ICAO

SAFETY

Safety Report

2018 Edition

A Coordinated, Risk-based Approach to Improving Global Aviation Safety

The air transport industry plays a major role in global economic activity and development. One of the key elements to maintaining the performance of civil aviation is to ensure safe, secure, efficient and sustainable operations at the global, regional and national levels.

A specialized agency of the United Nations, the International Civil Aviation Organization (ICAO) was established in 1944 to promote the safe and orderly development of international civil aviation throughout the world.

ICAO promulgates Standards and Recommended Practices (SARPs) to facilitate harmonized regulations in aviation safety, security, efficiency and sustainability on a global basis. ICAO serves also as the primary forum for co-operation in all fields of civil aviation among its 192 Member States.

Improving the safety of the global air transport system is ICAO's guiding and most fundamental strategic objective. The Organization works constantly to address and enhance global aviation safety through the following coordinated activities and targets outlined in its Global Aviation Safety Plan (GASP) (https://www.icao.int/safety/Pages/GASP.aspx).

- Policy and Standardization.
- Monitoring of key safety trends and indicators.
- Safety Analysis.
- Implementing programmes to address safety issues.

The GASP initiatives are monitored by ICAO's appraisal of global and regional aviation safety metrics on the basis of established risk management principles—a core component of contemporary State Safety Programmes (SSP) and Safety Management Systems (SMS). In all of its coordinated safety activities, ICAO strives to achieve a balance between assessed risk and the requirements of practical, achievable and effective risk mitigation strategies.

This report provides a high level summary on safety initiatives and updates on safety indicators, including accidents that occurred in 2017, and related risk factors. Results of analysis from the 2013–2017 reports are used as benchmarks for comparison, although it must be noted that numbers presented in this report may not exactly match those of the earlier reports due to the data having been updated in the intervening period.

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Note:

The ICAO RASG regions are used in the report and are listed in Appendix 2. This document focuses primarily on scheduled commercial flights. The scheduled commercial flights data was based on the Official Airline Guide (OAG) combined with internal ICAO preliminary estimates.

Contents

Executive Summary

In 2017, there were 4.1 billion passengers travelling by air worldwide. With a total of 50 fatalities for scheduled commercial departures, the year of 2017 had a global fatality rate of 12.2 fatalities per billion passengers, representing the safest year ever on the record for aviation.

The year-over-year accident statistics indicate an increase in both the total number of accidents as well as the accident rate. In 2017, the number of accidents increased by 17 per cent comparing to 2016 with 88 accidents reported by States. With scheduled commercial international and domestic operations accounting for approximately 36.6 million departures, around 5 per cent increase from 2016, the global accident rate also increased by 12 per cent, from 2.1 accidents per million departures in 2016 to 2.4 accidents per million departures in 2017. The accidents in these statistics, involving aircraft with a certificated maximum take-off weight (MTOW) of over 5700 kg as defined in ICAO Annex 13, were reviewed by the ICAO Safety Indicators Study Group (SISG).

In 2017, there were 50 fatalities for the scheduled commercial departures, which represents a substantial reduction from 182 in 2016 and the lowest level on the record of the past ten years. The number of fatal accidents decreased to 5 from 7 in 2016, which is also the lowest on the recent record. Despite a spike in fatalities due to a number of acts of unlawful interference in 2014 and the tragic events which caused significant loss of life in 2015, there was a general trend of lower number of fatal accidents and fatalities in the past ten years.

Chart 1-a: Accident Records: 2013–2017 Scheduled Commercial Flights

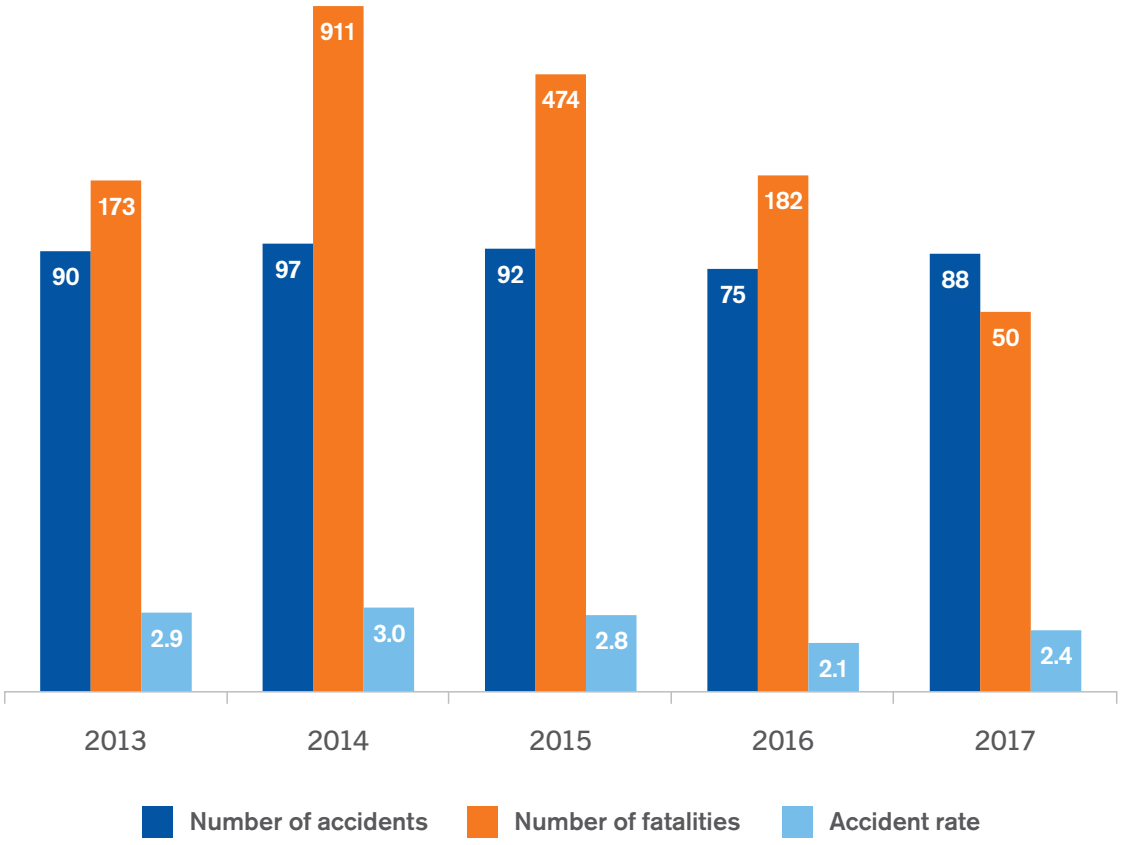


Chart 1-b: Historical Fatality Records for Scheduled Commercial Flights

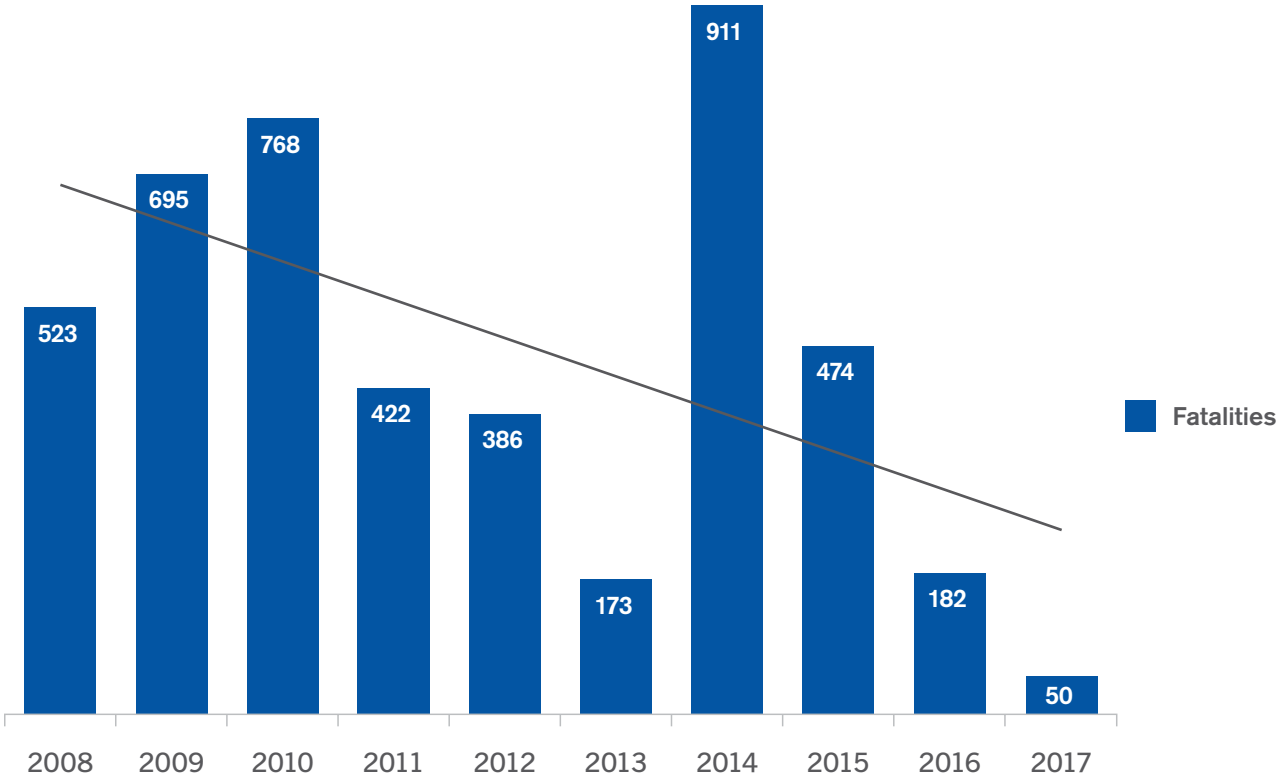
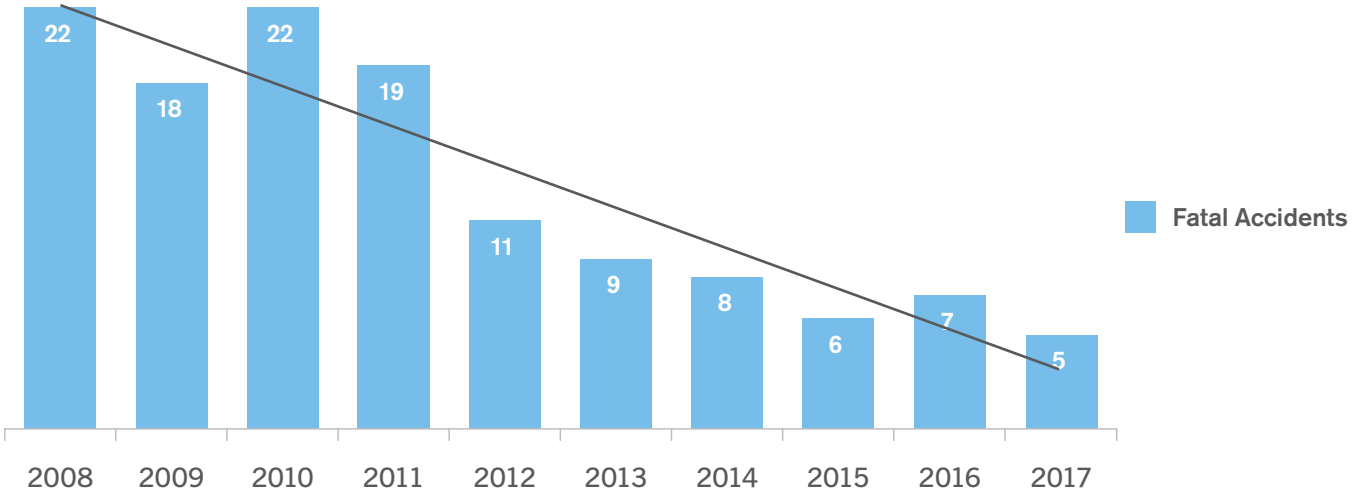


Chart 1-c: Historical Fatal Accident Records for Scheduled Commercial Flights



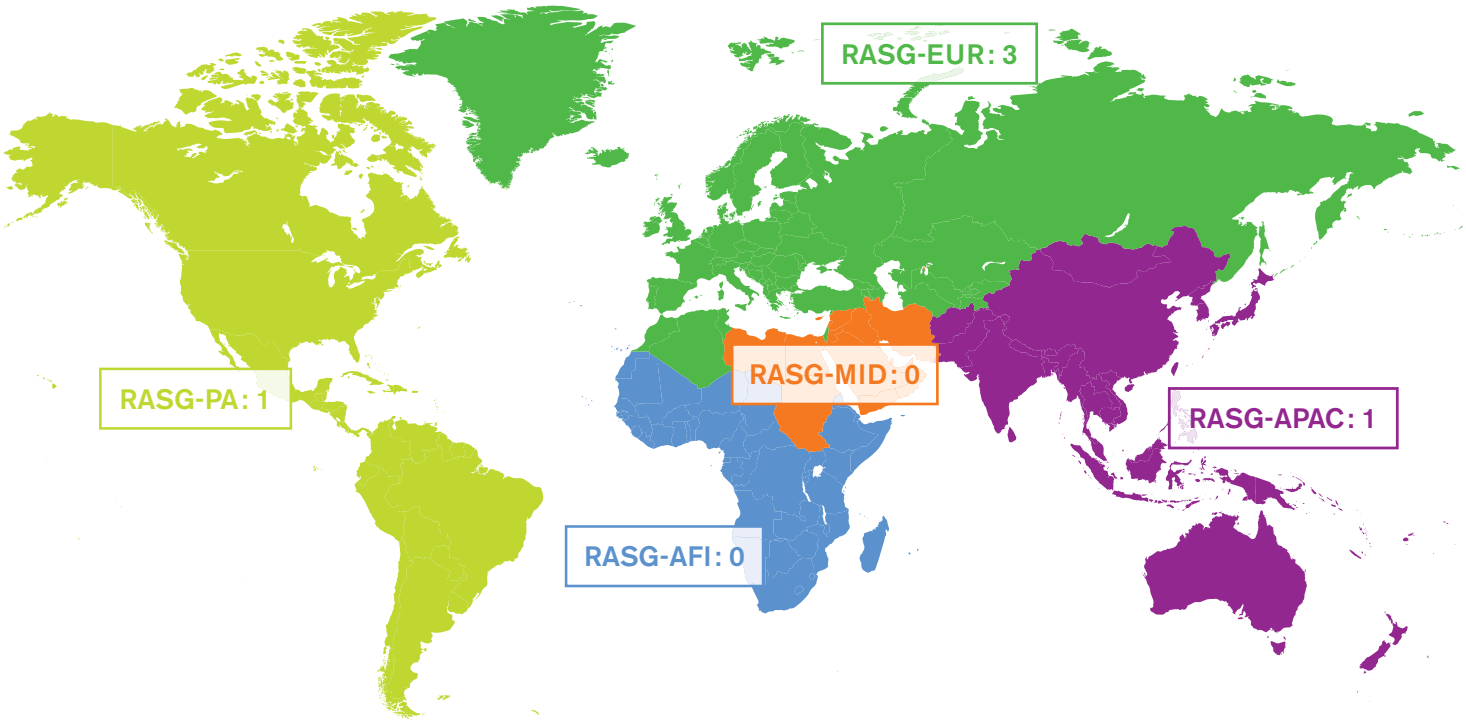
ICAO remains focused on its safety priorities which include Runway Safety, Controlled Flight into Terrain (CFIT), Loss of Control-Inflight (LOC-I) while continuing to promote the development and implementation of new safety initiatives.

