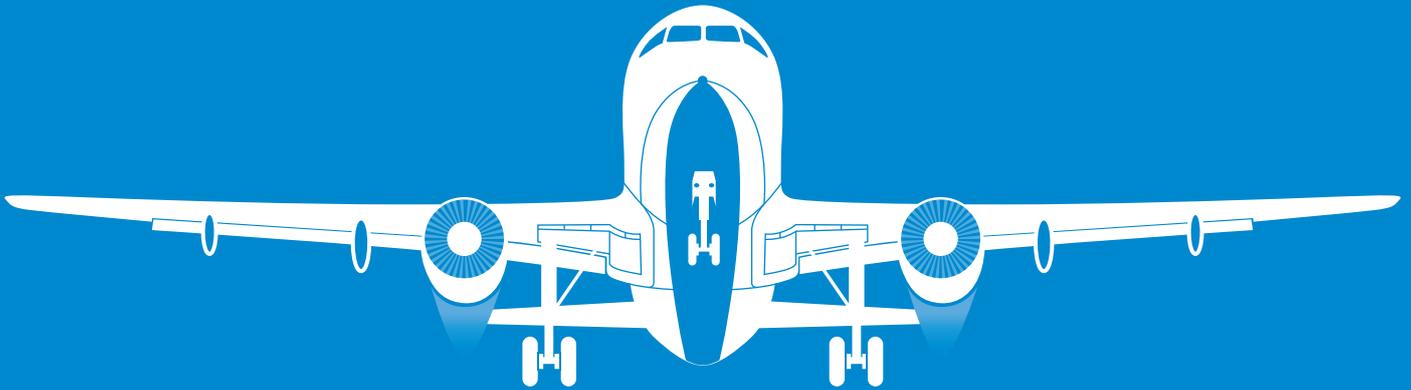


**EASA**  
European Aviation Safety Agency

**Summary**

# Annual Safety Review

# 2014





## Foreword by the Executive Director

In our previous edition, we noted with satisfaction that 2013 was the safest year ever for aviation in the world and in Europe. By contrast, 2014 has been a very challenging year for the European Aviation Safety Agency (EASA) and for aviation safety in general. The disappearance of Malaysia Airlines MH370, the dramatic accident of MH17, the crash of Air Asia QZ8501 and the radar interferences over central Europe have reminded us that the safety of passengers can never be taken for granted.

In 2014, EASA initiated fundamental changes in the way it operates in order to allow for a more proportionate and performance-based approach to safety. In particular, EASA adopted a new approach to simplify and lighten the way General Aviation is regulated and overseen in Europe. This approach focuses on safety culture, safety promotion and, lastly, common sense. It should also be seen as the precursor of a better, lighter approach to aviation regulation in Europe, with the ultimate goal of increasing the level of safety.

EASA has also reviewed its organisational structure in 2014 to prepare itself for the many challenges that it will face in the next 10 years, including new opportunities to enhance its role. A new Strategy and Safety Management Directorate was created to develop a single, more transparent, evidence-based and data-driven strategy, which will drive the Agency's work programme. The rulemaking activities were incorporated into 'operational' directorates, in order to increase synergies and to benefit from a better and direct operational feedback.

Over the past year, EASA introduced Operational Suitability Data rules, where aircraft manufacturers are required to establish certain data that is considered important to fly the aircraft safely. This data will be approved by the Agency and will then be used by operators and training organisations. The Agency also published the Flight Time Limitations and Third Country Operators rules and finalised the AIR OPS Regulation, as well as publishing an Opinion on flight recorders and underwater location devices in response to recent safety recommendations. In the ATM domain a common regulatory framework was finalised, as a basis for the implementation of the Single European Sky. In particular, common rules on Air Traffic Controller licensing were adopted.

Furthermore, EASA is committed to continually improving aviation safety and made a number of concrete proposals in 2014:

- A proposal to build a European alerting system to help airlines perform their risk-assessment when flying over conflict zones,
- A technical analysis of the controller-pilot communication via Data-link, identifying the sources of current operational problems and proposing a way forward.

