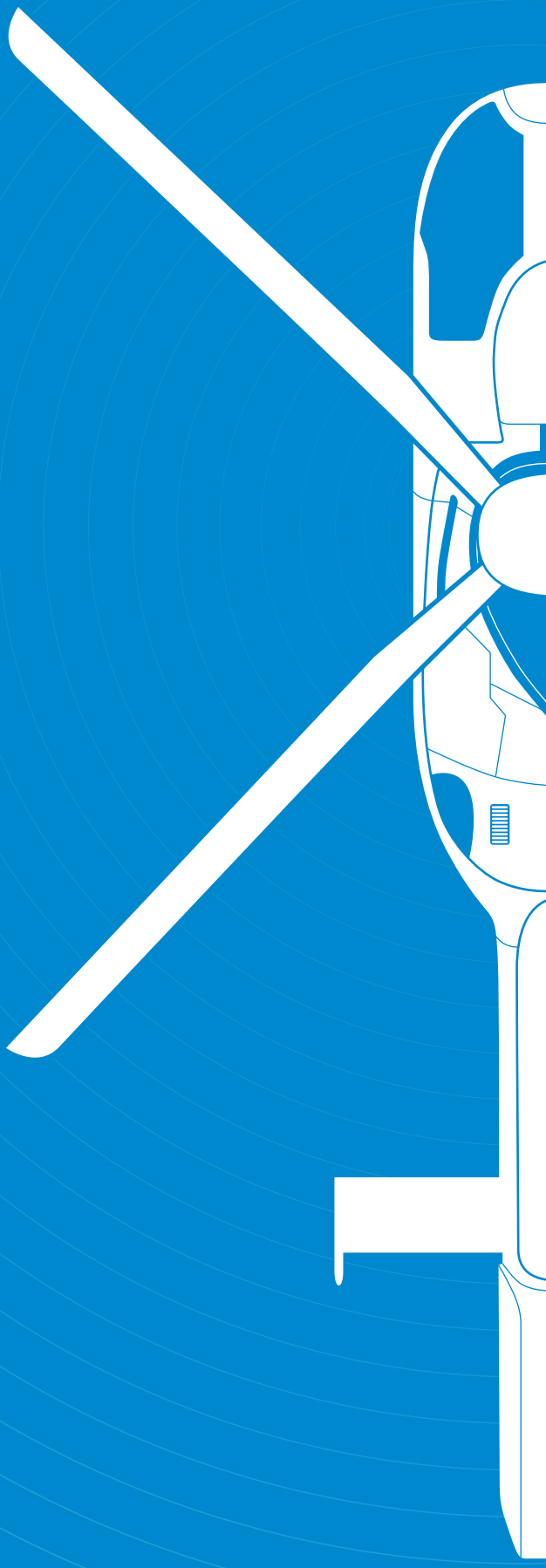
EASA
European Aviation Safety Agency



Annual Safety Review 2016

Summary

Disclaimer

The accident data presented is strictly for information purposes only. It is obtained from Agency databases comprised of data from ICAO, EASA Member States, Eurocontrol and the aviation industry. It reflects knowledge that was current at the time that the report was generated. Whilst every care has been taken in preparing the content of the report to avoid errors, the Agency makes no warranty as to the accuracy, completeness or currency of the content. The Agency shall not be liable for any kind of damages or other claims or demands incurred as a result of incorrect, insufficient or invalid data, or arising out of or in connection with the use, copying or display of the content, to the extent permitted by European and national laws. The information contained in the report should not be construed as legal advice.

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Foreword by the Executive Director

In 2015, the tragic events of Germanwings flight 9525 and Metrojet flight 9268 showed that Aviation safety is being challenged by new threats and emerging risks. To address these new risks the aviation community must continuously review and adjust the way it operates accordingly and promptly.

In July 2015, the EASA led Germanwings Taskforce delivered recommendations highlighting the need to look more closely at pilot assessment and to develop better support systems for pilots and aeromedical examiners.

Safety levels in Europe are also influenced by events in countries outside the European Union. We have increased our technical support to non-EU states so that the same safety principles delivered by the EASA system can be shared with others, particularly with authorities in economically emerging countries.

Conflicts around the world continue to challenge aviation authorities in their efforts to ensure the safe transport of passengers. The new threats highlight the need to further strengthen the links with security agencies. Towards this direction, EASA appointed a special military advisor to assist in the assessment of risks and to formulate appropriate mitigations.

However, safety and security risks are taking new forms through cybersecurity weaknesses and threats. The European Commission and the Member States through the EASA Management Board have endorsed the Agency's Cybersecurity strategy which is currently being implemented.

Due to the increasing population of unmanned aircraft systems (drones), EASA has been very active in this field, having proposed a flexible regulatory scheme to ensure the operation of drones does not affect the safety of the rest of the aviation system. Also, the Agency together with manufacturers and scientists is assessing the risk of collisions between drones and other aircraft.

The dynamic nature of aviation also means that the framework in which the Agency operates is reviewed and expanded. Updating the EASA Basic Regulation will further strengthen our ability to better address future challenges and continue to ensure the safety of aviation and that of EU citizens.

Patrick Ky
Executive Director

Introduction to the Annual Safety Review 2016

This document summarises the main points of the Annual Safety Review, while the full version is available as an electronic document on the EASA website. The review has been published since 2005 and this edition continues the evolution of the review from previous years with further safety risk portfolios being provided. The analysis in this year's review aims to identify the most common key risk areas (outcomes) and associated safety issues that lead to accidents in each of the different operational domains of aviation. The review also provides a link between the analysis and the current actions in the European Plan for Aviation Safety (EPAS). In the safety risk portfolios, event types in the ECCAIRS/ADREP Taxonomy have been matched as closely as possible to the different safety issues. However, perfect matches were not possible in all cases and therefore the numbers should on be taken as indicative of the general number of occurrences that relate to each safety issue.