ICAO is committed to improving aviation safety and enabling seamless cooperation and communication among stakeholders. ICAO continues to collaborate with established regional bodies/organizations, such as Regional Aviation Safety Groups (RASGs), Regional Safety Oversight Organizations (RSOOs) and Regional Accident and Incident Investigation Organizations (RAIOs), and to promote and develop the capacity building and implementation support necessary to address emerging safety issues.

The small growth in traffic experienced in 2017, when combined with the increase in the number of accidents, resulted in a global accident rate of 2.4 accidents per million departures—up 12 per cent compared to the previous year, which is still one of the lowest rate on record. As shown in the figure below, the RASG-AFI and RASG-MID did not have any fatal accidents in 2017. The RASG-APAC and RASG-PA each experienced a single fatal accident and the RASG-EUR had 3.

The ICAO Universal Safety Oversight Audit Programme (USOAP) Continuous Monitoring Approach (CMA) measures the implementation of Standards and Recommended Practices (SARPs) and Procedures for Air Navigation Services (PANS). The global average Effective Implementation (EI) increased from 64.7 per cent in 2016 to 65.5 per cent in 2017, and 69.19 per cent of the States have achieved the target of 60 per cent EI, as suggested by the Global Aviation Safety Plan (GASP) 2017–2019 edition. In 2017, the number of Significant Safety Concerns (SSCs) was halved from 8 in 8 States in 2016 to 4 in 4 States.

ICAO is working in partnership with the international aviation community to achieve future safety improvements, with an emphasis on improving safety performance through standardization, monitoring and implementation. This report provides a high level summary of ICAO's safety initiatives and achievements to enhance aviation safety in 2017 and key safety performance indicators with reference to the 2013–2017 time period.



Policy and Standardization

Aviation safety is at the core of ICAO's strategic objectives. The establishment and maintenance of international Standards and Recommended Practices (SARPs), as well as Procedures for Air Navigation Services (PANS), are fundamental tenets of the Convention on International Civil Aviation (Chicago Convention) and a core aspect of ICAO's mission and role. States should consistently increase the level of compliance with SARPs and promote the implementation of SARPs to further improve safety performance.

Today, ICAO manages over 12,000 SARPs across the 19 Annexes to the Convention and 5 PANS, many of which are constantly evolving in concert with latest developments and innovations. The development of SARPs and PANS follows a structured, transparent and multi-staged process—often known as the ICAO *"amendment process"* or *"standards-making process"*—involving a number of technical and non-technical bodies which are either within the Organization or closely associated with ICAO. Amendments made during 2016–2017 involved Annexes 1, 2, 3, 4, 6 (Volumes I, II, III), 8, 10 (Volumes I, II, IV), 11, 13, 14 (Volumes I, II), 15, which were adopted by ICAO Council during the Safety Week in March 2018. Details about the amendments for the above mentioned Annexes are shown in Table 1. More information about ICAO Annexes can be found in Appendix 5.

To ensure all new or amended SARPs and PANS will be effective and practical for end-users, the ICAO Air Navigation Commission (ANC) works through established panels of experts in various disciplines. It also takes advantage of the expertise within States and international organizations to develop its technical proposals. Each ANC panel is supported by the ICAO Secretariat with the appointment of a Secretary, while their respective Chairpersons are elected from amongst the panel membership. ICAO works in collaboration with States and industry partner organizations to deliver a coordinated, harmonized, safe and efficient international civil aviation system. The full list of current ANC panels can be found in Appendix 6. Chart 2 below indicates the participation in all the ANC panels from States and industry organizations in 2017.

There were in total 398 panel Members and 346 advisers from 61 States, which account for 31.8 per cent of ICAO's 192 Member States, and 146 panel Members and 123 advisers from 35 international organizations participating in all the ANC panels in 2017. More information about the panel memberships can be found in Appendix 7.

Chart 2: Participation in the ANC Panels from States and Organizations

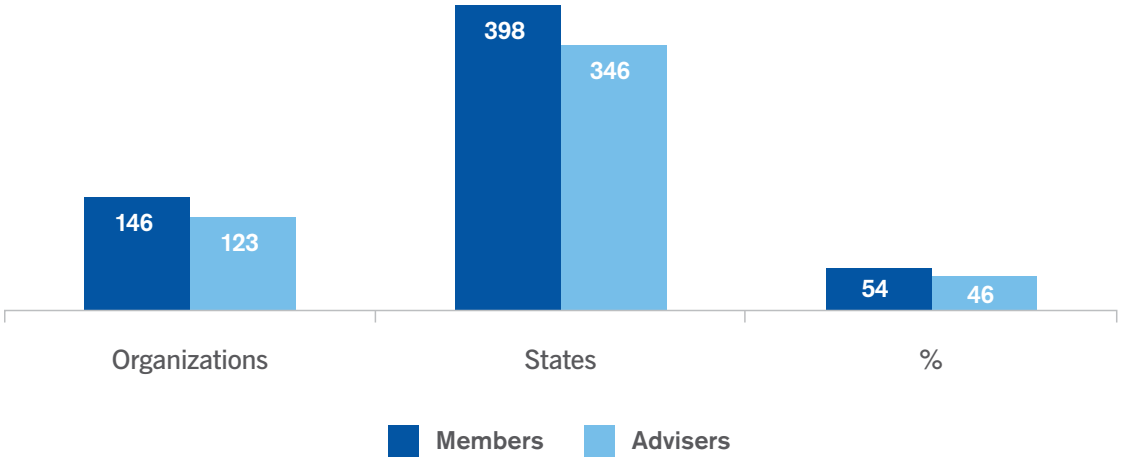


Table 1: 2018 Annex Amendments

TOPICS	AFFECTED		APPLICABILITY
	ANNEX	OTHER	
Introduction of remote pilot licence and the provision for the regulation of RPAS licensing to support international flights operating under IFR	1		3–Nov–2022*
Amendment as a result of proposed amendments to Annex 1 relating to RPAS	2		08–Nov–18 (2022*)
Consequential amendment concerning change of references related to the provision of aeronautical information service	3		08–Nov–2018
Introduction of space weather advisory information services; improvement of the provision of SIGMET information by meteorological watch offices (MWOS); information on the release of radioactive material into the atmosphere; SIGMET and AIRMET information; modifications of IWXXM representations of information; and aeronautical meteorological personnel qualification and competency, education and training	3		08–Nov–2018 (2019*) (2020*)
Consequential amendment to address the revised definition and description of "Procedure altitude/height"	4		08–Nov–2018
Airborne image recordings, flight data recorder parameter lists and the simplification of flight recorder SARPs	6 (I, II, III)		1–Jan–2023*
Amendment as a result of the restructuring of PANS-OPS, Vol I	2, 6 (I, II, III)		08–Nov–2018
Approval and global recognition of AMOs (Phase I and II) and provisions linked to EAMR framework	1, 6 (I, II, III), 8		5–Nov–2020*
Guidance on rescue and fire-fighting (RFFS) and helicopter refueling	6 (I and III)		08–Nov–2018
Harmonization and alignment of fatigue management SARPs	6 (I and III)		08–Nov–2018
Security of flight crew compartment	6 (I)		08–Nov–2018
Halon replacement in civil aircraft cargo compartment fire suppression systems	8		28–Nov–2024*
Continuing airworthiness SARPs concerning: Suspension and revocation of Type Certificate; Security Sensitive Airworthiness Directives; transfer and suspension and revocation of a type certificate; and Eligibility, issuance and continued validity of a Certificate of Airworthiness	8		08–Nov–2018
Design Standards for light aircraft under 750 kg; applicability of Annex 8, Part IIIB to single-engine aeroplanes over 5 700 kg; stall warning Standards; and Standards for the applicability of weight limitations for all aircraft for cargo compartment protection.	8		(28–Nov–2021*)
Global navigation satellite system (GNSS) and instrument landing system (ILS)	10 (I)		08–Nov–2018
Ground-based augmentation system (GBAS), satellite-based augmentation system (SBAS) and the strategy for introduction and application of non-visual aids to approach landing	10 (I)		08–Nov–2018
Radiotelephony procedures	10 (II)		08–Nov–2018
Surveillance and airborne collision avoidance systems (ACAS)	10 (IV)		08–Nov–2018
Access to evidential material during investigation and monitoring the progress of safety recommendations	13		08–Nov–2018
Modifications of aerodrome design specifications in Chapters 3 and 4	14 (I)		08–Nov–2018
Restructure of Annex 15 to facilitate incorporation of AIM requirements and changes to the technical content of Annex 15 to facilitate the transition from AIS to AIM environments	15	4, 6 (I), 10 (I, II), 11, 14 (I, II)	08–Nov–2018 (2020*)
Space weather information	15		08–Nov–2018

*Related topics contain embedded applicability dates

Safety Implementation

Implementation of the 2017–2019 Edition of the GASP

The Global Aviation Safety Plan (GASP) is ICAO's top strategic safety document. The GASP, including the global aviation safety roadmap, serves as an action plan to assist the aviation community in achieving the objectives presented in the Plan, through a structured, common frame of reference for all relevant stakeholders. The 2017–2019 edition of the GASP has three main objectives as shown in Figure 1:

1) All States to reach an effective implementation (EI) score of 60 per cent for the eight critical elements (CEs) of a safety oversight system by the end of 2017;
2) All States to implement a State Safety Programme (SSP) by 2022; and
3) All States to implement advanced safety oversight systems, including predictive risk management by 2028.

Figure 1: GASP 2017–2019 Objectives

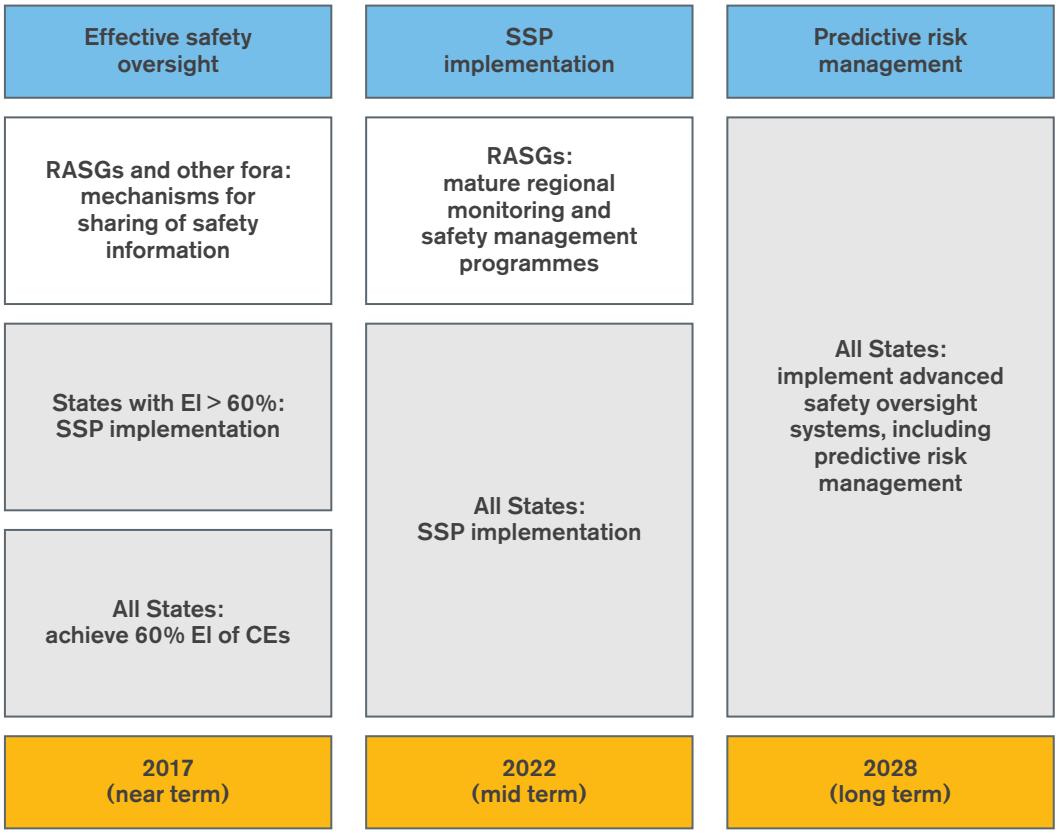
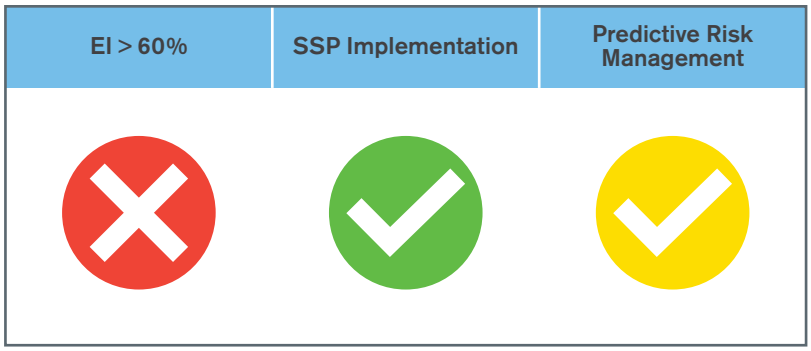


Figure 2 illustrates the implementation status of 2017–2019 edition of the GASP as of 31 May 2018. For the first objective on effective implementation of safety oversight, 69.19 per cent of States are above 60 per cent EI and the global average EI score sits at 65.51 per cent. Despite the marked trend of improvement, the first objective was not met by the end of 2017. For the second objective on SSP implementation, 85 per cent of all States with EI higher than 60 per cent (122 States) have started implementing their SSP. 37 per cent (46 States) have established a plan for SSP implementation and 3 States have declared that they have fully implemented an SSP. Based on this data, this objective is on track. For the third objective on predictive risk management, States struggle to achieve this as a standalone goal, mainly because it requires full SSP implementation. A proposal was made to merge this objective into the SSP one (not as standalone) for the 2020–2022 edition of the GASP, since it is part of implementing an SSP. So there are some difficulties in achieving this objective.

Figure 2: Implementation Status of the 2017–2019 Edition of the GASP



The Global Aviation Safety *Programme* (GAS*p*) is the ICAO programme which enables the Organization to achieve its strategic objective on safety and provides a structured approach for the implementation and monitoring of the GASP, its associated roadmap and supporting safety initiatives. The Organization established the GASP Study Group, which is composed of experts from States, international organizations and industry, to assist in the development of the 2020–2022 edition of the GASP. The group encompasses regional representation from all regions and allows ICAO to best understand the challenges and safety priorities of different States, regions and industry and work with them to propose meaningful solutions and updates to the GASP. For more information, please visit: www.icao.int/gasp

Implementation of Technical Initiatives

ICAO delivers technical assistance, training and implementation support tools to States to strengthen aviation safety oversight systems and operations necessary to develop and sustain a robust aviation safety and air navigation system. These activities align with the objectives of ICAO's No Country Left Behind (NCLB) initiative, which highlights ICAO's efforts to assist states in implementing ICAO SARPs and to help ensure that SARPs implementation are better harmonized globally, so that all states have the same access to the significant socio-economic benefits of safe and reliable air transport.