This year's Annual Safety Review includes changes to the content, which include more detailed analyses of the causes of safety occurrences that help to link the review to the EASp. In addition, EASA, with the involvement of a number of external groups and industry stakeholders<sup>1</sup>, is developing a set of safety risk portfolios that cover the different aviation activities.

As demonstrated by the events of 2014, the pursuit of safety in aviation is a task that requires our constant vigilance and effort.

**Patrick Ky**  
**Executive Director**

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1 Network of Analysts (NoA), the European Strategic Safety Initiative (ESSI)



## Executive Summary

In addition to presenting key statistics relating to worldwide and European aviation safety, this document contains for the first time safety risk portfolios for European commercial air transport aeroplanes and offshore helicopter operations. These portfolios link safety issues to their associated potential consequences or risk areas, which will form the main priorities contained in the European Aviation Safety Plan. They are living documents that will continually evolve, on the basis of further safety analysis and the changing aviation system. The most recent versions will be made available through the EASA website.

### Worldwide Aviation Safety

- 2014 16 fatal accidents occurred in 2014 involving Commercial Air Transport aeroplanes. This is compared with 14 fatal accidents in the previous year. The number of fatal accidents in 2014 was still significantly below the average number of fatal accidents for the previous 10 years (2004-2013).
- The biggest change in 2014 was the increase in fatalities when compared with 2013. In 2014 there were 648 fatalities in Fixed Wing Commercial Air Transport compared with 185 in 2013. The 2014 increase in fatalities was the result of accidents involving larger aircraft carrying more passengers than those in 2013. In 2013 no single accident involved more than 50 fatalities. The number of fatalities in 2014 was 1.5% higher than the average for the previous 10 years.

### European Commercial Air Transport Aeroplanes

There was 1 fatal accident involving EASA Member State aircraft during 2014. This was the Swiftair operated Air Algerie Flight 5017 accident in Mali on 24 July 2014 resulting in 116 fatalities. There were 26 non-fatal accidents in 2014, an increase of 22 from 2013 figures. However, there was a reduction in serious incidents from 74 down to 66. The top 5 safety risk areas that will be the main focus of activity under the European Aviation Safety Plan (EASp) in the area of Commercial Air Transport are assessed as:

1. **Loss of Control In-flight:** this is the most critical risk area for fatal accidents, both in Europe and worldwide. From the analysis performed by the Agency the top contributing safety issues for loss of control are the implementation of management systems and oversight, communication and decision making, knowledge of aircraft systems and associated procedures, crew awareness and the management of adverse weather conditions. These safety issues will be the focus of further risk assessment activities to ensure that the necessary actions are in place.
2. **System Component Failure:** technical failure is the most frequent cause of accidents and serious incidents. Excluding post-crash fires it is also the 2<sup>nd</sup> highest cause of fatal accidents.
3. **Mid-Air Collision/AIRPROX:** although there has been no major mid-air collision in Europe in recent years, AIRPROX related occurrences are the 2<sup>nd</sup> most critical risk area for all non-fatal accidents and serious incidents in Europe.
4. **Abnormal Runway Contact/Runway Excursions:** abnormal runway contact is often a pre-cursor for runway excursions, and together they comprise the most critical risk area for non-fatal accidents.
5. **Ground Collisions/Ground Handling:** ground handling occurrences are the 4<sup>th</sup> most frequent risk area for fatal accidents. This risk area also leads to significant damage to aircraft and equipment, highlighting the need for greater safety efforts in ground operations.



## Commercial Air Transport Helicopters

- 2014 was a better year for the safety of Commercial Air Transport Helicopters. There was 1 fatal accident in 2014 resulting in 2 fatalities. This is compared with 3 fatal accidents in 2013, resulting in 11 fatalities. There was also a 34% reduction in the number of non-fatal accidents and a 71% reduction in serious incidents compared with the 10 year average.
- The key risk areas in Commercial Air Transport Helicopters are Loss of Control – In flight (LOC-I), System or Component Failure (SCF), Controlled Flight into or Toward Terrain (CFIT)/Collisions during Take-off and Landing (CTOL) and Abnormal Landing Contact (ARC)/Excursions from helicopter landing areas.