Overview of Aviation Safety in EASA Member States

This section provides a general overview of aviation safety in the EASA MS. It compares the number of fatal accidents and fatalities in each operational domain in 2015 with the annual average for the past 10 years. The top five operational domains in terms of the number of fatalities in 2015 were:

Commercial Air Transport Aeroplanes. In 2015, CAT aeroplane accidents were responsible for the highest number of fatalities across all aviation domains. In 2014, there were 2 fatal accidents, which continues the trend of not more than two fatal accidents in CAT Aeroplanes per year since 2005. This operational domain is the greatest focus of EASA's safety activities and the reorganisation of the collaborative groups and advisory bodies will help the Agency to learn more about the safety challenges faced by airlines and manufacturers.

Non-Commercial Aeroplanes. In terms of fatal accidents, the second highest number occurred in non-commercial operations with aeroplanes. This domain also had the second highest number of fatalities with 65, which is less than the 10-year yearly average of 79. The General Aviation Roadmap is key to the Agency's strategy for non-commercial aeroplane operations and the establishment of a Collaborative Analysis Group (CAG) in this area to support the work of the current General Aviation Sub-Safety Consultative Committee will help to identify the most effective safety actions.

Gliders/Sailplanes. Glider/sailplane operations had the third highest number of fatalities with 27 and the second highest number of fatal accidents, of which there were 24. Both the number of fatalities and the number of fatal accidents were slightly higher than the 10-year average.

Aerial Work/Part SPO Aeroplanes. In 2015, there were two major accidents involving aerial work/Part SPO operated aeroplanes. One was an airborne collision between two LET-410 aircraft taking part in Parachuting operations in Slovakia that resulted in 7 fatalities. The other occurred at the Shoreham Air Show in the United Kingdom and resulted in 11 ground fatalities. These two accidents led to a much higher number of fatalities compared with the 10-year annual average despite there being the same number of fatal accidents. Following the Shoreham accident, the UK CAA completed a review of public air display arrangements and an associated actions report. In addition, EASA is currently performing specific analysis on parachuting operations in collaboration with experts from this domain to understand more about the risks and consider how improvements can be made.

Non-Commercial Helicopters. Non-commercial helicopter operations had the fifth-highest number of fatalities, which was a reduction of more than 50% when compared with the 10-year annual average.

	Domain	Fatal Accidents 2015	Fatal Accidents Annual 10 Year Average	Fatalities 2015	Fatalities Annual 10 Year Average
	**CAT Aeroplanes**	1	1.3	150	64.2
	**Offshore**	0	0.4	0	3
	**CAT Helicopters**	1	2	4	9.1
	**Aerial Work/Part SPO Aeroplanes**	7	7	23	11.3
	**Aerial Work/Part SPO Helicopters**	2	4.3	4	8.5
	**Non-Commercial Aeroplanes**	41	42.2*	65	79*
	**Non-Commercial Helicopters**	6	8.2*	7	14.5*
	**Balloons**	2	0.6*	3	1.8*
	**Gliders**	24	22.3*	27	25.9*
	**RPAS**	0	0*	0	0

*Annual average is 5 years only from 2011-2015

Commercial Air Transport – Aeroplanes

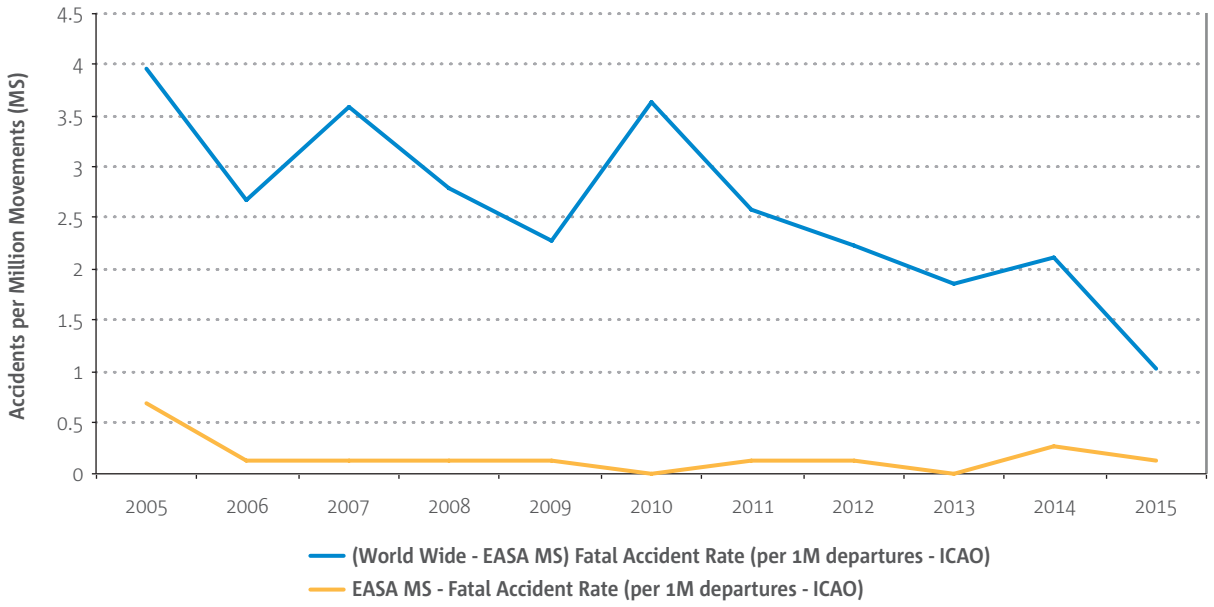
This section covers commercial air transport operations involving aeroplanes over 5 700 kg MTOM and operated by an EASA MS Air Operators Certificate (AOC) holder/airline.