The following summary represents highlights on some of the ICAO activities that support the aviation safety and air navigation strategic objectives under the NCLB initiative:

- State implementation of SARPs as measured by the ICAO Universal Safety Oversight Audit Programme (USOAP) Continuous Monitoring Approach (CMA) was supported by the ICAO work programme. The global average effective implementation (EI) increased marginally from 64.7 per cent in 2016 to 65.5 per cent in 2017. However, the number of significant safety concerns (SSCs) was halved from 8 SSCs in 8 States to 4 SSCs in 4 States, and no new SSCs were identified. In 2017, ICAO also supported the management of rapid and coordinated responses to crises in several States and sub-regions, implementing contingencies and providing urgent assistance to States and coordinating efforts among the stakeholders to achieve safety objectives.

- Several States improved safety oversight systems through capacity building supported by technical assistance (TA) projects implemented by ICAO. In 2017, the voluntary contributions of the Aviation Safety Fund (SAFE) funded 6 new, 10 ongoing and 8 completed TA projects. These projects contributed to resolving the SSCs and increased EI in those States by up to 30 per cent. The Table 2 below represents EI improvements of 11 States in which TA projects funded by the ICAO SAFE have been implemented since 2014. In this connection, ICAO encourages the voluntary contributions from donor States, international organizations and industry so that more ICAO TA projects using these valuable resources could be developed and implemented for the benefit of States in need of help, which in the end will contribute to aviation safety enhancement around the globe.

- ICAO NCLB activities have been supported by Member States, international organizations and industry. These partners have joined the ICAO Aviation Safety Implementation Assistance Partnership (ASIAP). ASIAP membership and SAFE fund contributions increased in 2017 and this is planned to continue in 2018. The third ICAO World Aviation Forum (IWAF) was held and the Aviation Benefits Report (https://www.icao.int/sustainability/Documents/AVIATION-BENEFITS-2017-web.pdf) was published in 2017, and both annual initiatives will continue to be delivered in 2018.

- The Global Aviation Safety Plan (GASP) and Global Air Navigation Plan (GANP) have provided the global frameworks for continuous safety improvements and harmonized global air navigation modernization. This has been supported in the regions by the Planning and Implementation Regional Groups (PIRGs) and RASGs, RSOOs and the Cooperative Development of Operational Safety and Continuing Airworthiness Programmes (COSCAPs), and globally by the Safety Management and Runway Safety Programmes. A global RSOO Forum was

convened and a new global strategy and action plan for the improvement of RSOOs was agreed upon, including the setting up of the Global Aviation Safety Oversight System (GASOS) concept endorsed by the Directors General of Civil Aviation (DGCA) meeting globally. The year of 2017 concluded with the lowest numbers of fatal accidents and fatalities on scheduled commercial flights involving airplanes with MTOW above 5700 kg, a new Global Runway Safety Action Plan (https://www.icao.int/safety/RunwaySafety/Documents%20and%20Toolkits/GRSAP_Final_Edition01_2017-11-27.pdf) launched at the second Global Runway Safety Symposium, the convening of the second Global Air Navigation Industry Symposium (GANIS), first Safety and Air Navigation Implementation Symposium (SANIS) and Global PIRG/RASG Forum.

- To support States in implementing effective State Safety Programmes (SSP), as of 31 May 2018, ICAO has delivered 4 regional safety management symposia and workshops. These symposia provided an important information-sharing opportunity for regulators, service providers and other aviation professionals involved in safety management activities with the workshops providing hands-on exercises related to implementation. To recognize and emphasize safety oversight as the foundation of an effective SSP, the SSP Foundation tool was developed on ICAO integrated Safety Trend Analysis and Reporting System (iSTARS) to complement the SSP Gap Analysis tool. The tool, which allows States to verify the status of a subset of USOAP protocol questions (PQs) that have been identified as the foundation for SSP, was highlighted during the Safety Management Workshops. To make safety management training more accessible to all aviation professionals, the ICAO Safety Management online course is available and supports the development of a common theoretical understanding of ICAO safety management SARPs and related fundamentals concepts. The course is a prerequisite for ICAO SSP classroom courses and the update to be released in 2018 reflects the 4th edition of the ICAO Safety Management Manual (SMM) (Doc 9859). The SMM is complemented by the Safety Management Implementation (SMI) public website (www.icao.int/SMI) which was launched as another support mechanism to States and industry in implementing SSP and SMS.

- iMPLEMENT is an ICAO product designed to help the Directors General of Civil Aviation (DGCA) and the Transport Ministers to assess the current status of aviation in their countries, identify the best solutions in order to maintain or improve their aviation capability and evaluate the needs of the aviation system through a data-driven decision making approach. In 2017, the Civil Aviation Authority-Human Resource (CAA-HR) toolkit and the Civil Aviation Safety Inspector (CASI) recognition programme, including the ICAO recognition minimum requirements, were developed and launched as part of iMPLEMENT.

- The ICAO Next Generation Aviation Professionals (NGAP) Programme was launched in 2009 to help ensure that enough qualified and competent aviation professionals are available to operate, manage and maintain the future international air transport system. ICAO is working with stakeholders to create greater awareness of the impending shortages of personnel and assist the global aviation community in attracting, educating and retaining the next generation of aviation professionals. In 2017, the ICAO NGAP achievements included implementing the new Assembly resolution on NGAP, convening the NGAP Global Summit, conducting a model ICAO Forum and several related side activities, providing support to the Dreams Soar initiative and collaborating with the University of Waterloo to develop a course of Fundamentals of the Air Transport System for students and young professionals. Other NGAP activities involved launching a beta version of the new Aviation Training and Education Directory, updating aviation personnel forecasts, and engaging with the United Nations Educational, Scientific and Cultural Organization (UNESCO), the International Labour Organization (ILO), UN Women and the International Telecommunication Union (ITU) to promote NGAP, gender equality and science, technology, engineering and math (STEM) education.

Table 2: USOAP EI Improvements for States by SAFE Funded TA Projects (2014–March 2018)

State	EI & Date of Previous Activity	SAFE Project (Start Date)	SAFE Project (End Date)	EI & Date of Latest Activity	EI Improvement
Uruguay	Sep 2014 (Off-site SSC PQ Management) EI 59.03 & 2 SSCs	Jul 2015	On-going	Mar 2016 (ICVM) EI 71.72 & 2 SSCs resolved Sep 2017 (IVA) EI 71.72	Overall EI 59.03 -> 71.72 (+12.69)
Nepal	Jul 2013 (ICVM) EI 55.46	Feb 2016 (TCB) Nov 2016 (CAT 2016)	Jul 2017 Nov 2016	Jul 2017 (ICVM) EI 66.76 & SSC resolved	Overall EI 55.46 -> 66.76 (+11.3)
Thailand	Jan 2015 (CMA audit) EI 34.2 and SSC	25 Apr 2016	29 Apr 2016	Sep 2017 (ICVM) EI 41.11, SSC resolved	Overall EI 34.2 -> 44.11 (+9.91)
Kazakhstan	Dec 2014 (Off-site SSC PQ Management) EI 65.15 & SSC	Jul 2015	Oct 2015	Apr 2016 (ICVM) EI 74.18 & SSC resolved	Overall EI 65.15 -> 74.18 (+9.03)
Indonesia	Apr 2016 (OVA) EI 51.61	11 Jul 2016 (CAT 2016) May 2017 (CAT 2017)	15 Jul 2016 16 June 2017	Oct 2017 (ICVM) EI 80.84	Overall EI 51.61 -> 80.84 (+29.23)
Bangladesh	Jun 2012 (ICVM) EI 50.81	27 Nov 2016 (CAT 2016) 7 Jul 2017 (CAT 2017)	1 Dec 2016 10 Jul 2017	Sep 2017 (ICVM) EI 75.34	Overall EI 50.81 -> 75.34 (+24.53)
Guyana	Feb 2007 (CSA audit) EI 45.56	Mar 2016	Mar 2017	Nov 2016 (ICVM) EI 65.22	Overall EI 45.56 -> 65.22 (+19.66)
Madagascar	May 2014 (OVA) EI 59.1	Feb 2015	Sep 2016	Jan 2018 (ICVM) EI 77.95	Overall EI 59.1 -> 77.95 (+18.85)
Paraguay	May 2016 (OVA) EI 53.94	Jun 2016	Dec 2016	Jun 2016 (ICVM) EI 71.33	Overall EI 53.94 -> 71.33 (+17.39)
Zambia	Dec 2012 (ICVM) EI 47.47	Aug 2014	Nov 2014	Jun 2016 (ICVM) EI 71.33	Overall EI 47.47 -> 62.17 (+14.7)
Philippines	Feb 2013 (ICVM) EI 60.47	26 Sep 2016	30 Sep 2016	May and Jun 2017 (ICVM and OVA) EI 70.48	Overall EI 60.47 -> 70.48 (+10.01)

ICVM: ICAO Coordinated Validation Mission
IVA: Integrated Validation Activity
OVA: Off-site Validation Activity
CAT: Combined Action Team
CSA: Comprehensive Systems Approach

Safety Monitoring

USOAP CMA Status

Each ICAO Member State should establish and implement an effective safety oversight system that reflects the shared responsibility of States and the broader aviation community, to address all areas of aviation activities. The Universal Safety Oversight Audit Programme (USOAP) Continuous Monitoring Approach (CMA) measures the effective implementation of a State's safety oversight system.

To standardize the conduct of audits under USOAP CMA, ICAO has established protocol questions (PQs) that are based on the safety-related ICAO Standards and Recommended Practices (SARPs) established in the Annexes to the Chicago Convention, Procedures for Air Navigation Services (PANS), ICAO documents and guidance material. Each PQ contributes to assessing the effective implementation (EI) of the eight critical elements (CEs) in the eight audit areas. These eight CEs are primary aviation legislation (CE-1), specific operating regulations (CE-2), state system and functions (CE-3), qualified technical personnel (CE-4), technical guidance, tools and provisions of safety-critical information (CE-5), licensing, certification, authorization and/or approval obligations (CE-6), surveillance obligations (CE-7) and resolution of safety issues (CE-8).

The eight audit areas identified in the USOAP are primary aviation legislation and civil aviation regulations (LEG), civil aviation organization (ORG), personnel licensing and training (PEL), aircraft operations (OPS), airworthiness of aircraft (AIR), aircraft accident and incident investigation (AIG), air navigation services (ANS), and aerodromes and ground aids (AGA). The use of standardized PQs ensures transparency, quality, consistency, reliability and fairness in the conduct and implementation of USOAP CMA activities. Starting in 2018 and for States with the most mature safety oversight systems, some of the audit activities will focus on assessing the implementation of the State Safety Programme (SSP).

A comprehensive analysis of USOAP results can be found on the ICAO website (https://www.icao.int/safety/CMAForum/Documents/USOAP_REPORT_2013-2016.pdf).

As of 31 May 2018, out of 192 ICAO Member States, 6 States have not yet received an USOAP audit. The current average USOAP score for States is 65.51 per cent, and 69.19 per cent of the States have achieved the target of 60 per cent EI, as per the objective identified in the Global Aviation Safety Plan (GASP) 2017–2019 edition.

Chart 3: Global Audit Results
(average EI percentage by audit area)

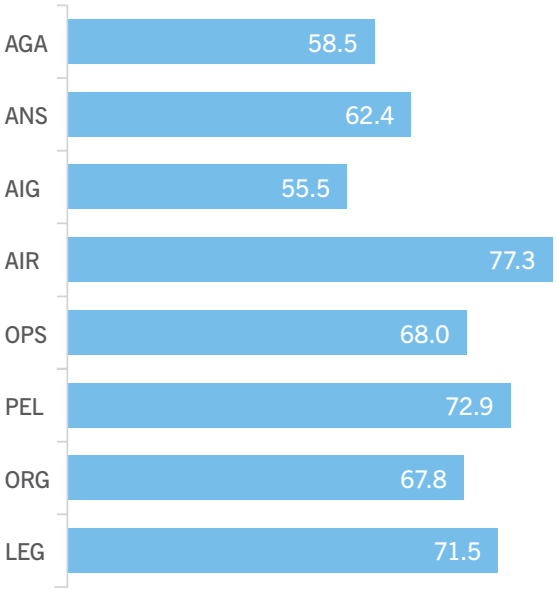


Chart 4: Global Audit Results
(average EI percentage by CEs)

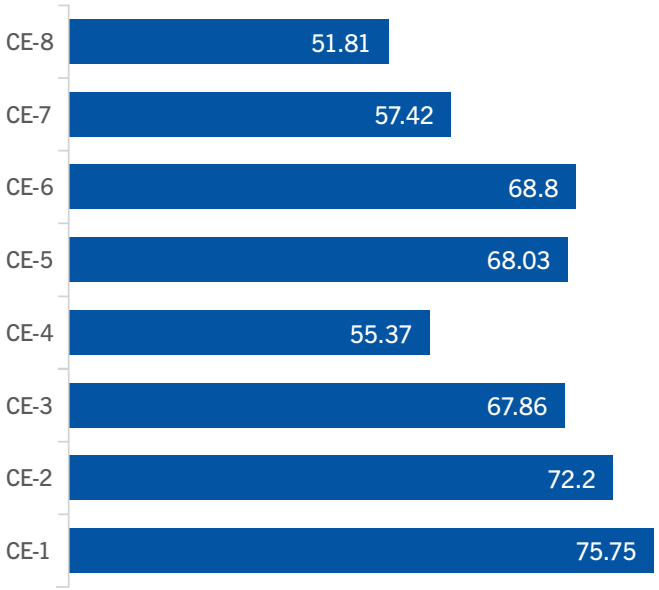
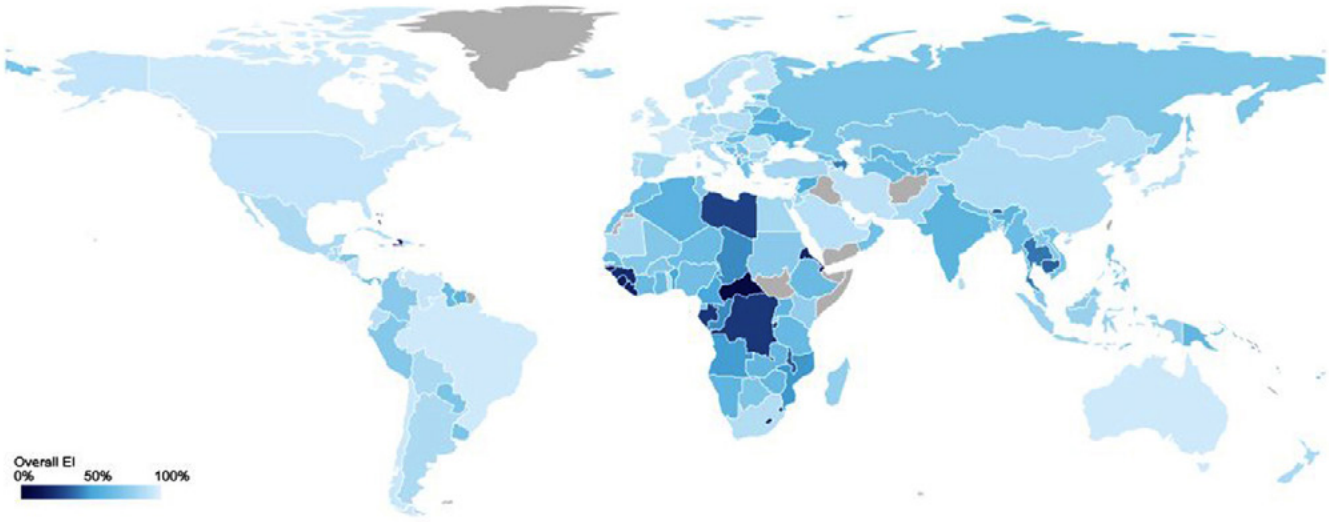