## General Aviation

- 2014 has also been a positive year for General Aviation safety, with a 20% reduction in the number of fatal accidents and an 18% reduction in the number of fatalities, when compared with the 10 year average. However, there were still 173 fatalities in General Aviation, highlighting the importance of the continued safety improvement efforts.
- The key risk areas in Fixed Wing General Aviation are those related to landing including Abnormal Runway Contact (ARC), Loss of Control – Ground (LOC-G) and Runway Excursion (RE). In addition, Loss of Control – In flight (LOC-I) and System or Component Failure (SCF) will also be key priorities of EASA work on General Aviation safety in 2015.

# European versus Worldwide Safety

### Scope

Commercial Air Transport aeroplanes with a mass greater than 5,700 kg world-wide conducting passenger and cargo operations. A comparison is provided between EASA Member State operated aircraft and the rest of the world.

### Key Messages:

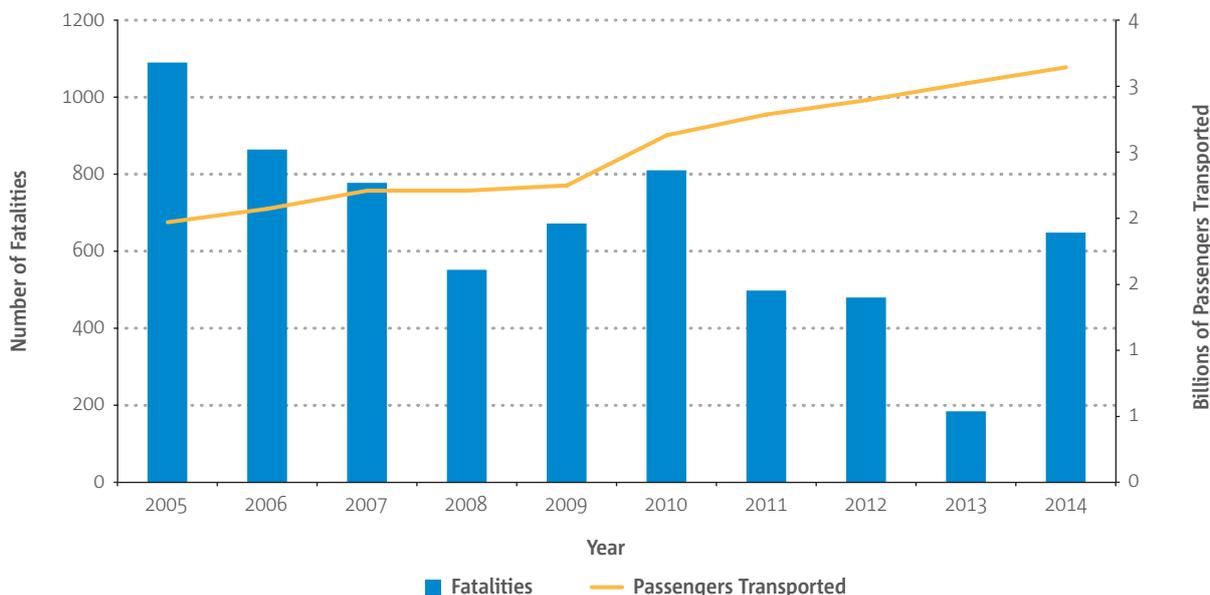
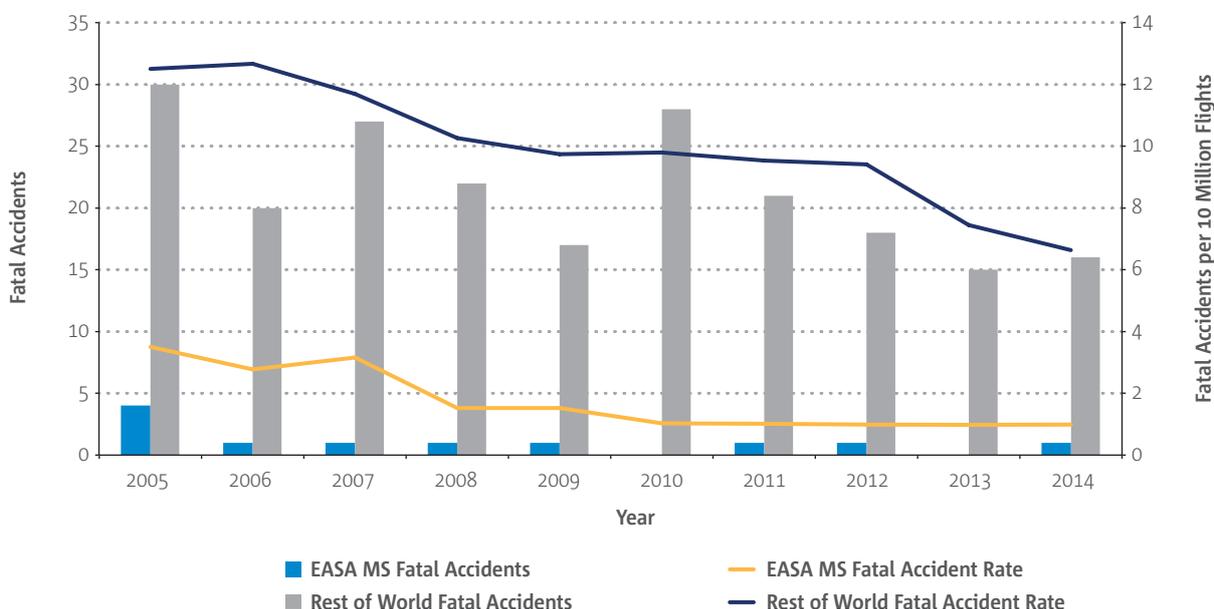
- Globally, in terms of the high absolute number of fatalities, 2014 has been a bad year for aviation safety, yet the number of fatal accidents increased by only two accidents. Despite this, as a result of continuing growth in worldwide traffic, the 3-year rate of fatal accidents per million flights has decreased by 12%.
- Although in 2014 there were fewer fatal accidents worldwide than the average for the last ten years, the number of fatalities was close to the average and higher than that in recent years.