Key Statistics: The key statistics in the tables below show the numbers of accidents and serious incidents for EASA MS AOC holders. The only fatal accident in CAT aeroplanes involving an EASA MS operator in 2015 was the Germanwings accident on 24 March 2015. It can be observed that there was a higher number of non-fatal accidents involving EASA MS operators in 2015 than the 10-year average, with 24 compared with the average of 21.8 from the previous 10 years. At the same time, there was a 24% reduction in the number of Serious Incidents over the same period with a total of 58 serious incidents when compared with the average of 75.8. In terms of fatalities, the single fatal accident recorded in 2015 resulted in 150 fatalities, which is higher than the 10-year average. There was also a slight increase in serious injuries with 11 compared with 9.2 for the previous 10 years.

	Fatal Accidents	Non-Fatal Accidents	Serious Incidents
2005-2014 Annual average	1.3	21.8	75.8
2015	1	24	58

	Fatalities	Serious Injuries
2005-2014 Annual average	64.2	9.2
2015	150	11

- **EASA MS** AOC holders show a lower rate of fatal accidents per one million departures than the rest of the world. The rate has remained well below 0.5 fatal accident per million departures since 2006.





Commercial Air Transport - Aeroplanes Safety Risk Portfolio

Outcome Percentage of Fatal Accidents (2006-2015)		11				64%	45%	27%	18%	9%	0%	18%	0%
Outcome Percentage of Non-Fatal Accidents (2006-2015)		283				7%	22%	36%	5%	1%	5%	30%	0%
Safety Issues		Total number of occurrences in 2011-2015 per safety issue				Key Risk Areas (Outcomes and precursors)							
		Incidents (ECR data)	Serious Incidents	Total Accidents	Fatal Accidents	Aircraft Upset in Flight	System Failure	Ground Collisions and Ground Handling	Terrain Conflict	Runway Incursions	Fire	Abnormal Runway Contact and Excursions	Airborne Conflict
Operational	Detection, recognition and recovery of deviation from normal operations	569	22	12	2	■		■	■			■	
	Operation in adverse weather conditions	9 209	37	33	1	■	■	■	■	■		■	■
	Ground handling operations	10 697	8	7	1	■		■	■	■	■	■	■
	Maintaining adequate separation between aircraft on the ground and in the air	10 001	43	8	—	■	■	■					■
	Pre-flight preparation/ planning and in-flight re-planning	2 535	7	2	—	■		■	■	■		■	■
	Aircraft maintenance	1 318	7	1	—	■	■	■	■	■	■	■	■
	Fuel management	30	9	—	—	■	■		■				
	Birdstrikes	11 421	3	—	—	■	■	■			■	■	
	Calculation and entry of take-off and landing parameters into aircraft system	3	3	—	—	■		■				■	
	Handling and execution of go-arounds	2	4	—	—	■			■			■	■
	Prevention and resolution of conflict with aircraft not fitted with transponders	95	2	—	—								■
	Dangerous goods handling	4	—	—	—			■			■		

Commercial Air Transport - Aeroplanes Safety Risk Portfolio

Outcome Percentage of Fatal Accidents (2006-2015)		11				64%	45%	27%	18%	9%	0%	18%	0%
Outcome Percentage of Non-Fatal Accidents (2006-2015)		283				7%	22%	36%	5%	1%	5%	30%	0%
Safety Issues		Total number of occurrences in 2011-2015 per safety issue				Key Risk Areas (Outcomes and precursors)							
		Incidents (ECR data)	Serious Incidents	Total Accidents	Fatal Accidents	Aircraft Upset in Flight	System Failure	Ground Collisions and Ground Handling	Terrain Conflict	Runway Incursions	Fire	Abnormal Runway Contact and Excursions	Airborne Conflict
Technical	Handling and operation of the aircraft following a technical failure	564	15	12	1	■	■	■	■	■	■	■	
	False or disrupted ils signal capture	202	4	—	—	■			■			■	
	Contamination of controls or critical surfaces	177	2	—	—	■		■			■	■	
	Damage tolerance to RPAS collisions	6		—	—	■	■				■	■	■
Consequences	Suitability of recording devices	19	3	5	2	■	■		■		■	■	■
	Survivability and evacuation	18	2	6	1	■	■	■	■	■	■	■	
Human	Personal readiness and crew impairment	1 718	40	1	1	■	■	■	■	■	■	■	■
	Flight crew perception and awareness/ decision making and planning	34	11	5	—	■	■	■	■	■		■	■
	CRM and communication	3 083	17	5	—	■	■	■	■	■	■	■	■
	Monitoring of flight parameters and automation modes	—	5	—	—	■		■	■			■	■
	Knowledge of aircraft systems and use of associated procedures	—	2	—	—	■	■	■	■	■	■	■	■
Organisational	Implementation of reporting systems and safety management	—	2	—	—	■	■	■	■	■	■	■	■
	Oversight of organisations	—	—	—	—	■	■	■	■	■	■	■	■

CAT Aeroplanes – Top Key Risk Areas

Aircraft Upset in Flight (Loss of Control): 64% of fatal accident outcomes involve loss of control, which has been the most frequent accident type in the last 10 years. This risk area also includes events that are direct precursors to a loss of control, such as deviation from flight path, abnormal airspeed or the triggering of stall protections. Below are the actions currently ongoing in the European Plan for Aviation Safety (EPAS) that are related to this key risk area.

EPAS Actions	**Rulemaking**	**RMT.0647**	Loss of control or loss of flight path during go-around or climb
	Rulemaking	**RMT.0397**	Unintended or inappropriate rudder usage — rudder reversals
	Rulemaking	**RMT.0581**	Loss of control prevention and recovery training
	Rulemaking	**RMT.0116**	Real weight and balance of an aircraft
	Rulemaking	**RMT.0118**	Analysis of on-ground wings contamination effect on take-off performance
	Rulemaking	**RMT.0581**	Loss of control prevention and recovery training
	Action on Member States	**MST.004**	Include loss of control in flight in national SSPs
	Safety Promotion	**SPT.012**	Promote the new European provisions on pilot training
	Research project	**RES.005**	Startle effect management

Aircraft System Failure: With 45% of fatal accidents involving technical failures in some way during the past 10 years, this is both a major accident outcome and a precursor to other types of accident. Specific analysis work is ongoing to identify the main, systemic, safety issues that may be present in the domains of airworthiness, maintenance and production.