Figure 3: USOAP Overall Effective Implementation (EI)



States, listed in alphabetical order, with an **EI above 60 per cent** (as of 31 May 2018):

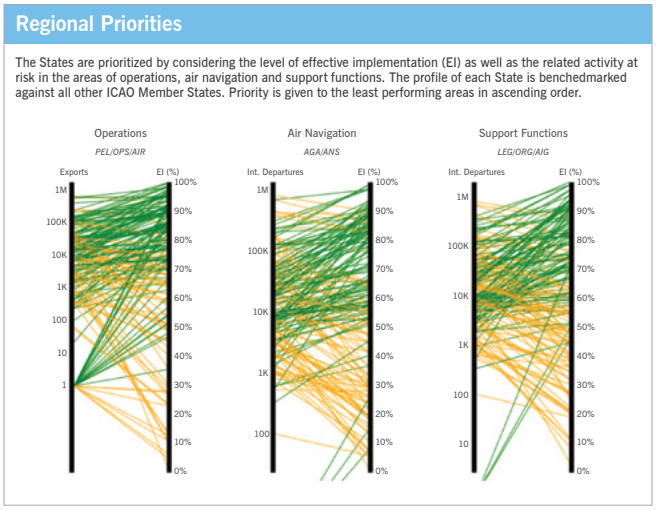
- Argentina
- Armenia
- Australia
- Austria
- Bahrain
- Bangladesh
- Belgium
- Belize
- Bolivia (Plurinational State of)
- Bosnia and Herzegovina
- Botswana
- Brazil
- Brunei Darussalam
- Bulgaria
- Burkina Faso
- Cabo Verde
- Canada
- Chile
- China
- China, Hong Kong Special Administrative Region
- China, Macao Special Administrative Region
- Colombia
- Costa Rica
- Cote d'Ivoire
- Croatia
- Cuba
- Cyprus
- Czech Republic
- Democratic People's Republic of Korea
- Denmark
- Dominican Republic
- Ecuador
- Egypt
- El Salvador
- Equatorial Guinea
- Estonia
- Ethiopia
- Fiji
- Finland
- France
- Gambia
- Georgia
- Germany
- Ghana
- Greece
- Guatemala
- Guyana
- Honduras
- Hungary
- Iceland
- Indonesia
- Iran (Islamic Republic of)
- Ireland
- Israel
- Italy
- Jamaica
- Japan
- Jordan
- Kazakhstan
- Kenya
- Kuwait
- Kyrgyzstan
- Lao People's Democratic Republic
- Latvia
- Lithuania
- Luxembourg
- Madagascar
- Malaysia
- Maldives
- Mali
- Malta
- Mauritania
- Mauritius
- Mexico
- Mongolia
- Montenegro
- Morocco
- Myanmar
- Namibia
- Nepal
- Netherlands
- New Zealand
- Nicaragua
- Niger
- Nigeria
- Norway
- Oman
- Pakistan
- Panama
- Papua New Guinea
- Paraguay
- Peru
- Philippines
- Poland
- Portugal
- Qatar
- Republic of Korea
- Republic of Moldova
- Romania
- Russian Federation
- Rwanda
- San Marino
- Saudi Arabia
- Senegal
- Serbia
- Singapore
- Slovakia
- Slovenia
- South Africa
- Spain
- Sri Lanka
- Sudan
- Sweden
- Switzerland
- The former Yugoslav Republic of Macedonia
- Togo
- Trinidad and Tobago
- Tunisia
- Turkey
- Turkmenistan
- Uganda
- United Arab Emirates
- United Kingdom of Great Britain and Northern Ireland
- United Republic of Tanzania
- United States of America
- Uruguay
- Uzbekistan
- Venezuela (Bolivarian Republic of)
- Viet Nam
- Zambia
- Zimbabwe

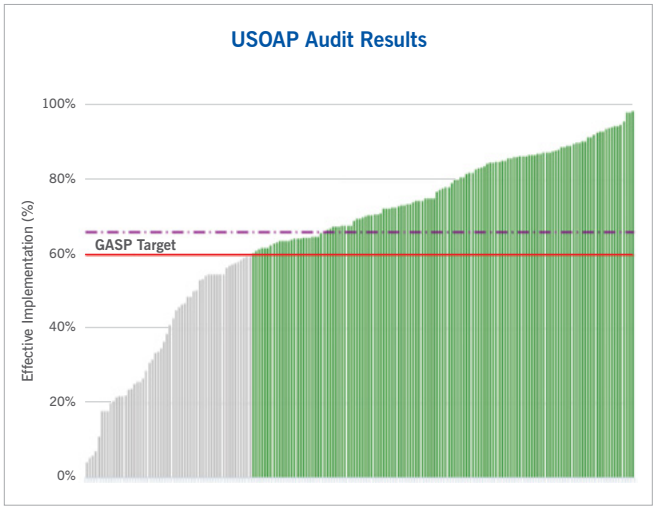
iSTARS

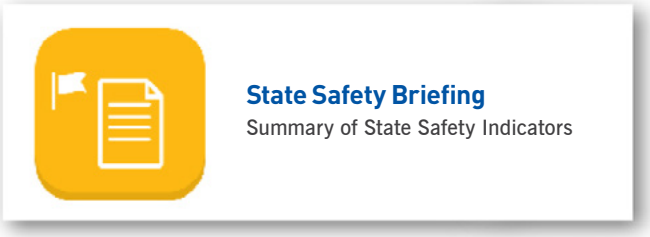
ICAO's integrated Safety Trend Analysis and Reporting System (iSTARS) (https://www.icao.int/safety/istars/) is a web-based system on the ICAO Secure Portal featuring a collection of web applications (apps) and datasets that facilitate and assist users in conducting aviation safety, efficiency and risk analyses. The apps listed in the iSTARS catalogue are grouped into different aviation fields. iSTARS also provides an integrated framework of monitoring safety information and safety indicators at global, regional and state level.

As of 31 May 2018, iSTARS included 34 apps. Examples of iSTARS apps include the following:

The Regional Safety Briefing (RSB) app shows a variety of safety, audit and performance metrics by region or group. The results include various USOAP data as indicated in the figure below, significant safety concerns (SSCs), accident statistics, performance based navigation (PBN) implementation, etc.







The State Safety Briefing (SSB) app provides an overview of various safety indicators and results for each Member State such as State safety performance dashboard, the intersection of State USOAP protocol question (PQ) findings by audit area and critical elements (CEs), the status of the implementation of the international aerodromes certification process, the implementation of State Safety Programme (SSP) and PBN.

	LEG	ORG	PEL	OPS	AIR	AIG	ANS	AGA
CE-1	7	1				8		
CE-2	4		6	9	17	5		8
CE-3		8	4	5	5	10		5
CE-4			4	4	5	7		7
CE-5	2		7	17	15	27		9
CE-6			39	4	17			55
CE-7			10	3	3			23
CE-8			8	5	3	14		10

PQ Findings by Audit Area and Critical Element Intersection

The Implementation Status of SSP

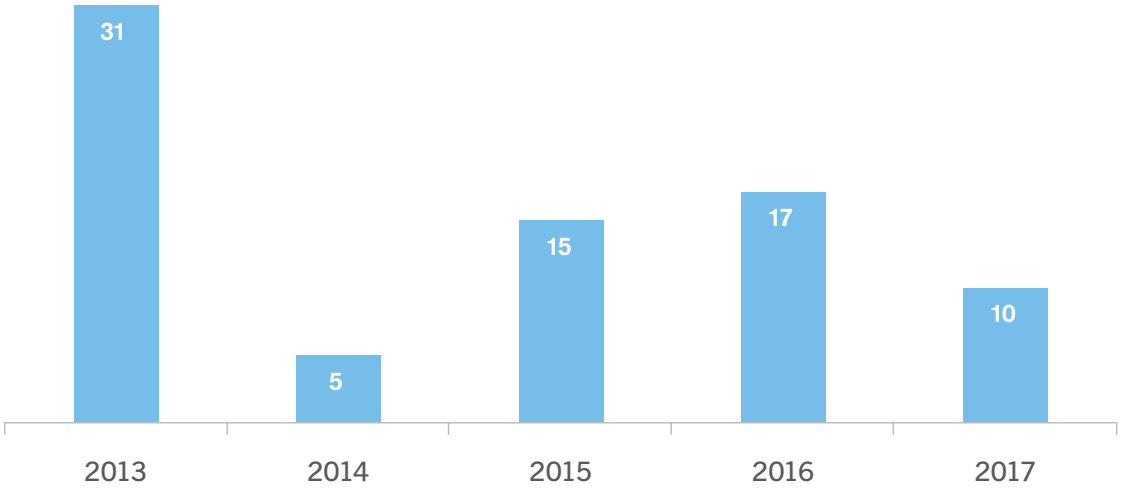
Safety Recommendations Addressed to ICAO

Annex 13 — *Aircraft Accident and Incident Investigation* mandates States to investigate accidents and serious incidents for the prevention of such occurrences.

One of the outputs of the safety investigation process is a set of Safety Recommendations (SR) which may be addressed to States, industry, or to ICAO if the investigators have suggestions for changes to ICAO documents. ICAO will inform the originating body within 90 days of receipt of the SR, the actions taken by ICAO, the actions intended to be taken by ICAO, or reasons why no action will be taken by ICAO. Some of the SRs addressed to ICAO are forwarded to relevant expert groups which may lead to amendments and/or developments of ICAO documents.

In 2017, ICAO received 10 SRs from 5 States. These recommendations are available at https://www.icao.int/safety/airnavigation/AIG/Pages/Safety-Recommendations-addressed-to-ICAO.aspx. The chart below depicts the number of safety recommendations addressed to ICAO in the past five years.

Chart 5: Safety Recommendations received by ICAO for the period 2013–2017



Safety Initiatives

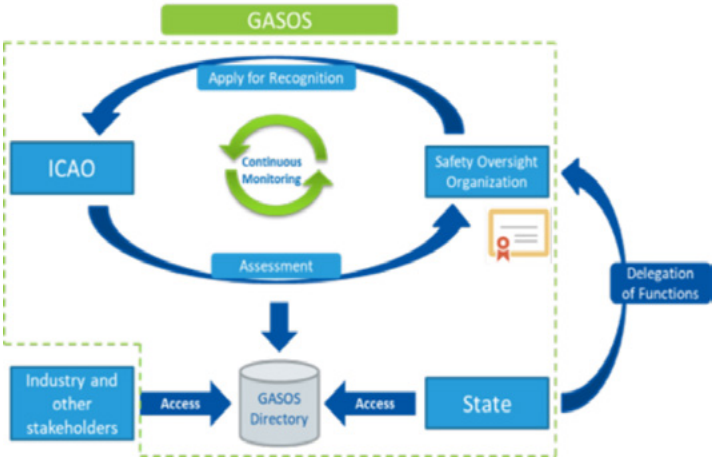
Global Aviation Safety Oversight System (GASOS)

The world of aviation continues to undergo rapid changes. Worldwide air traffic volume is expected to double in the next fifteen years; new technologies are rolling out; business models of aircraft ownership, registration, and use are changing; and industry activity is becoming increasingly multinational. These rapid developments make it increasingly difficult for many States to maintain their safety oversight responsibilities. Therefore, a global approach to safety oversight can help reduce the risks these rapid changes may introduce.

This global approach to safety is known as GASOS which received its first Ministerial endorsement in March 2017 at the Forum on Regional Safety Oversight Organizations (RSOOs) for Global Aviation Safety. Subsequent regional endorsements around the world soon followed throughout 2017. The GASOS concept was also presented at the Safety and Air Navigation Implementation Symposium (SANIS) in December 2017 where further development of the concept was encouraged.

GASOS is designed to be a voluntary, standardized-assessment and recognition mechanism for safety oversight organizations (SOOs) such as State civil aviation authorities, RSOOs, and accident investigation organizations. It is a proposed solution that will provide States access to ICAO recognized SOOs that can effectively assist them in the implementation of their safety oversight obligations. The results will allow for more efficient and effective use of limited resources, greater harmonization worldwide, and an overall increase to safety performance.

Since receiving endorsement, ICAO has been working to develop GASOS with an aim at launching the programme in a phased approach beginning in 2020. To date, ICAO has completed:



- A feasibility study confirming GASOS to be achievable;
- Established a study group of experts to assist in its development;
- Developed a concept of operations and implementation plan;
- Identified risks and established a risk register;
- Undertaken a review to define and establish the appropriate legal framework for GASOS implementation; and
- Developed a business case.

The next phase, beginning in early September 2018, is to conduct several pilot tests. Using a USOAP CMA methodology ICAO will conduct a pilot assessment on various SOOs' capability to assist States in the implementation of their safety oversight obligations. These pilot tests will help fine-tune the assessment mechanisms of GASOS and provide an opportunity for SOOs to improve the safety assistance they currently provide.

Unmanned Aircraft System (UAS) / Remotely Piloted Aircraft System (RPAS)

Unmanned aircraft (UA) include a broad spectrum of aircraft from meteorological balloons that fly freely to highly complex aircraft piloted from remote locations by licensed aviation professionals. The latter are part of a category referred to as remotely piloted aircraft (RPA) and operate as part of a remotely piloted aircraft system (RPAS). ICAO has been leading the development of a regulatory framework to enable the safe and efficient integration of RPA into non-segregated airspace and at aerodromes for over 10 years. In particular, through the work of the Remotely Piloted Aircraft Systems Panel (RPASP), ICAO is engaged in a detailed study of the International Convention on Civil Aviation (the "Chicago Convention") and its 19 Annexes with a view to developing international Standards and Recommended Practices (SARPs) and guidance material applicable to RPA engaged in international navigation under instrument flight rules (IFR).

ICAO's initial work on RPAS has led to the amendment of Annex 2 – Rules of the Air, which now contains high level provisions regarding certification, licensing, operating rules and special authorizations; Annex 7 – Aircraft Nationality and Registration Marks, to define RPA as unmanned aircraft and ensure nationality and registration marks can be applied regardless of size or configuration of aircraft; and Annex 13 – Aircraft Accident and Incident Investigation, extending the definition of "accident" to include unmanned aircraft. In March 2015, ICAO published the Manual on Remotely Piloted Aircraft Systems (Doc 10019) to direct the development of future SARPs. In October 2017, an RPAS Concept of Operations for International IFR Operations (CONOPS) was published. The RPAS CONOPS (https://www.icao.int/safety/UA/Documents/RPAS%20CONOPS.pdf) aims to describe the operational environment of manned and unmanned aircraft, thereby ensuring a common understanding of how the subset that are remotely piloted can be expected to be accommodated and ultimately integrated into national airspace. The scope is currently limited to certificated RPAS operating internationally within controlled airspace under IFR in non-segregated airspace and at aerodromes in the 2031 onward timeframe. More recently, in March 2018, ICAO adopted an amendment to Annex 1 – Personnel Licensing on remote pilot licensing, competency-based training and assessment – the first in a series of amendments planned for the remaining Annexes. This will become applicable on 3 November 2022 (refer to Table 1). The development of guidance material in support of this amendment is currently underway.