	Fatal Accidents	Fatalities
2014	16	648
2004-2013 (Yearly Average)	23	638

- The graph at top right shows that the fatal accident rate for EASA Member States (Lower Line) compares favourably with that for the rest of the world (Upper Line), highlighting the continued high level of safety in European aviation.
- While in 2013, no fatal accidents resulted in more than 50 fatalities, in 2014 there were three fatal accidents that resulted in more than 100 fatalities each. The change in the number of worldwide fatalities is shown in the graph at bottom right and contrasts the increasing number of passengers that are transported by air.



- Within the scope of this analysis, the major worldwide fatal accidents with over 100 fatalities include Malaysian Airlines Flight MH370, Air Algerie Flight 5017 and Air Asia Flight 8501. The loss of Malaysian Airlines Flight MH17 is not included as this occurrence is considered to be a hostile action, which is outside the scope of the globally accepted definition for aircraft accidents as laid down in ICAO Annex 13. This occurrence and work on aviation safety for aircraft overflying conflict zones is covered in more detail in the full version of this document. Were MH17 to be included in the accident figures, the number of fatalities would increase to 946.
- With reference to EASA Member States, there is one fatal accident in Commercial Air Transport within the scope of this analysis. That is the Swiftair operated Air Algerie Flight 5017 accident in Mali on 24 July 2014. This accident is included in the EASA Member States analysis because the aircraft was operated by an airline based in a Member State.
- There has been no more than 1 fatal accident per year involving EASA Member State registered Commercial Air Transport aeroplanes since 2005. No fatal accidents occurred in 2010 and 2013.





# European Commercial Air Transport – Aeroplanes

## Scope

Commercial Air Transport aeroplanes in passenger and cargo operations with a mass greater than 5,700 kg involving EASA Member State operated or registered aircraft.