EPAS Actions	**Rulemaking**	**RMT.0049**	Specific risk and standardised criteria for conducting aeroplane-level safety assessments of critical systems
	Rulemaking	**RMT.0217**	CAMOs' and Part-145 organisations' responsibilities
	Rulemaking	**RMT.0393**	Maintenance check flights (MCFs)
	Rulemaking	**RMT.0453**	Ditching parameters without engine power
	Rulemaking	**RMT.0521**	Airworthiness review process
	Rulemaking	**RMT.0586**	Tyre pressure monitoring system
	Rulemaking	**RMT.0588**	Aircraft continuing airworthiness monitoring — Review of key risk elements
	Rulemaking	**RMT.0671**	Engine bird ingestion
	Rulemaking	**RMT.0686**	HP rotor integrity and loss-of-load (due to shaft failure)

Ground Collisions and Ground Handling: This refers to the collision of an aircraft with other aircraft, obstacles or vehicles while the aircraft is moving on the ground, either under its own power or while being towed. It also includes all ground-handling related issues (aircraft loading, refuelling, etc.). In the last 10 years, 27 % of fatal accidents involved ground collision and other associated ground events. There has been an increasing trend in this area and the subject has featured highly in discussion with Member States at the Network of Analysts and industry at the CAT CAG. A dedicated analysis task will be carried out during 2016 in order to complete the identification of safety issues.

EPAS Actions	**Rulemaking**	**RMT.0116**	Real weight and balance of an aircraft
	Rulemaking	**RMT.0118**	Analysis of on-ground wings contamination effect on take-off performance
	Action on Member States	**MST.018**	Include ground safety in national SSPs
	Action on Member States	**RES.001**	Erroneous weight or centre of gravity
	Research project	**RES.004**	Transport of lithium battery by air

Terrain Conflict (CFIT): This includes the controlled collision with terrain. It comprises those situations where the aircraft collides or nearly collides with terrain while the flight crew has control of the aircraft. It also includes occurrences that are the direct precursors to such outcomes, such as descending below weather minima, undue clearance below radar minima, etc. This risk area is the second-highest contributor to fatal accidents in the last 10 years, accounting for 18% of those accidents.

EPAS ctions	**Rulemaking**	**RMT.0371**	TAWS operation in IFR and VFR and TAWS for turbine-powered aeroplanes under 5 700 kg MTOM able to carry six to nine passengers
	Action on Member States	**MST.006**	Include CFIT in national SSPs

Runway Incursions: This key risk area refers to the incorrect presence of an aircraft, vehicle or person on an active runway or on its protected areas. In the last 10 years, 18% of fatal accidents within the EASA MS involve runway incursions. More detailed analysis of this area is planned for later in 2016 together with the development of safety risk portfolios for ATM and Aerodromes.

EPAS Actions	**Action on Member States**	**MST.014**	Include runway incursions in national SSPs
	Action on Member States	**MST.011**	Runway safety teams
	Action on Member States	**MST.018**	Include ground safety in national SSPs

Abnormal Runway Contact and Excursions: This covers the risk of runway excursions, including the direct precursors such as hard landings, high speed landings, and landings following an unstabilised approach. It also includes the tail, wing, engine nacelle strike during take-off or landing. This risk area represents 9% of the fatal accidents in the last 10 years.

EPAS Actions	**Rulemaking**	**RMT.0296**	Review of aeroplane performance requirements for CAT operations
	Rulemaking	**RMT.0369**	Prediction of wind shear for aeroplane CAT operations (IRs)
	Rulemaking	**RMT.0570**	Reduction of runway excursions
	Rulemaking	**RMT.0116**	Real weight and balance of an aircraft
	Rulemaking	**RMT.0118**	Analysis of on-ground wings contamination effect on take-off performance
	Action on Member States	**MST.007**	Include runway excursions in national SSPs
	Action on Member States	**MST.011**	Include ground safety in national SSPs
	Action on Member States	**MST.018**	Promoting EAPPRE
	Research project	**RES.001**	Erroneous weight or centre of gravity
	Safety Promotion	**SPT.075**	Runway safety teams

Airborne Conflict: This key risk area refers to the potential collision of two aircraft in the air. It includes direct precursors such as separation minima infringements, genuine TCAS resolution advisories or airspace infringements. Although there have been no CAT Aeroplane airborne collision accidents in recent years within the EASA MS, this key risk area has been identified by members of the Network of Analysts and by some airlines, specifically in the context of the collision risk relating to the operation of aircraft without transponders in uncontrolled airspace.

EPAS Actions	**Rulemaking**	**RMT.0376**	Carriage of ACAS II equipment on aircraft other than aeroplanes in excess of 5 700 kg or 19 pax
	Rulemaking	**RMT.0445**	Technical requirements and operational procedures for airspace design, including procedure design
	Rulemaking	**RMT.0464**	Requirements for air traffic services
	Rulemaking	**RMT.0477**	Technical requirements and operational procedures for aeronautical information services and aeronautical information management
	Action on Member States	**MST.010**	Include MACs in national SSPs
	Action on Member States	**MST.024**	Loss of separation between civil and military aircraft
	Safety Promotion	**SPT.052**	Promote the deployment of ground-based safety nets
	Safety Promotion	**SPT.053**	Study the performance and promote safe operations of airborne safety nets
	Safety Promotion	**SPT.070**	Ground-based ATM safety nets

Fire: While there were no fatal accidents involving EASA MS operators in the last 10 years where fire was a contributing factor, there have been occurrences in other parts of the world that make it an area of concern within the EPAS.