In 2016, the 39th Session of the ICAO Assembly expanded the scope of the Organization's work programme to include the regulation of all UA, including small UA typically engaged in domestic operations. Accordingly, the Unmanned Aircraft Systems Advisory Group (UAS-AG) was established in 2016 to provide guidance and best practices to States, regulatory bodies and stakeholders to enable the safe and efficient operation of UA. The UAS-AG is comprised of UAS regulatory and operational personnel, ATM and related industry technical experts from geographically diverse Member States, international organizations, industry and academia. The UAS-AG's first order of business was to develop an online Toolkit to assist States that have no, or limited, regulations or guidance material. The Toolkit offers not only helpful information and resources, but also serves as a platform for the exchange of global best practices, lessons learned, and effective governance approaches. More information about the toolkits can be found on the ICAO website https://www.icao.int/safety/UA/UASToolkit/Pages/default.aspx.

In March 2017, in response to events involving the operation of small UA by uncertified, untrained recreational users, ICAO issued State letter AN 13/55-17/38, reminding Member States as a matter of urgency of their obligation under Annex 2 – Rules of the Air, to establish and enforce regulations mandating that aircraft not be operated in a negligent or reckless manner or in such proximity to other aircraft as to create a collision hazard, including at international aerodromes.

In May 2017, recognizing that a variety of UA are set to be used in lower altitude, domestic airspace, ICAO announced a Request for Information (RFI) calling for solutions from industry, States and stakeholders to establish a harmonized global framework for a new concept under development known as UAS traffic management (UTM), which intends to serve as a highly automated ATM-like system for areas with high density UA operations. The RFI focused on solutions for the registration, communications and geofencing-like systems needed to enable UTM. In February 2018, ICAO announced a second RFI seeking solutions to enable the safe and efficient transition between future UTM and concurrent ATM systems. The UAS-AG is in the process of developing a framework to ensure the global harmonization and interoperability of UTM systems based on these RFI submissions.

In support of the No Country Left Behind (NCLB) Initiative, ICAO has conducted several global and regional activities on RPAS and UAS, including an RPAS Symposium in Abuja, Nigeria in July 2017 focused on the African continent. In addition, at least one RPAS Workshop has been conducted in each ICAO region between 2016 and 2017. In September 2017, ICAO hosted the Second Global RPAS Symposium under the theme of Licensing, Training and Operator Responsibilities: Initial Steps for RPAS/UAS Entrance into the ATM Environment. The event provided an opportunity for States, international organizations and other stakeholders to gain a more detailed understanding of the roles and responsibilities of RPAS operators, airspace managers, training facilities, licensing authorities, regulators and industry towards ensuring safe operations. ICAO also held DRONE ENABLE, its first ever UAS Industry Symposium. Leading experts from academia, industry, States and international organizations presented their perspectives on solutions for domestic UA operations and for a common UTM framework, with particular focus on necessary registration, communications and geofencing like systems.

Through these activities, ICAO continues to lead the development of a comprehensive and harmonized regulatory framework for unmanned aviation.

Global Flight Tracking Updates

ICAO's work to develop a comprehensive flight tracking system began in May 2014 with a multi-disciplinary meeting involving States, Industry and representatives of several Air Navigation Committee (ANC) Panels. This meeting recommended the development of a Concept of Operations (CONOPS) for a Global Aeronautical Distress and Safety System (GADSS). Subsequently in June 2014 the ICAO Council recommended that this be delivered to the High Level Safety Conference (HLSC) in 2015.

At this meeting, the GADSS CONOPS was reviewed and endorsed by States and now forms a high level plan for the overall system that is being developed to track flights, locate accident sites and recover flight recorder data.

Using this CONOPS as a guide, Standards and Recommended Practices (SARPS) have been developed to address many elements of the GADSS system. The first stage was the adoption of Standards in Annex 6 Part I which established the responsibility of the Operator to track their flights throughout their area of operations, and the requirement for 15 minute reporting to be established in oceanic areas. This will become applicable on 8 November 2018 (refer to Table 1).

Guidance to support the implementation of these provisions was developed and published, in July 2017, in Circular 347 Aircraft Tracking Implementation Guidelines. This describes the process for operators to determine their requirements and implement a tracking system in line with Annex 6 Part I. The guidance was developed by the Normal Aircraft Tracking Implementation Initiative (NATII), who also recommended further provisions for risk based variations to the prescriptive Standard, and the establishment of contact and surveillance information databases to support the operators both in their implementation and in the operation of the Aircraft Tracking system. The risk based variations were also approved and have now been adopted into Annex 6. Additional work on the contact repository and provision of surveillance information is intended to be complete by early Fall 2018 in time for the applicability of the Annex 6 Provisions.

The next areas to be addressed included the monitoring of flights in distress, and the facility to recover flight data recorders in the event of an accident. Distress tracking establishes a requirement for all new aircraft with a certificate of airworthiness issued on or after 1 Jan 2021 to be equipped with an autonomous distress tracker, which would be capable of automatically transmitting a signal from which the aircraft position could be determined at least once every minute, in the event of a distress condition being detected. The operator is responsible to make this position information available to Air Traffic Service Units (ATSUs), Rescue and Coordination Centres (RCCs) and other organizations, as determined by the State of the Operator. The precise mechanism by which this information can be most effectively made available is still being determined, however some form of data repository is likely, providing a central location for the storage and access of this position information.

Also from 1 January 2021, aircraft will be required to have a means available to recover flight recorder data and make this available in a timely manner. This performance based provision allows for different solutions such as data streaming or deployable flight data recorders.

Guidance in support of these provisions has been drafted in Doc 10054 - Manual on Location of Aircraft in Distress and Flight Recorder Data Recovery, which is planned for publication by the end of 2018.

More information about ICAO Global Flight Tracking safety initiative can be found on the ICAO website https://www.icao.int/safety/globaltracking/Pages/Homepage.aspx.

Global Runway Safety Action Plan

Based on the analysis of accident data for the scheduled commercial air transport operations, runway safety events were identified as one of the three high-risk accident categories in ICAO Global Aviation Safety Plan (GASP) 2017–2019 edition. Runway safety related events include the following ICAO accident occurrence categories: abnormal runway contact (ARC), bird strikes (BIRD), ground collision (GCOL), runway excursion (RE), runway incursion (RI), loss of control on the ground (LOC-G), collision with obstacle(s) (CTOL) and undershoot/overshoot (USOS).

The ICAO global Runway Safety Programme (RSP) was launched in 2011, and the first Global Runway Safety Symposium was held in May of that year. The ICAO RSP involves substantial collaboration with partner organizations from the whole aviation industry including: Airports Council International (ACI); the Civil Air Navigation Services Organization (CANSO); the European Aviation Safety Agency (EASA); European Organization for the Safety of Air Navigation (EUROCONTROL); the United States Federal Aviation Administration (FAA); the Flight Safety Foundation (FSF); the International Air Transport Association (IATA); the International Council of Aircraft Owner and Pilot Associations (IAOPA); the International Business Aviation Council (IBAC); the International Coordinating Council of Aerospace Industries Associations (ICCAIA); the International Federation of Airline Pilots' Associations (IFALPA); and the International Federation of Air Traffic Controllers' Associations (IFATCA).

In January 2017 the ICAO RSP Partners established a Runway Safety Action Plan Working Group (RSAP-WG), with the aim of reviewing the RSP achievements, objectives and priorities, and to develop a global runway safety action plan (GRSAP), which was unveiled at the Second Global Runway Safety Symposium in Lima, Peru, 20–22 November 2017. Through a review and analysis of runway safety occurrence data and risk analysis, the RSAP-WG identified runway excursions and runway incursions as the main high risk occurrence categories. This GRSAP provides recommended actions for runway stakeholders, including ICAO, the runway safety programme partners, State Civil Aviation Authorities, Regional Safety Oversight Organizations (RSOOs), Regional Aviation Safety Groups (RASGs), aircraft operators, aerodrome operators, air navigation service providers and Aerospace Industry, and is linked to the ICAO Global Aviation Safety Plan (GASP). The actions are aimed at reducing the global rate of runway excursions and runway incursions. Detailed information about the Global Runway Safety Action Plan can be found on the ICAO's website https://www.icao.int/safety/RunwaySafety/Pages/default.aspx.

Cargo Safety

Portable Electronic Devices (PED)

Security concerns on threats posed by improvised explosive devices (IEDs) concealed in passengers' personal items (including PEDS), were raised by some Member States, prompting them to prohibit the carriage of large PEDs in the aircraft cabins on flights on certain routes. Following this decision, the ICAO Council established a joint task force comprising of two groups of experts: a multidisciplinary Cargo Safety Group (CSG) and the Aviation Security (AVSEC) Panel task force on IEDs to address the multiple aspects of the issue from a holistic and integrated approach.

The CSG, composed of experts in the areas of flight operations, dangerous goods, airworthiness, aerodromes, safety management, security and facilitation, was tasked to evaluate existing aircraft capabilities, identify the safety hazards posed by the carriage of PEDs in checked baggage and assess the associated safety risks. The Task Force on IEDs discussed the threat and risk related to IEDs concealed in personal items, and considered the advantages and challenges inherent in the implementation of possible mitigation measures aimed at addressing such a threat, taking into account their impact on the global aviation system.

The two groups met twice in June and July of 2017 and formulated a number of recommendations for consideration by the relevant ICAO technical panels. One main conclusion of the second meeting of the CSG was that, if PEDs were relocated from the cabin to aircraft cargo compartments there may be an order of magnitude increase in potential cargo fires based on analysis conducted by the Federal Aviation Administration (FAA) and European Aviation Safety Agency (EASA).

Lithium Batteries

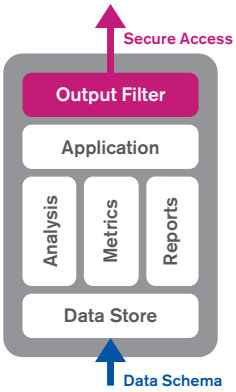
The Council approved amendments to the 2017–2018 Edition of the Technical Instructions for the Safe Transport of Dangerous Goods by Air (Doc 9284) which require that PEDs containing lithium batteries in checked baggage be completely switched off and that measures be taken to protect PEDs from damage and unintentional activation.

Work on an overarching strategy to mitigate risks associated with the carriage of lithium batteries by air continued by several expert groups such as:

- The SAE G-27 Lithium Battery Packaging Performance Committee ("G-27") reviewing lithium battery packaging for transport by air is developing a performance-based package standard.
- The Cargo Safety Sub Group (CSSG) of the Flight Operations Panel comprised of experts from flight operations, airworthiness and dangerous goods, is developing recommendations and guidance on conducting safety risk assessments and identifying appropriate mitigations for the carriage of all cargo, including lithium batteries.
- Working Group 4 of the Airworthiness Panel (AIRP) is also developing new standards and guidance for manufacturers to specify the cargo compartment fire suppression capabilities needed for operators to determine the limitation of specific aircraft fire suppression systems.
- The United Nations Sub-Committee of Experts on the Transport of Dangerous Goods created the informal working group on lithium batteries to work on the development of a comprehensive hazard-based system to classify lithium batteries and cells for transport.

Safety Information Monitoring System

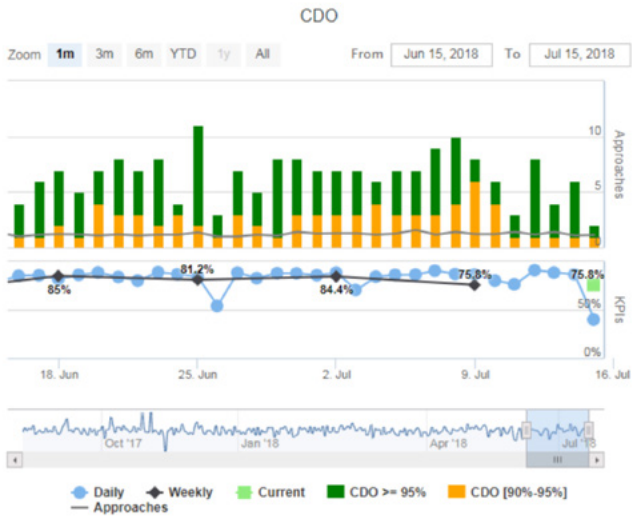
One of the recommendations of the 2015 High-Level Safety Conference (HLSC) and that of the resolutions of the ICAO 39th Assembly held in 2016 were to introduce a phased approach for global information exchange. The implementation of this recommendation and resolutions resulted in launching the ICAO Safety Information Monitoring System (SIMS) in 2017.



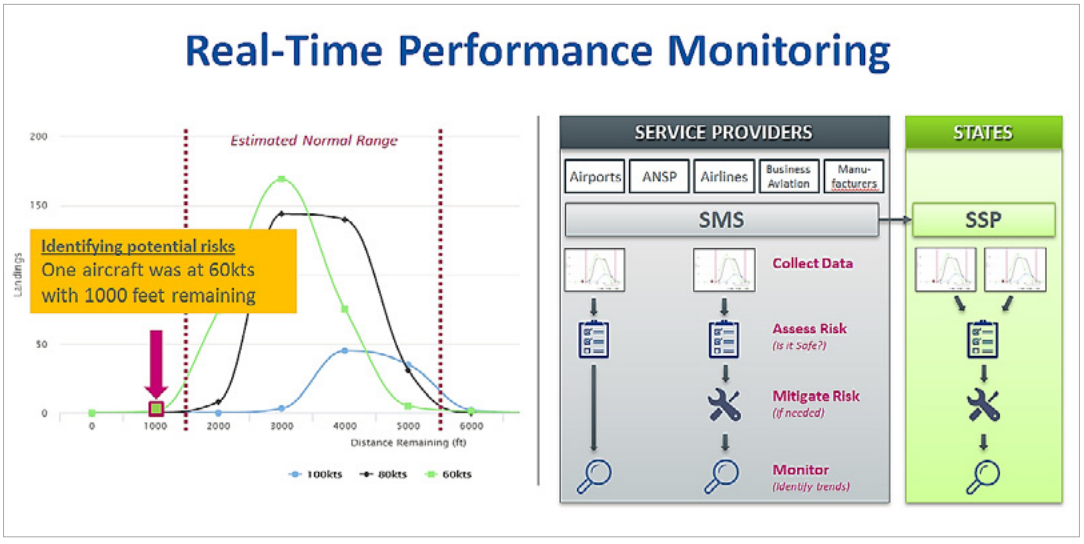
SIMS is a web-based safety data and information system comprised of applications generating indicators to support States in their safety management efforts. SIMS promotes cooperation amongst States and industry to collect and analyse available information pertinent to the monitoring of safety performance.

SIMS resides on the ICAO secure portal and as of 31 May 2018, it already had over 100 users from 12 different ICAO Member States. The evolution of SIMS continues and Member States are encouraged to join this project. Currently available applications on SIMS include Horizontal Flight Efficiency (Airspace Monitoring), Vertical Flight Efficiency (Approach Monitoring), Runway Safety Event Monitoring, Ramp Inspections and Occurrences Monitoring.

ICAO Member States can use the SIMS platform to display their data into meaningful information, as a cost-effective way to gain direct insight into their stored data without having to develop complex in-house information technology systems. ICAO has partnered with third-party data providers in support of Automatic Dependent Surveillance Broadcast (ADS-B) data for its applications. The use of ADS-B data is one of the primary data sources for SIMS indicators, in addition to data provided via a secured system by States. ICAO has developed SIMS legal framework that addresses, among others, data privacy and safety data protection elements. More information about SIMS can be found on the ICAO website www.icao.int/safety/sims.