## Key Messages

The number of fatal accidents in 2014 remains below the ten-year average, while the number of non-fatal accidents in 2014 is slightly above the average. The number of serious incidents in 2014 is 15% below the average for the preceding decade; 66 compared to 78.

	Fatal Accidents	Non-Fatal Accidents	Serious Incidents
2014	1	26	66
2004-2013 yearly average	1.2	22.6	78.1

In 2014, 116 persons were fatally injured, with all fatalities resulting from one accident; Air Algerie Flight 5017. Only 11 serious injuries occurred during 2014 and were mainly caused by in-flight turbulence.

	Fatalities	Serious Injuries
2014	116	11
2004-2013 average	52.4	8.6

The analysis of safety risk areas and associated safety issues in European Commercial Air Transport fixed-wing (CAT FW) operations has led to the development of a CAT FW sector safety risk portfolio. The portfolio identifies the key safety risk areas that will form the main priorities contained in the European Aviation Safety Plan (EASp). Each of the associated safety issues will be subjected to a further risk assessment process involving NAAs and industry stakeholders in order to support the definition and prioritisation of appropriate safety actions.

CAT – Fixed Wing		Risk Areas								
Safety Issue	SYS	LOC-I	SCF	MAC	RE/ARC	GCOL/RAMP	Fire	CFIT	RI	
		Operational	Management of adverse weather conditions	■			■	■		■
	Erroneous take-off and landing parameters	■	■		■					
	Inadequate handling of Go-Arounds	■			■			■		
	Inadequate recognition and recovery from aircraft warning system operation	■		■	■			■		
	Improper management of separation between aircraft	■		■		■				
	Improper fuel management	■	■		■			■		
	Incorrect maintenance	■	■	■	■	■	■	■	■	
	Improper loading and dangerous goods handling	■	■		■	■	■			
	Inadequate ground handling activities (e.g. de-icing and servicing)	■				■			■	
	Birdstrikes	■		■						
	Survivability and Evacuation	■			■	■	■	■	■	



CAT – Fixed Wing		SYS	Risk Areas							
Safety Issue			LOC-I	SCF	MAC	RE/ARC	GCOL/RAMP	Fire	CFIT	RI
Technical	Technical failure in flight		■	■	■	■		■	■	
	Contamination of controls or critical surfaces		■	■		■				
	ILS false/disrupted signal capture		■	■		■				
	Unsuitability of Recording devices	■								
Human	Inadequate crew situational awareness	■	■		■	■	■	■	■	■
	Inadequate crew resource management (CRM), communication and decision-making	■	■		■	■	■		■	■
	Inadequate knowledge of aircraft systems and associated procedures	■	■		■	■			■	
	Inadequate monitoring of flight parameters/automation modes		■		■	■			■	
	Crew impairment	■	■		■		■	■	■	■
Organisational	Improper oversight	■								
	Inadequate management system (incl. procedures)	■								

## Commercial Air Transport Helicopters and Offshore Helicopters

### Scope

Commercial Air Transport Helicopters in passenger and cargo operations across all mass groups and involving EASA Member State operated or registered aircraft.

### Key Messages

Compared to the 10-year average, 2014 was a good year. Only one fatal accident occurred in 2014, which resulted in two fatalities. These figures are well below the average for the preceding decade of 2,6 and 11,6 respectively. The numbers of non-fatal accidents and serious incidents were also below the ten-year average in 2014.

	Fatal Accidents	Non-Fatal Accidents	Serious Incidents
2014	1	5	1
2004-2013 average	2.6	7.6	3.34
	Fatalities	Serious Injuries	
2014	2	3	
2004-2013 average	11.6	5.4	



## Offshore Helicopters

An initial risk portfolio has been developed to record the key safety issues identified for offshore helicopter operations. These safety issues stem from an analysis of offshore helicopter accidents that was performed in response to a recommendation from the UK CAA in their CAP 1145 report on offshore helicopter safety. Further safety risk portfolios will be developed for other helicopter aviation sectors, including Helicopter Emergency Medical Services (HEMS).