Rulemaking Programme	**Requirements**	**RMT.0071**	Additional airworthiness specifications for operations: Thermal/acoustic insulation material
EPAS Actions	**Action on Member States**	**MST.005**	Include fire, smoke and fumes in national SSPs
	Safety Promotion	**SPT.069**	Transportation of lithium batteries
	Research project	**RES.002**	Research study on toxicity
	Research project	**RES.003**	Research study on cabin Air quality
	Research project	**RES.004**	Transport of lithium battery by air

CAT Aeroplanes – Priority Safety Issues

Operational Safety Issues

- Detection, recognition and recovery from normal operations
- Operation in adverse weather conditions
- Calculation and entry of take-off and landing parameters into aircraft systems
- Handling and operation of the aircraft following a technical failure
- Maintaining adequate separation between aircraft (in the air and on the ground)
- Ground-handling operations
- Prevention and resolution of conflict with aircraft not fitted with transponders

Human Factors Safety Issues

- Planning, personal readiness and crew impairment
- Flight crew perception and awareness
- CRM and communication

Organisational Safety Issues:

- Implementation of reporting systems and safety management
- Oversight of organisations



Non-Commercial Operations – Aeroplanes

This Section covers non-commercial operations involving fixed-wing aeroplanes where the state of registry was an EASA MS. It also includes flight training and other non-commercial activities. In the beginning of autumn 2016, a CAG will be established for non-commercial operations – aeroplanes. Once established, it will support the continued identification of safety issues and aid the Agency in performing safety-risk assessments for each of the identified safety issues in the portfolio.

Key Statistics: The key domain statistics are in the tables below. The number of fatal accidents was slightly below the 10-year average, while the number of non-fatal accidents was significantly lower. In terms of fatalities, there were 14 less fatalities than the 10-year average and also a lower number of serious injuries.

	Fatal Accidents	Non-Fatal Accidents	Serious Incidents
2005-2014 Annual average	42.2	338.0	21.7
2015	41	279	18

	Fatalities	Serious Injuries
2005-2014 Annual average	79	43.9
2015	65	36

Non-Commercial Operations - Aeroplanes Safety Risk Portfolio

Outcome percentage of fatal accidents (2006-2015)		199				47%	15%	9%	6%	3%	3%	1%	1%
Outcome percentage of non-fatal accidents (2006-2015)		1.643				8%	1%	17%	2%	19%	4%	25%	12%
Safety Issues		Total number of occurrences in 2011-2015 per safety issue				Key Risk Areas (Outcomes)							
		Incidents (ECR data)	Serious Incidents	Total Accidents	Fatal Accidents	Aircraft Upset in Flight	Terrain Conflict	Engine Failure	Airborne Conflict	Other System Failures	Obstacle Conflict	Abnormal Runway Contact and Excursions	Aircraft Upset on Ground
Operational	Detection, recognition and recovery of deviation from normal operations	45	10	372	84	■	■				■	■	■
	Maintaining adequate separation between aircraft on the ground and in the air	1 347	32	308	26	■			■				
	Operation in adverse weather conditions	120	7	190	24	■	■	■	■	■	■	■	■
	Intentional low flying	16	1	18	11	■	■				■		
	Pre-flight preparation/ planning and in-flight re-planning	72	3	44	8	■	■	■	■	■	■	■	■

Non-Commercial Operations - Aeroplanes Safety Risk Portfolio

Outcome percentage of fatal accidents (2006-2015)		199				47%	15%	9%	6%	3%	3%	1%	1%
Outcome percentage of non-fatal accidents (2006-2015)		1.643				8%	1%	17%	2%	19%	4%	25%	12%
Safety Issues		Total number of occurrences in 2011-2015 per safety issue				Key Risk Areas (Outcomes)							
		Incidents (ECR data)	Serious Incidents	Total Accidents	Fatal Accidents	Aircraft Upset in Flight	Terrain Conflict	Engine Failure	Airborne Conflict	Other System Failures	Obstacle Conflict	Abnormal Runway Contact and Excursions	Aircraft Upset on Ground
Operational	Aircraft loading and balance	—	—	4	2	■						■	
	Hard landings due to incorrect action and perception of the situation	46	5	225	1	■					■	■	■
	Unstabilised approach	8	2	39	1	■	■				■	■	■
	Aircraft maintenance	21	3	11	1	■	■	■	■	■	■	■	■
	Prevention and resolution of conflict with aircraft not fitted with transponders	26	2	2	1	■			■				
	Control of manual aircraft flight path	—	—	29	—	■	■		■		■	■	■
	Birdstrikes	112	1	12	—	■		■		■		■	■
Technical	Diagnosis and management of engine failures in flight	25	4	25	2	■	■	■		■		■	■
	Management of landing gear system malfunctions	374	16	385						■		■	■
Human	Flight crew perception and awareness decision making and planning	—	4	59	7	■	■	■	■	■	■	■	■
	Use and adequacy of rules and procedures (incl. Checklists)	—	1	12	1	■	■	■	■	■	■	■	■
	Knowledge and competency of individuals	—	—	22	—	■	■	■	■	■	■	■	■
	Pressure during operation	—	—	3	—	■	■	■	■	■	■	■	■
	Navigation during operation	53	2	—	—		■		■		■		

Non-Commercial Operations – Aeroplanes – Top Key Risk Areas

Aircraft Upset (Loss of Control): With 47%, loss of control is the most common type of accident outcome in the last 10 years for non-commercial operations with aeroplanes. Loss of control is the area of greatest focus for future work in this domain of operations.

Terrain Conflict (CFIT): CFIT was the second most common accident outcome in the last 10 years with 14.7% and continues to present a significant safety challenge in this domain of operations.

Engine Failure: This is the third most frequent type of fatal accident outcome in the last 10 years with 9.1%.