Continuous Descent Operations Indicator (CDO)



Wildlife Strike Hazard Reduction

The presence of wildlife (birds and other animals) on and in the vicinity of aerodromes poses a serious threat to aircraft operational safety. Wildlife strikes can cause accidents and serious incidents, costing the aviation industry billions in losses due to aircraft damage, flight delays and other operational impacts. To address this safety challenge, ICAO has been undertaking various inititives to help States reduce wildlife strike hazard to aviation.

First and foremost, ICAO has developed SARPs in Annex 14, Volume I, requiring the assessment of wildlife strike hazard through the establishment of a national procedure for recording and reporting wildlife strikes, the collection of informaiton on the presence of wildlife on or aound the aerodome constituting a potential hazard, and an ongoing evaluation of the wildlife hazard by competent personnel. Guidance material is provided in the Airport Services Manual, Part 3 (Doc 9137), covering roles and responsibilities within a bird/wildlife strike control programme, repellent techniques, habitat management, best practises for wildlife management programmes, as well as emerging technology and communication procedures.

A dedicated chapter on wildlife hazard management will also be inlcuded in PANS-Aerodromes (Doc 9981), which is being reviewed for applicability in 2020.

On 16-18 May 2017, the ICAO/ACI Wildlife Strike Hazard Reduction Symposium was held at the ICAO Headquarters. This symposium was a great success in increasing the international awareness of the wildlife strike threat to aircraft operational safety, building an international community to exchange ideas, experiences and cooperative efforts, advancing new technologies and formulating effective strategies in preventing and mitigating the risk of wildlife strikes to aircraft.

In this symposiem ICAO presented a comprehensive analyisis of wildlife strike reports received in the ICAO Bird Strike Information System (IBIS) for the years 2008 to 2015. During the above period, 97 751 reports were received from 91 States on strikes occurring in 105 States and territories, a significant increase from the 42 508 reports for the period of 2001 to 2007. The analysis shows that 68 per cent of the bird strikes occurred during the day and 25 per cent occurred at night time. Although wildlife strikes occurred throughout the year, the busiest months are May through October. The months with the least reported number of wildlife strikes are January and February. 91 per cent of the strikes for which location data was furnished occurred on or near the aerodrome. 31 per cent of these occurred during the take-off phase while 59 per cent occurred during the approach and landing phase. 2 501 reports had a clear indication of an effect on the flight. 49 per cent of those strikes led to precautionary landings and 28 per cent resulted in aborted take offs. The Charts below illustrate the above conclusions. Further details of the analysis are contained in the ICAO Electronic bulletin (EB 2017/25) at www.icao.int/IBIS.

Chart 6: Wildlife Strike Occurrences by Light Conditions 2008–2015

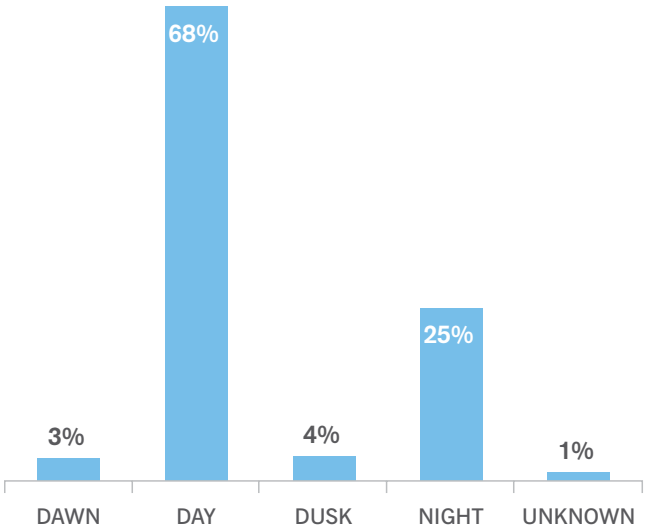


Chart 7: Month of Occurrence 2008–2015

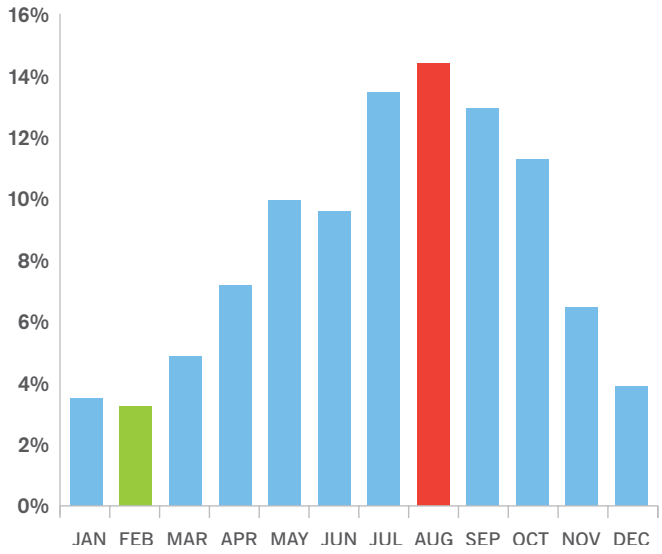


Chart 8: Wildlife Strike Occurrences by Flight Phase 2008–2015

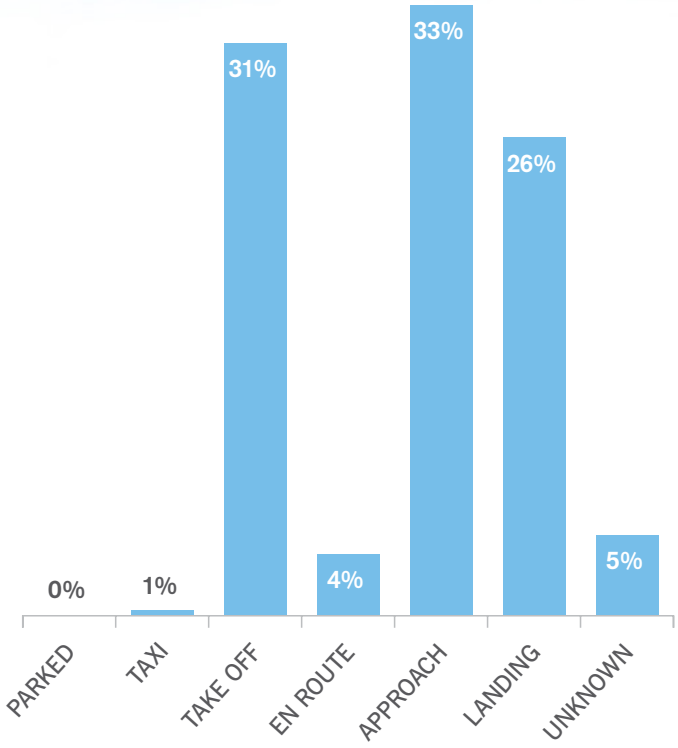
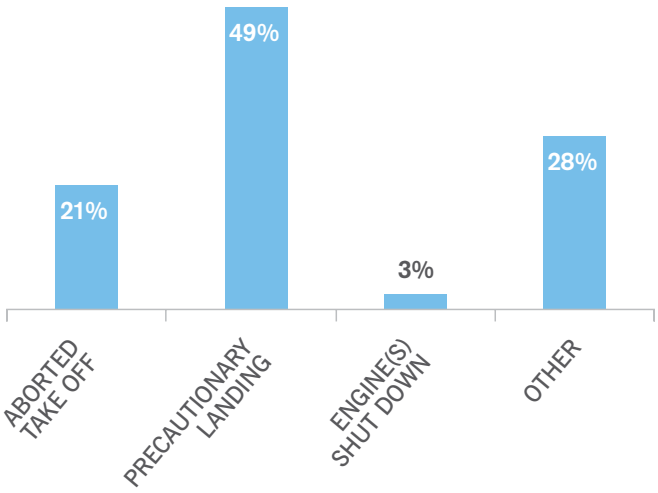


Chart 9: Wildlife Strike Effects on Flight



In order to better facilitate occurrence reporting and data analysis, ICAO now has replaced the old IBIS computer-application with a new reporting system based on the European Co-ordination Centre for Accident and Incident Reporting Systems (ECCAIRS) platform. A User Manual and Software Installation Manual can be downloaded at www.icao.int/IBIS. States are encouraged to submit wildlife strike reports either via ECCAIRS e5f/e4f files, or via an ECCAIRS compatible Excel form that can also be downloaded at www.icao.int/IBIS.

Consideration is also being given to the development of an ICAO reporting portal to provide States with a single place where they can submit all their reports as required, including the wildlife strike reports.

Accident Statistics

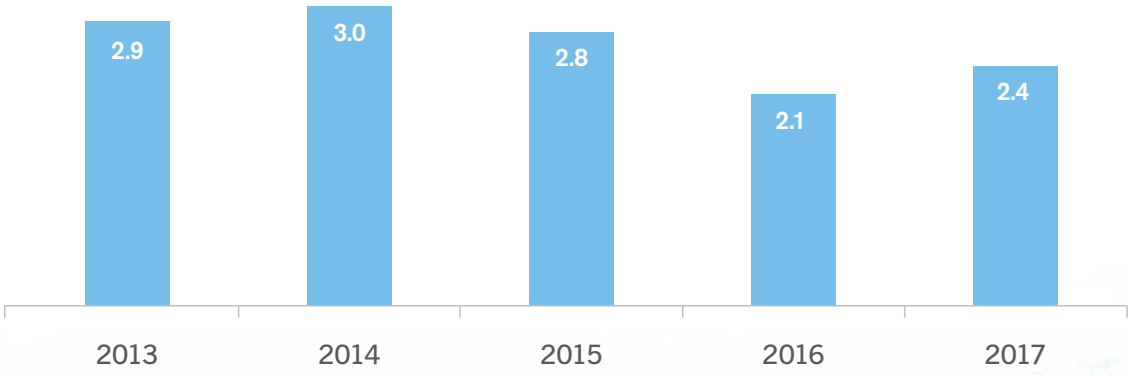
The ICAO's global accident rate provides an overall indicator of safety performance. The accident rate is based on scheduled commercial operations involving fixed-wing aircraft with a maximum take-off weight (MTOW) above 5700kg. Aircraft accidents are reviewed and categorized by the ICAO Safety Indicators Study Group (SISG) using the definition provided in Annex 13 – Aircraft Accident and Incident Investigation.

Departures data is comprised of scheduled commercial operations that involve the transportation of passengers, cargo and mail for remuneration and is collated by the ICAO Air Transport Bureau. Estimates are made where data has not been provided by States. As new data is provided to ICAO it will be incorporated into the database, which may cause small changes to the calculated rates from year to year.

Chart 10 below shows the global accident rate trend (per million departures) over the previous five years, with 2017 having an accident rate of 2.4 accidents per million departures, the second lowest ever recorded.

More accident statistics can be found in Appendix 1. Scheduled commercial accidents occurred in 2017 are listed in Appendix 4.

Chart 10: Global Accident Rates (accidents per million departures)



Regional Accident Statistics

To further analyse the state of aviation safety, the accident data for scheduled commercial air transport operations is categorized according to RASG regions by State of occurrence. The tables below provide details on the state of aviation safety in different RASGs for 2017 in the context of global outcomes. RASG regions used in this report are shown in Appendix 2.

Although the accident rate of the PA region increased from 2.1 in 2016 to 3.5 in 2017, there was only one fatal accident with one fatality in this region. The EUR region had the lowest accident rate but with the highest number of fatal accidents and fatalities. The sharp fall in the accident rate of the AFI region from 7.3 in 2015 to 1.2 in 2016 and increase to 5.3 in 2017, illustrate the volatile nature of these statistics due to the small number of departures in this region. For this reason, these numbers should be considered in the context of the total number of accidents.

Table 3: Departures, Accidents and Fatalities by RASG Region of Occurrence

RASG	Estimated Departures (millions)	Number of Accidents	Accident Rate (per million departures)	Fatal Accidents	Fatalities
AFI	1.3	7	5.3	0	0
APAC	11.8	20	1.7	1	2
EUR	8.7	12	1.4	3	47
MID	1.3	2	1.6	0	0
PA	13.5	47	3.5	1	1
WORLD	**36.6**	**88**	**2.4**	**5**	**50**

Table 4: Share of Traffic and Accidents by RASG Region of Occurrence

RASG Region	Share of Traffic	Share of Accidents
AFI	3.6%	8.0%
APAC	32.2%	22.7%
EUR	23.8%	13.6%
MID	3.5%	2.3%
PA	36.8%	53.4%

GSIE Harmonized Accident Rate

In the spirit of promoting aviation safety, the Department of Transportation of the United States, the Commission of the European Union, the International Air Transport Association (IATA) and ICAO signed a Memorandum of Understanding (MoU) on a Global Safety Information Exchange (GSIE) on 28 September 2010 during the 37th Session of the ICAO Assembly. The objective of the GSIE is to identify information that can be exchanged between the parties to enhance risk reduction activities in the area of aviation safety.

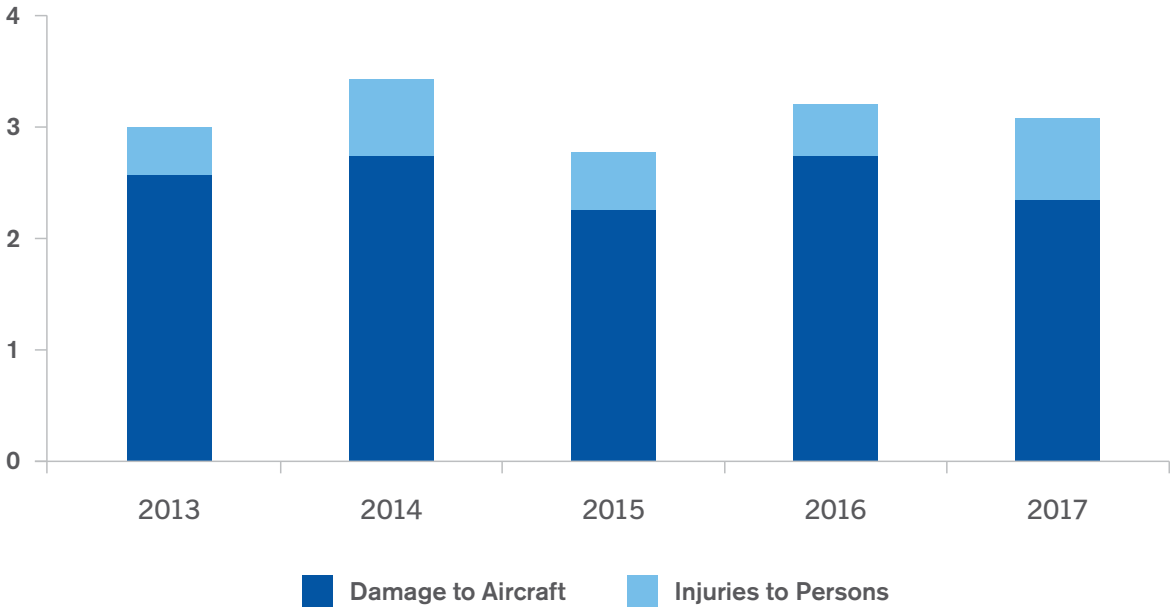
The GSIE developed a harmonized accident rate beginning in 2011. This was accomplished through close co-operation between ICAO and IATA to align accident definitions, criteria and analysis methods used to calculate the harmonized rate, which is considered a key safety indicator for commercial aviation operations worldwide. The joint analysis includes accidents meeting the ICAO Annex 13 criteria for all typical commercial airline operations for scheduled and non-scheduled flights.

Starting in 2013, ICAO and IATA have increasingly harmonized the accident analysis process and have developed a common list of accident categories to facilitate the sharing and integration of safety data between the two organizations.