Offshore Helicopters		SYS	Risk Areas				
Safety Issue	LOC-I		SCF	CFIT/CTOL	RE/ARC	MAC	FIRE
Operational	Ditching, water impact, survivability and evacuation (Including failure of Emergency Locator Transmitter (ELT) beacon)	■					
	Inadequate recognition and recovery following operation of aircraft warning system		■		■	■	■
	Inadequate management of the automatic flight control system or automated flight path		■		■	■	■
	Incorrect control of the aircraft flight path		■		■	■	■
	Management of moving deck, vessel, platform, (P,R,Y) and dimensions		■		■	■	
	Inadequate clearance between helicopter and obstacles		■		■	■	
	Management of adverse weather conditions (loss of visual references)		■		■	■	■
	Management of flight situations (Gas Exhaust, Hot Gas Turbulences, Main Structures Effects)		■		■	■	
	Incorrect illumination of helideck, vessel, platform,		■		■	■	
	Improper fuel management		■		■	■	
	Inadequate flight planning and preparation				■		■
	Incorrect maintenance		■	■	■	■	■
Technical	Automatic flight control system failures		■	■	■	■	
	Gearboxes and transmission system failures		■	■	■	■	■
Human	Incorrect perception of situations by flight crew (e.g. Disorientation, visual illusions by day and night)		■		■	■	■
	Incorrect or inadequate flight crew actions		■		■	■	■
	Inadequate CRM, communication and decision-making		■		■	■	■
	Inadequate monitoring of flight parameters/ automation modes		■		■	■	
	Inadequate knowledge of aircraft systems and associated procedures		■	■	■	■	
	Incorrect application of rules and procedures		■	■	■	■	■
Organisational	Inadequate Operational Procedures, Current Practices and Oversight	■					
	Inadequate Operational Leadership and Supervision	■					



# General Aviation

## Scope

General aviation operations involving EASA Member State registered aircraft.

## Key Messages

When looking at the General Aviation community as a whole, it can be seen that the number of fatal accidents as well as fatalities and injuries is decreasing. Nevertheless, further work is being carried out as part of EASA's General Aviation Roadmap to better capture flight exposure data that would aid in understanding the reasons behind this reduction.

	Fatal Accidents	Non-Fatal Accidents	Serious Incidents
2014	112	789	41
2009-2013 average	139.4	863.2	27.2
	Fatalities	Serious Injuries	
2014	173	161	
2009-2013 average	211.4	170.6	

## Safety Risk Portfolios for General Aviation

In General Aviation, there are many different sectors and therefore it will be necessary to develop different safety risk portfolios that are specific to each operational domain to ensure that risks are identified and assessed appropriately. In addition to the work that has already been completed on a safety risk portfolio for Balloons, portfolios will be developed to cover the following areas of General Aviation: aeroplanes, helicopters, gliders and microlights. Other portfolios might also be required in the future.

## Safety Risk Areas for the Sectors of General Aviation

The analysis has enabled the identification of the safety risk areas for the different sectors of General Aviation.

### General Aviation – Fixed Wing

The key risk areas are those related to landing, including Abnormal Runway Contact (ARC), Loss of Control – Ground (LOC-G) and Runway Excursion (RE). In addition, Loss of Control – In flight (LOC-I) and System or Component Failure (SCF) will also be key priorities of EASA work on General Aviation safety in 2015. Other longer term priorities for fixed wing general aviation include Ground Collisions (GCOL), Low Altitude operations (LALT), Fuel related occurrences (FUEL) and Controlled Flight into or toward Terrain (CFIT).

### General Aviation – Helicopters

The most critical safety areas is Loss of control – In flight (LOC-I). In addition, the key safety areas for the EASp are Abnormal runway contact (ARC)/Loss of Control – Ground (LOC-G)/Runway excursions (RE). Finally, the remaining safety risk areas in this sector are System Component Failure (SCF), Collisions during Take-off and Landing (CTOL) and Low Altitude operations (LALT).