Airborne Conflict: This is the fourth most common type of fatal accident outcome in the last 10 years with 5.5%. As well as the specific operational Safety Issue identified below, some HF Safety Issues are closely related to airborne conflict.

Non-Commercial Operations Aeroplanes – Priority Safety Issues

Operational Safety Issues

- Detection, recognition and recovery from normal operations
- Operation in adverse weather conditions
- Maintaining adequate separation with aircraft (in the air and on the ground)
- Pre-flight preparation/planning and in-flight re-planning

Human Factors Safety Issues

- Flight crew perception and awareness
- Use and adequacy of rules and procedures
- Knowledge and competency of individuals

Non-Commercial Operations Aeroplanes – Related Safety Actions

EPAS Actions	**Rulemaking**	**RMT.0498**	Reorganisation of Part 23 and CS-23
	Rulemaking	**RMT.0547**	Task force for the review of Part-M for General Aviation
	Rulemaking	**RMT.0657**	Training outside ATOs
	Rulemaking	**RMT.0677**	Easier access of General Aviation pilots to IFR flying
	Rulemaking	**RMT.0678**	Addressing other FCL GA issues
	Action on Member States	**MST.016**	Airspace infringement risk in General Aviation
	Action on Member States	**MST.017**	Safety of transportation of dangerous goods in GA
	Safety Promotion	**SPT.044**	Improve General Aviation safety in Europe through risk awareness and safety promotion.

Gliders

This section covers glider/sailplane operations where the state of registry is an EASA MS.

Key Statistics: The key statistics for gliders are in the tables below. There were slightly higher numbers of fatal glider accidents and fatalities in 2015 with 24 fatal accidents and 27 fatalities. The number of non-fatal accidents was slightly lower than the 10-year average with 156. There was a slight increase in the number of serious injuries with 36.

	Fatal Accidents	Non-Fatal Accidents	Serious Incidents
2005-2014 Annual average	22.3	166.0	1.3
2015	24	156	2

	Fatalities	Serious Injuries
2005-2014 Annual average	25.9	27.5
2015	27	36

Gliders – Top Key Risk Areas

Aircraft Upset (Loss of Control): This type of accident outcome is by far the most significant type of fatal accident over the past 10 years with 52%.

Gliders - Priority Safety Issues

- Unstabilised approaches and detection
- Recognition and recovery from normal operations

Glider Operations – Related Safety Actions

EPAS Actions	**Rulemaking**	**RMT.0698**	Revision of the operational rules for sailplanes
	Safety Promotion	**SPT.044**	Improve General Aviation safety in Europe through risk awareness and safety promotion.

Glider Safety Risk Portfolio

Outcome Percentage of Fatal Accidents (2011-2015)		121				52%	8%	7%	6%	4%	3%	0%	0%
Outcome Percentage of Non-Fatal Accidents (2011-2015)		963				11%	3%	8%	8%	2%	32%	0%	0%
Safety Issues		Total number of accidents in 2011-2015 per safety issue				Key Risk Areas (Outcomes)							
		Incidents (ECR data)	Serious Incidents	Total Accidents	Fatal Accidents	Aircraft Upset in Flight	Terrain Conflict	Glider Towing Events	Other System Failures	Airborne Conflict	Abnormal Runway Contact and Excursions	Obstacle Conflict	Aircraft Upset on Ground
Operational	Forced landings	318	16	1 010	105	■	■	■	■	■	■	■	■
	Detection, recognition and recovery of deviation from normal operations	25	3	257	61	■	■	■			■	■	■
	Maintaining adequate separation between aircraft on the ground and in the air	123	6	168	16	■		■		■			
	Operation in adverse weather conditions	13	1	59	7	■	■	■		■	■	■	■
	Intentional low flying	—	1	21	4	■	■				■	■	
	Handling and operation of the aircraft following a technical failure	—	2	14	2	■	■	■	■		■	■	■
	Birdstrikes	—	—	4	1	■					■		■
	Control of manual aircraft flight path	—	—	5	—	■	■				■	■	■
	Pre-flight preparation/ planning and in-flight re-planning	9	—	5	—	■	■	■		■	■	■	
	Aircraft maintenance	—	1	2	—	■	■	■	■	■	■	■	■
Technical	Tow rope disconnects and launch cable failures	—	1	21	4	■		■					
	Management of landing gear system malfunctions	—	—	7	—				■		■		■
Human	Personal readiness and crew impairment	38	—	22	4	■	■	■	■	■	■	■	■
	Flight crew perception and awareness/ decision making and planning	—	—	16	4	■	■	■		■	■	■	■
	Use and adequacy of rules and procedures	—	—	4	1	■	■	■	■	■	■	■	■
	Knowledge and competency of individuals	—	—	5	—	■	■	■	■	■	■	■	■



Aerial Work/ Part SPO Aeroplanes

This chapter covers all aerial work/Part SPO operations involving EASA MS registered aeroplanes (except gliders/ sailplanes) and includes all mass groups.

Key Statistics: There was the same number of fatal accidents in 2015 when compared to the 10-year average and there was also a lower number of non-fatal accidents. There was an airborne collision between two LET-410 aircraft involved in parachuting operations in Slovakia that resulted to seven fatalities while the Shoreham Air Show accident in the United Kingdom resulted in 11 ground fatalities.