Harmonized Analysis of Accidents

A total of 109 accidents were considered as part of the harmonized accident criteria in 2017. These include scheduled and non-scheduled commercial operations, including ferry flights for aircraft with an MTOW above 5700kg. The GSIE harmonized accident rate for the period from 2013 to 2017 is shown in Chart 11 below. Since 2013 the accident rate has been broken down by operational safety component: accidents involving damage to aircraft with little or no injury to persons and accidents with serious or fatal injuries to persons.

Chart 11: GSIE Harmonized Accident Rate (accidents per million sectors)



Definitions and Methods

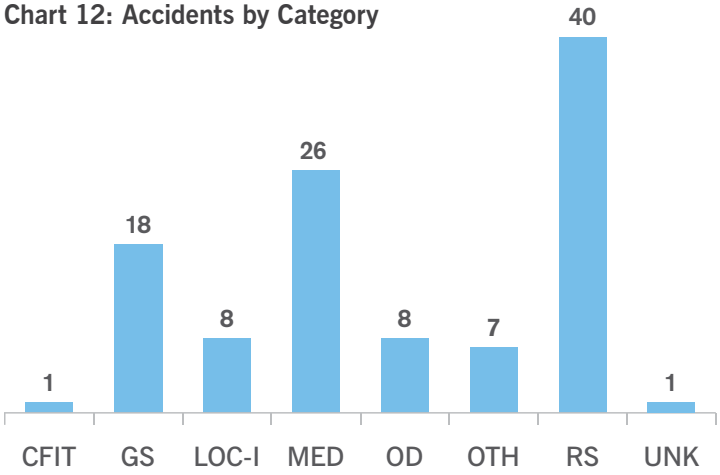
In order to build upon the harmonized accident rate presented in the last four safety reports, ICAO and IATA worked closely to develop a common taxonomy that would allow for a seamless integration of accident data between the two organizations. A detailed explanation of the harmonized accident categories and how they relate to the Commercial Aviation Safety Team/ICAO Common Taxonomy Team (CICTT) occurrence categories can be found in Appendix 3.

Accidents by Category

Differences between the approaches of the ICAO (CICTT Occurrence Categories) and IATA (Flight-crew centric Threat and Error Management Model) classification systems required the harmonization of accident criteria to be used. The breakdown of accidents by harmonized category is shown in Chart 12 below.

Full details of categories can be found in Appendix 3.

Chart 12: Accidents by Category



Accident Categories	
CFIT	Controlled Flight into Terrain
GS	Ground Safety
LOC-I	Loss of Control in-Flight
MED	Injuries to and/or Incapacitation of Persons
OD	Operational Damage
OTH	Other
RS	Runway Safety
UNK	Unknown

Accidents by Region of Occurrence

A harmonized regional analysis is provided by the ICAO RASG regions of occurrence. The number of accidents and harmonized accident rate by region are shown in Charts 13 and 14 below.

Future Development

Both ICAO and IATA continue to work closely together and, through their respective expert groups, provide greater alignment in their analysis methods and metrics for the future. This ongoing work will be shared with GSIE participants, States, international organizations and safety stakeholders in the interest of promoting common, harmonized safety reporting at the global level.

Chart 13: Number of Accidents

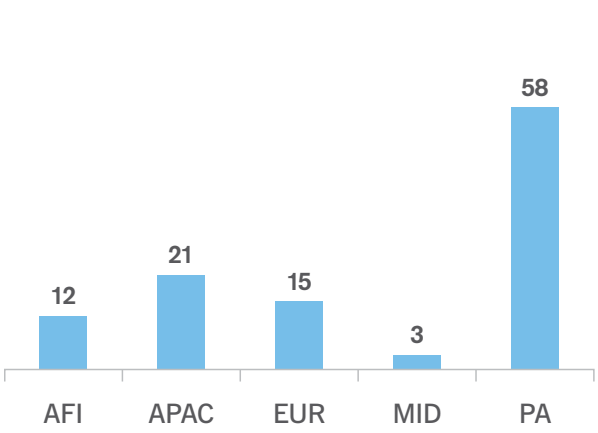
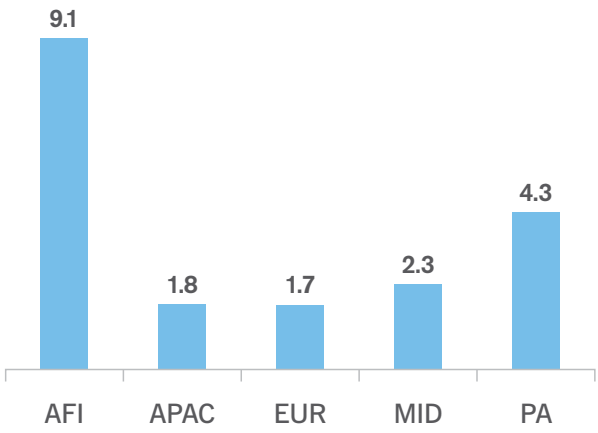


Chart 14: Accident Rate



Appendix 1

Analysis of Accidents – Scheduled Commercial Air Transport

This appendix provides a detailed analysis of accidents occurred in 2017. The data used in this analysis are for air transport operations involving fixed-wing aircraft with MTOW over 5700 kg conducting scheduled commercial air transport operations.

High-Risk Accident Occurrence Categories

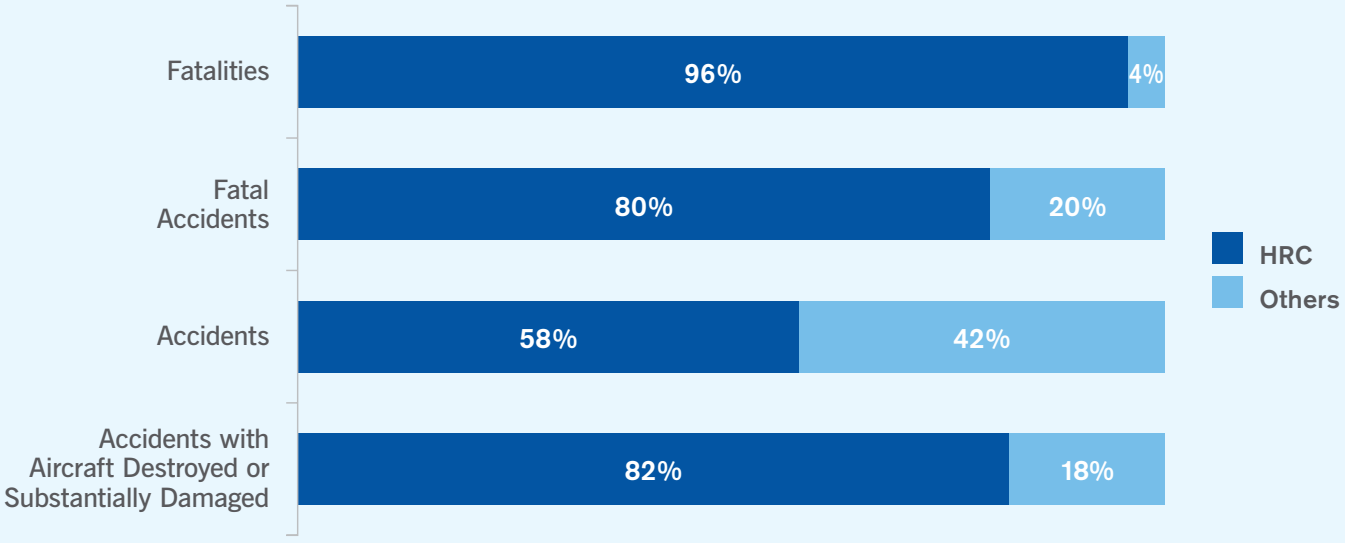
Based on an analysis of accident data for scheduled commercial air transport operations, ICAO has identified three high-risk accident categories as its safety priorities in the edition of 2017–2019 Global Aviation Safety Plan (GASP):

- Runway safety related events (RS)*;
- Loss of control in-flight (LOC-I); and
- Controlled flight into terrain (CFIT).

ICAO uses these high-risk accident categories as a baseline in its safety analysis.

Chart 15 shows that the three categories represented 58 per cent of the total number of accidents, 80 per cent of fatal accidents, 96 per cent of all fatalities and 82 per cent of the accidents that destroyed or caused substantial damage to aircraft in 2017.

Chart 15: High-Risk Category Accident Distribution



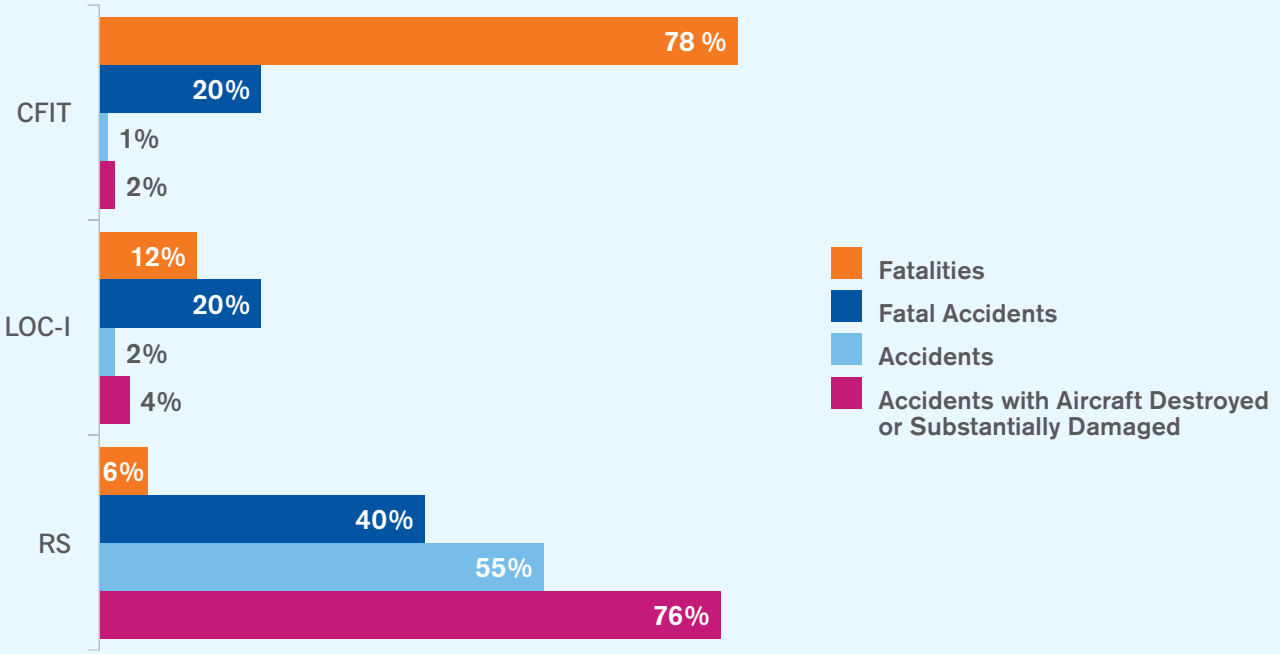
* Events related to runway safety include the following ICAO accident occurrence categories: Abnormal Runway Contact, Bird Strikes, Runway Excursion, Runway Incursion, Loss of Control on Ground, Ground Handling, Ground Collision, Collision with Obstacles, Undershoot/Overshoot, Aerodrome.

Chart 16 below shows a comparison of the distribution of accidents, fatal accidents, fatalities and accidents in which aircraft was destroyed or substantially damaged related to the three high-risk occurrence categories in 2017. Accidents related to runway safety (RS) accounted for more than half of all accidents in 2017 (55 per cent, compared with 57.3 per cent in 2016), and included 2 fatal accidents with 3 fatalities. There was one single fatal accident related to Loss of control-inflight (LOC-I) and Controlled flight into terrain (CFIT) respectively in 2017.

Notable observations and trends from 2017 accident data include:

- Although the CFIT occurrence category represented only 1 per cent of all 2017 accidents with a single fatal accident, it accounted for 78 per cent of all fatalities and remains of significant concern of safety.
- The LOC-I category represented 2 per cent of all 2017 accidents with the second-highest percentage of fatalities (12 per cent, down from 36.8 per cent in 2016).
- Accidents related to RS continue to account for the highest percentage of all accidents. Although these accidents resulted in relatively low numbers of fatalities, they represented the highest percentage of the accidents that destroyed or caused substantial damage to aircraft and accounted for 76 per cent of all these accidents.

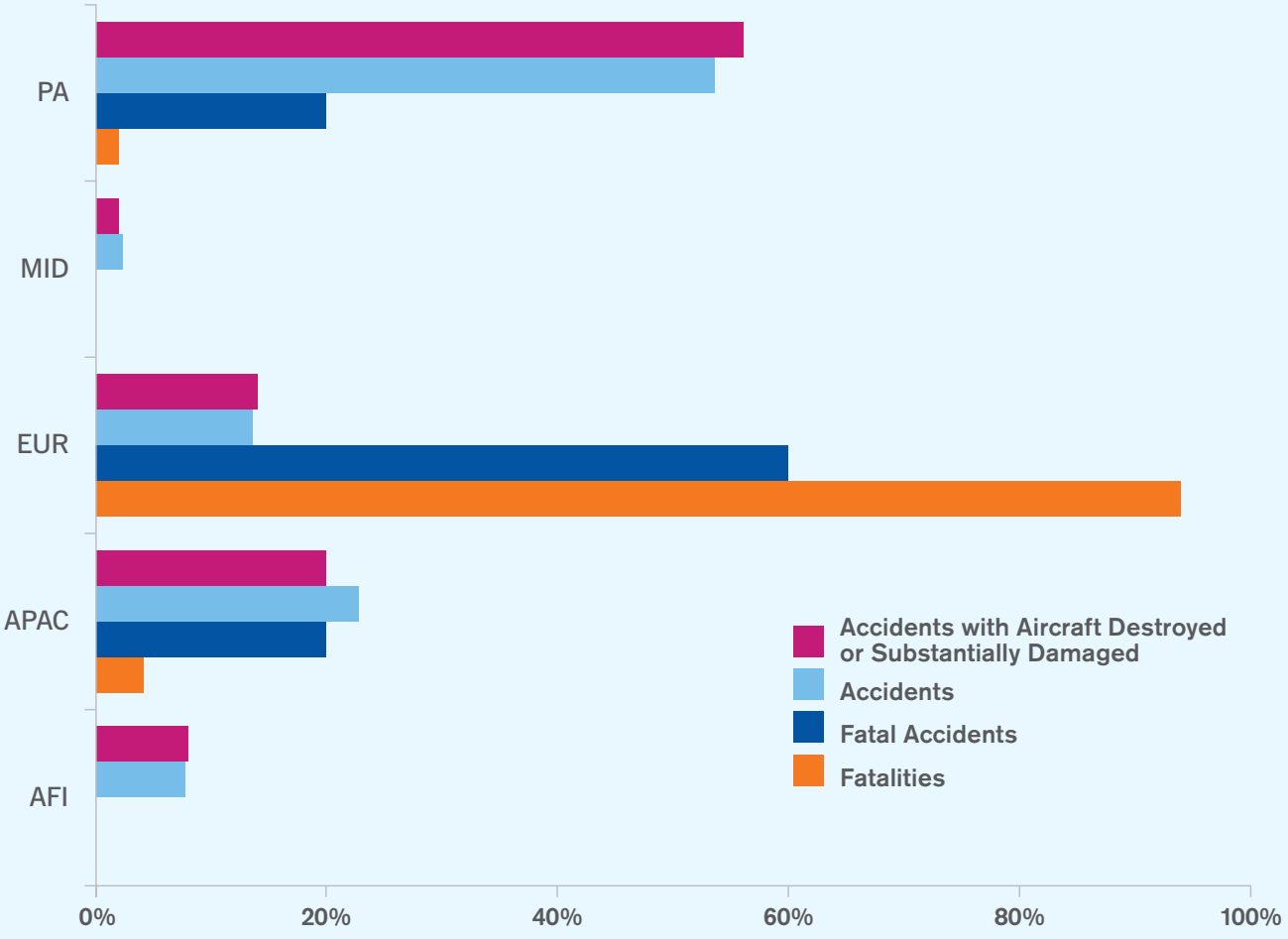
Chart 16: High-Risk Category Accident Overview



Accidents by RASG Region

Chart 17 below indicates the percentage of accidents and related fatalities by RASG region of occurrence in 2017. The States included in each RASG region are listed in Appendix 2.