### Gliders

For the Glider sector, the most critical safety risk is Abnormal Runway Contact/Loss of Control-Ground/Runway Excursion (ARC/LOC-G/RE). Other key risk areas for Gliders include Loss of Lifting conditions enroute (LOLI), Loss of Control – In flight (LOC-I), Glider towing related occurrences (GTOW) and Collisions during Take-off and Landing (CTOL).

### Balloons

An initial Sector Safety Risk Portfolio has been developed for the Balloon Sector, which is provided in the Technical Document. The most critical safety risk areas that have been identified are Abnormal Runway Contact (ARC), Collisions during Take-Off and Landing (CTOL), Loss of Control – In flight (LOC-I), MAC/AIRPROX (MAC) and Fire related occurrences (FIRE). The Balloon Sector Safety Risk Portfolio has enabled the identification of the key safety issues. In the operational context, the main issues are related to weather planning, control of the balloon flight path, due to a pilot misunderstanding the inertia of a balloon in flight, and also loss of separation during mass balloon launches. From a human factors perspective, safety issues were also identified concerning pilot knowledge, commercial pressures on pilots to fly, decision making, pre-flight planning and communications between pilots during mass launches.

	GA - Balloons	SYS	Risk Areas				
	Safety Issue		CTOL	LOC-I	MAC	ARC	FIRE
Operational	Inadequate or poor weather planning		■	■		■	
	Incorrect control of manual flight path through control of balloon inertia		■	■	■	■	
	Loss of separation – Particularly during mass balloon launches			■	■		
Technical	Propane system fire						■
	Exterior Colour Schemes and Markings – Insufficient Visibility of Balloon Registration leading to communication problems during mass launches			■	■		
Human	Insufficient pilot knowledge of balloon physics		■	■	■	■	
	Commercial and competitive pressure to initiate flights		■			■	
	Incorrect decision making and planning		■		■	■	
	Insufficient or poor communication – Insufficient situational awareness during mass balloon launches			■	■		
Organisational	Insufficient passenger safety knowledge	■					
	Insufficient availability of operational documentation – e.g. Map Marking with Power Wires		■			■	



## Glossary of terms and abbreviations

CTOL	Collision with objects or obstacles on Take-off or Landing while airborne.
CFIT	Controlled Flight into or Toward Terrain: in-flight collision or near collision with terrain, water, or obstacle without an indication of loss of control
EASA MS or MS	EASA Member States (EU28 + Iceland, Lichtenstein, Norway, Switzerland)
EASp	European Aviation Safety Plan
FIRE	Fire/Smoke non-impact: fire or smoke in or on the aircraft, in flight, or on the ground, which is not the result of impact OR Fire/Smoke post impact: fire/Smoke resulting from impact
GCOL	Ground Collision: Collision while taxiing to or from the runway
ICAO	International Civil Aviation Organisation
LOC-I	Loss of Control In-flight: loss of aircraft control while , or deviation from intended flightpath, in flight. Loss of control inflight is an extreme manifestation of a deviation from the intended flightpath. The phrase “loss of control” may cover only some of the cases during which an unintended deviation occurred.
MAC / AIRPROX	Mid-air Collision / Aircraft Proximity issues: loss of separation, near collisions and collisions between aircraft in flight
RAMP	Occurrences during or as a result of ground handling operations including those which occur while servicing, boarding, loading , and deplaning the aircraft.
RE/ARC	Runway Excursion: a veer off or overrun off the runway surface Abnormal Runway Contact: any landing or take-off involving abnormal runway or landing surface contact
RI	Runway Incursion: any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and take-off of aircraft
SCF	System Component Failure: failure or malfunction of an aircraft system or component. NB. This can be further defined as NP (non-powerplant) and PP (Powerplant).
SYS	Systemic issues: these are system-wide problems that affect aviation as a whole. Their association to a particular safety even or circumstance is not always obvious. In most scenarios, they become evident by triggering and play a significant role in the development of safety occurrences. They often relate to deficiencies in organisational processes and procedures.



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