	Fatal Accidents	Non-Fatal Accidents	Serious Incidents
2005-2014 Annual average	7	23.5	4.3
2015	7	22	6

Aerial Work/Part SPO - Aeroplane Safety Risk Portfolio

Outcome Percentage of Fatal Accidents (2011-2015)		34				50%	21%	4%	2%	2%	2%	2%	0%	0%
Outcome Percentage of Non-Fatal Accidents (2011-2015)		121				11%	8%	17%	19%	8%	6%	2%	17%	17%
Safety Issues		Total number of occurrences in 2011-2015 per safety issue				Key Risk Areas (Outcomes)								
		Incidents (ECR data)	Serious Incidents	Total Accidents	Fatal Accidents	Aircraft Upset in Flight	Airborne Conflict	Engine Failure	Other System Failure	Obstacle Conflict	Glider Towing	Terrain Conflict	Abnormal Runway Contact and Runway Excursions	Aircraft Upset on Ground
Operational	Detection, recognition and recovery of deviation from normal operations	5	2	39	17	■	■			■	■	■	■	■
	Maintaining adequate separation between aircraft on the ground and in the air	132	9	35	11		■							
	Safe forced landings	11	4	32	1	■	■	■	■	■	■	■	■	
	Control of manual aircraft flight path	—	—	2	1	■	■			■		■	■	■
	Intentional low flying	—	—	2	1	■				■		■	■	
	Operation in adverse weather conditions	15	3	9	—	■		■		■	■		■	■

Aerial Work/Part SPO - Aeroplane Safety Risk Portfolio

Outcome Percentage of Fatal Accidents (2011-2015)		34				50%	21%	4%	2%	2%	2%	2%	0%	0%
Outcome Percentage of Non-Fatal Accidents (2011-2015)		121				11%	8%	17%	19%	8%	6%	2%	17%	17%
Safety Issues		Total number of occurrences in 2011-2015 per safety issue				Key Risk Areas (Outcomes)								
		Incidents (ECR data)	Serious Incidents	Total Accidents	Fatal Accidents	Aircraft Upset in Flight	Airborne Conflict	Engine Failure	Other System Failure	Obstacle Conflict	Glider Towing	Terrain Conflict	Abnormal Runway Contact and Runway Excursions	Aircraft Upset on Ground
Operational	Aircraft maintenance	4	1	4	—	■	■	■	■	■	■	■	■	■
	Pre-flight preparation/ planning and in-flight re-planning	5	—	4	—	■	■	■	■	■	■	■	■	■
	Fuel management	—	—	2	—	■		■	■	■	■	■	■	
	Birdstrikes	15	1	—	—	■		■	■				■	
Technical	Handling and operation of the aircraft following a technical failure	1	—	6	1	■		■	■	■		■	■	■
	Management of landing gear system malfunctions	31	2	21	—	■			■				■	■
	Engine reliability	3	1	8	—	■		■						
Human	Flight crew perception and awareness decision making and planning	—	—	5	2	■	■			■		■	■	■
	Use and adequacy of rules and procedures	—	1	1	1	■	■	■	■	■	■	■	■	■
	Personal readiness and crew impairment	19	1	3	—	■	■	■	■	■	■	■	■	■
	Knowledge and competency of individuals	—	—	1	—	■	■	■	■	■	■	■	■	■

Aerial Work/Part SPO Aeroplanes – Top Key Risk Areas

Aircraft Upset: This type of accident outcome is the most significant type of fatal accident in Part SPO Aeroplanes over the last 5 years, accounting for 50% of fatal accidents.

Airborne Conflict: The second most frequent type of accident outcome in Part SPO – Aeroplanes over the last 5 years is airborne conflict, accounting for 21% of accidents, predominately occurring during air shows and parachuting operations.

Aerial Work/Part SPO Aeroplanes – Priority Safety Issues

- **Operational Safety Issues:** Detection, recognition and recovery from normal operations, maintaining adequate separation with aircraft (in the air and on the ground) and operations in adverse weather conditions,
- **Human Factors Safety Issues:** Planning, personal readiness and crew impairment and flight crew perception and awareness.

Aerial Work/Part SPO Aeroplanes – Related Safety Actions

EPAS Actions	**Rulemaking**	**RMT.0340**	Standard operating procedures and specific requirements/alleviations for specialised operations



Non-Commercial Operations Helicopters

This final section covers non-commercial operations involving both helicopter and gyrocopters, where the state of registry was an EASA MS.

Key Statistics: The key domain statistics are in the tables below. There were six fatal accidents in 2015, compared with the 10-year average of 8.2. There was also a lower number of non-fatal accidents than the 10-year average.

	Fatal Accidents	Non-Fatal Accidents	Serious Incidents
2005-2014 Annual average	8.2	47.1	0.7
2015	6	34	2

Non-Commercial Operations - Helicopter Safety Risk Portfolio

Outcome Percentage of Fatal Accidents (2006-2015)		42				44%	10%	10%	9%	9%	4%	3%	0%
Outcome Percentage of Non-Fatal Accidents (2006-2015)		243				34%	2%	2%	14%	10%	5%	2%	14%
Safety Issues		Total number of occurrences in 2011-2015 per safety issue				Key Risk Areas (Outcomes)							
		Incidents (ECR data)	Serious Incidents	Total Accidents	Fatal Accidents	Aircraft Upset in Flight	Terrain Conflict	Engine Failure	Other system failures	Abnormal Runway Contact and Excursions	Obstacle Conflict	Airborne Conflict	Aircraft Upset on Ground
Operational	Detection, recognition and recovery of deviation from normal operations	10	1	122	14	■	■			■	■	■	■
	Operation in adverse weather conditions	6	—	44	12	■	■	■	■	■	■	■	■
	Intentional low flying	—	—	23	8	■					■		
	Maintaining adequate separation between aircraft on the ground and in the air	128	3	35	4	■						■	
	Wirestrikes	—	—	15	4	■	■				■		
	Safe forced landings	6	—	30	3	■	■	■	■	■	■	■	■
	Handling and operation of the aircraft following a technical failure	—	—	3	2	■	■			■	■	■	■
	Pre-flight preparation/ planning and in-flight re-planning	7	—	5	2	■	■	■	■	■	■	■	
	Control of manual aircraft flight path	—	—	3	—	■	■			■	■		■
	Aircraft maintenance	—	—	1	—	■	■	■	■	■	■	■	■

Non-Commercial Operations - Helicopter Safety Risk Portfolio

Outcome Percentage of Fatal Accidents (2006-2015)		42				44%	10%	10%	9%	9%	4%	3%	0%
Outcome Percentage of Non-Fatal Accidents (2006-2015)		243				34%	2%	2%	14%	10%	5%	2%	14%
Safety Issues		Total number of occurrences in 2011-2015 per safety issue				Key Risk Areas (Outcomes)							
		Incidents (ECR data)	Serious Incidents	Total Accidents	Fatal Accidents	Aircraft Upset in Flight	Terrain Conflict	Engine Failure	Other system failures	Abnormal Runway Contact and Excursions	Obstacle Conflict	Airborne Conflict	Aircraft Upset on Ground
Technical	Diagnosis and management of engine failures in flight	—	—	2	—	■	■	■	■	■	■	■	
Human	Personal readiness and crew impairment	58	—	17	2	■	■	■	■	■	■	■	■
	Knowledge and competency of individuals	—	—	3	1	■	■	■	■	■	■	■	■
	Flight crew perception and awareness decision making and planning	—	—	2	1	■	■			■	■	■	■

Non-Commercial Operations Helicopters – Top Key Risk Areas

Aircraft Upset (Loss of Control): With 44%, aircraft upset is the most common type of accident outcome in non-commercial helicopter operations.

Terrain Conflict (CFIT): This type of accident outcome is the second most significant type of fatal accident in the last 10 years and occurred was the case in 10% of fatal accidents.

Engine and Other System Failures: Engine and other system failures were the third and fourth most frequent accident outcomes over the last 10 years, each accounting for 9%.

Non-Commercial Operations - Helicopter Safety Risk Portfolio

- **Operational Safety Issues:** Detection, recognition and recovery of deviation from normal operations, operations in adverse weather conditions and intentional low flying.
- **Human Factors Safety Issues:** Planning, personal readiness and crew impairment and flight crew perception and awareness.

Safety Risk Management, Annual Safety Review and the European Plan for Aviation Safety

In order to improve aviation safety in Europe it is vital that the output of the safety analysis process is used to support the data-driven approach in the identification and prioritisation of actions for the European Plan for Aviation Safety (EPAS). The safety risk portfolios, as described in this review, are the result of the analysis process and highlight both the key risk areas (outcomes) and safety issues within each operational domain. These safety risk portfolios are the analysis output from the Safety Risk Management (SRM) process. This process involves EASA, Member States and industry through a range of advisory and collaborative-group activities.



The 5 steps of the Safety Risk Management Cycle include:

1. The identification of safety issues (or hazards) that affect the European aviation system;

2. The assessment of safety issues (or hazards), which aims at assessing the risks associated with the consequences of the safety issues (or hazards) identified in the previous phase;

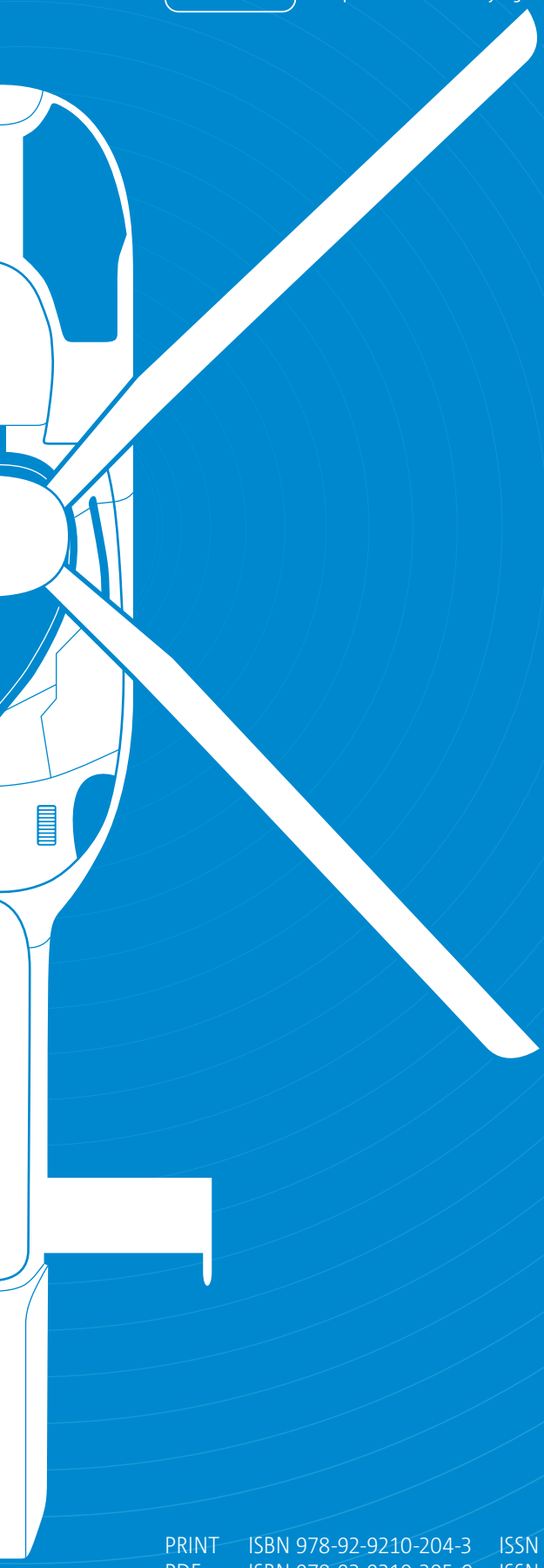
3. The definition and programming of safety actions seeking to identify strategies (or mitigation actions) to address those issues (or hazards) whose level of risk cannot be tolerated following the assessment;

4. The implementation and follow-up of safety actions aimed at tracking the status of and report on the agreed strategies; and

5. Safety Performance aimed at reviewing identified risk areas to assess if the risks previously identified have been mitigated and to compare them with safety performance indicators.



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