Chart 17: Accident Overview by RASG Region

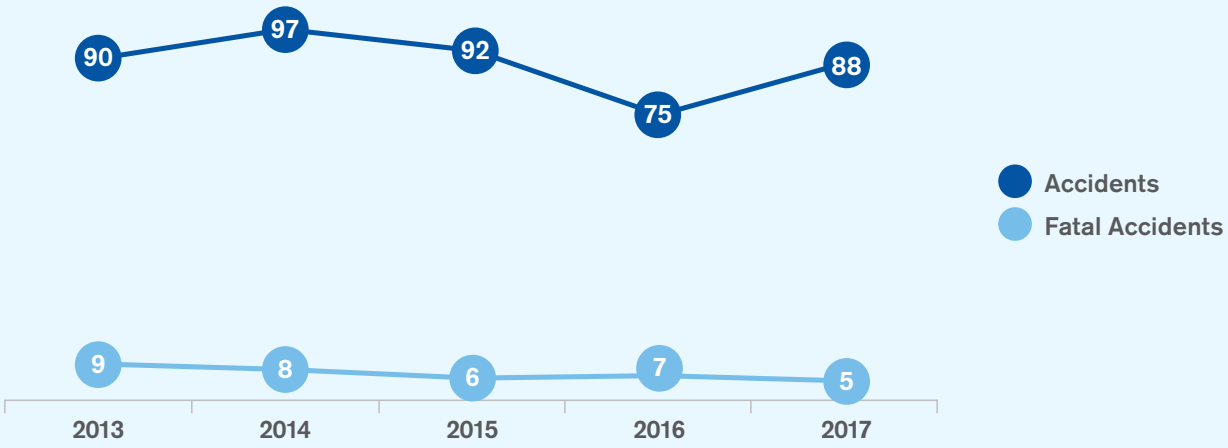


The RASG-PA region is one of the largest regions geographically and also represents the highest traffic volume though RASG-APAC is rapidly catching up. Therefore, the share of accidents in RASG-PA is understandably higher compared to other regions. In 2017, the RASG-EUR region experienced the highest percentage of fatal accidents and fatalities although the share of accidents was down to 13.6 per cent from 26 per cent in 2016.

Accident Trends

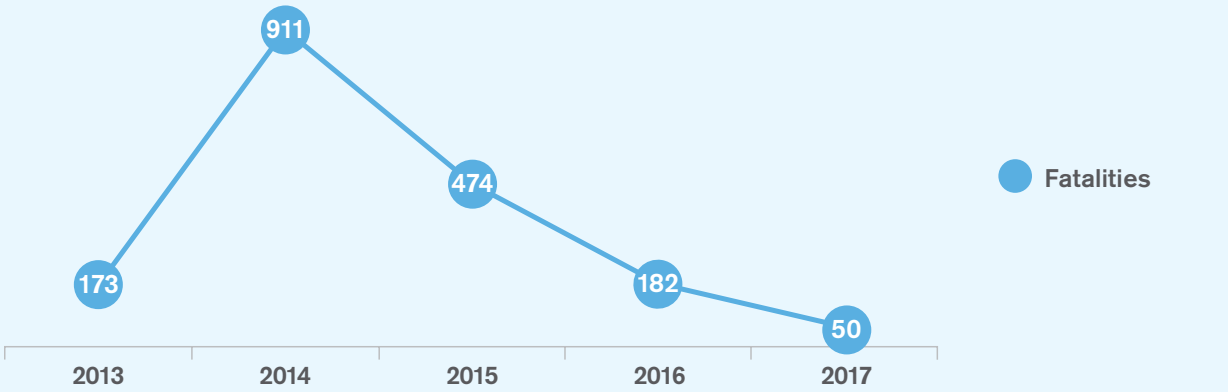
The number of accidents and fatal accidents on scheduled commercial flights during the 2013–2017 period are shown in Chart 18.

Chart 18: Accident and Fatal Accident Trend (2013–2017)



The annual number of accidents experienced has been generally stable during 2013–2017, varying between 75 and 97 per year. The accident count and the global accident rate increased in 2017 but with less fatal accidents and much fewer fatalities, both the lowest on recent record. Chart 19 shows the number of fatalities associated with above-mentioned fatal accidents.

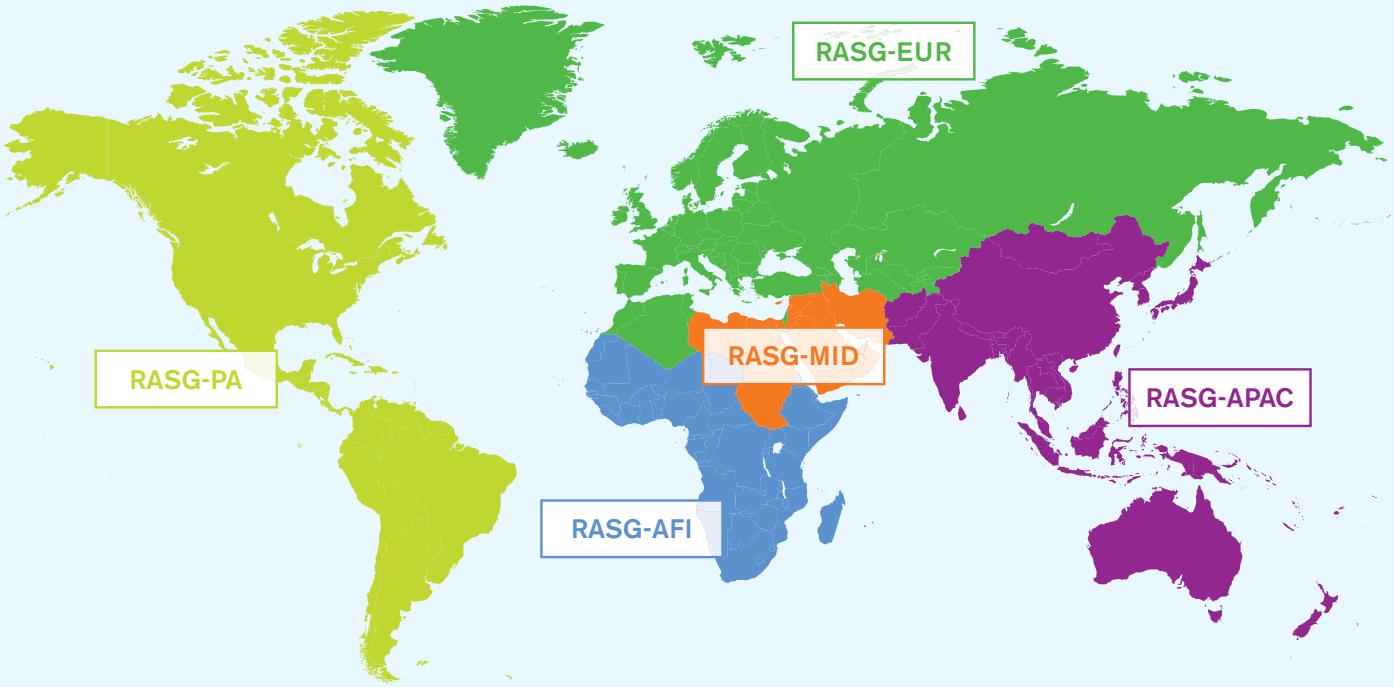
Chart 19: Fatalities Trend (2013–2017)



Appendix 2

Regional Aviation Safety Group (RASG) Regions

The assignment of States or areas to specific groupings is for statistical convenience and does not imply any assumption regarding political or other affiliation of States or territories by ICAO.



RASG-AFI (48)

Angola
Benin
Botswana
Burkina Faso
Burundi
Cameroon
Cape Verde
Central African Republic
Chad
Comoros
Congo
Côte d'Ivoire
Democratic Republic of the Congo
Djibouti
Equatorial Guinea
Eritrea
Ethiopia
Gabon
Gambia
Ghana
Guinea
Guinea-Bissau
Kenya
Lesotho
Liberia
Madagascar
Malawi
Mali
Mauritania
Mauritius
Mozambique
Namibia
Niger
Nigeria
Rwanda
Sao Tome and Principe
Senegal
Seychelles
Sierra Leone
Somalia
South Africa
South Sudan
Swaziland
Togo
Uganda
United Republic of Tanzania
Zambia
Zimbabwe

RASG-APAC (39)

Afghanistan
Australia
Bangladesh
Bhutan
Brunei Darussalam
Cambodia
China
Cook Islands
Democratic People's Republic of Korea
Fiji
India
Indonesia
Japan
Kiribati
Lao People's Democratic Republic
Malaysia
Maldives
Marshall Islands
Micronesia (Federated States of)
Mongolia
Myanmar
Nauru
Nepal
New Zealand
Pakistan
Palau
Papua New Guinea
Philippines
Republic of Korea
Samoa
Singapore
Solomon Islands
Sri Lanka
Thailand
Timor-Leste
Tonga
Tuvalu
Vanuatu
Viet Nam

RASG-EUR (56)

Albania
Algeria
Andorra
Armenia
Austria
Azerbaijan
Belarus
Belgium
Bosnia and Herzegovina
Bulgaria
Croatia
Cyprus
Czech Republic
Denmark
Estonia
Finland
France
Georgia
Germany
Greece
Hungary
Iceland
Ireland
Israel
Italy
Kazakhstan
Kyrgyzstan
Latvia
Lithuania
Luxembourg
Malta
Monaco
Montenegro
Morocco
Netherlands
Norway
Poland
Portugal
Republic of Moldova
Romania
Russian Federation
San Marino
Serbia
Slovakia
Slovenia
Spain
Sweden
Switzerland
Tajikistan
The former Yugoslav Republic of Macedonia
Tunisia
Turkey
Turkmenistan
Ukraine
United Kingdom
Uzbekistan

RASG-MID (15)

Bahrain
Egypt
Iraq
Islamic Republic of Iran
Jordan
Kuwait
Lebanon
Libyan Arab Jamahiriya
Oman
Qatar
Saudi Arabia
Sudan
Syrian Arab Republic
United Arab Emirates
Yemen

RASG-PA (34)

Antigua and Barbuda
Argentina
Bahamas
Barbados
Belize
Bolivia
Brazil
Canada
Chile
Colombia
Costa Rica
Cuba
Dominican Republic
Ecuador
El Salvador
Grenada
Guatemala
Guyana
Haiti
Honduras
Jamaica
Mexico
Nicaragua
Panama
Paraguay
Peru
Saint Kitts and Nevis
Saint Lucia
Saint Vincent and the Grenadines
Suriname
Trinidad and Tobago
United States
Uruguay
Venezuela

Appendix 3

GSIE Harmonized Accident Categories

Category	Description
Controlled Flight into Terrain (CFIT)	Includes all instances where the aircraft was flown into terrain in a controlled manner, regardless of the crew's situational awareness. Does not include undershoots, overshoots or collisions with obstacles on take-off and landing which are included in Runway Safety.
Loss of Control in-Flight (LOC-I)	Loss of control in-flight that is not recovered.
Runway Safety (RS)	Includes runway excursions and incursions, undershoot/overshoot, tail strike and hard landing events.
Ground Safety (GS)	Includes ramp safety, ground collisions, all ground servicing, pre-flight, engine start/ departure and arrival events. Taxi and towing events are also included.
Operational Damage (OD)	Damage sustained by the aircraft while operating under its own power. This includes in-flight damage, foreign object debris (FOD) and all system or component failures.
Injuries to and/or Incapacitation of Persons (MED)	All injuries or incapacitations sustained by anyone coming into in direct contact with any part of the aircraft structure. Includes turbulence-related injuries, injuries to ground staff coming into contact with the structure, engines or control surfaces aircraft and on-board injuries or incapacitations and fatalities not related to unlawful external interference.
Other (OTH)	Any event that does not fit into the categories listed above.
Unknown (UNK)	Any event whereby the exact cause cannot be reasonably determined through information or inference, or when there are insufficient facts to make a conclusive decision regarding classification.

Category	CICTT Occurrence Categories	IATA Classification End States
Controlled Flight into Terrain (CFIT)	CFIT, CTOL	CFIT
Loss of Control in-Flight (LOC-I)	LOC-I	Loss of Control In-flight
Runway Safety (RS)	RE, RI, ARC, USOS	Runway Excursion, Runway Collision, Tailstrike, Hard Landing, Undershoot, Gear-up Landing / Gear Collapse
Ground Safety (GS)	G-COL, RAMP, LOC-G	Ground Damage
Operational Damage (OD)	SCF-NP, SCF-PP	In-flight Damage
Injuries to and/or Incapacitation of Persons (MED)	CABIN, MED, TURB	None (excluded in IATA Safety Report)
Other (OTH)	All other CICTT Occurrence Categories	All other IATA end-states
Unknown (UNK)	UNK	Insufficient Information

Appendix 4

List of Scheduled Commercial Accidents in 2017

Date	Model	State of Occurrence	RASG Region	Fatalities	Accident Category
2017-01-02	Airbus A320-200	Thailand	APAC	0	ARC
2017-01-03	Boeing 777-200	Canada	PA	0	GCOL
2017-01-16	Boeing 747-400F	Kyrgyzstan	EUR	39	CFIT
2017-01-28	Boeing 737-400	Columbia	PA	0	RE
2017-02-07	Saab 340	Bahamas	PA	0	RE
2017-02-09	Beech 1900D	Canada	PA	0	GCOL
2017-02-11	Boeing 737-700	United States	PA	0	RAMP
2017-02-13	De Havilland Dash 8	United States	PA	0	TURB
2017-02-18	De Havilland Dash 8-300	Maldives	EUR	0	ARC
2017-02-23	De Havilland Dash 8-400	Netherlands	EUR	0	ARC, SCF-NP
2017-03-03	Beech 1900C	Canada	PA	0	GCOL
2017-03-06	Airbus A319-100	United States	PA	0	CABIN
2017-03-09	Boeing MD-83	United States	PA	0	TURB
2017-03-13	Boeing 737-800	Australia	APAC	0	TURB
2017-03-17	Douglas DC-3C	Canada	PA	0	LOC-I
2017-03-20	ATR 42-500	Brazil	PA	0	RE
2017-03-27	Boeing 737-NG	Islamic Republic of Iran	MID	0	SCF-NP
2017-03-28	Boeing 737-300	Peru	PA	0	F-POST
2017-04-01	Let L-410	Nigeria	AFI	0	RE
2017-04-08	Boeing 737-800	Malaysia	APAC	0	RE
2017-04-09	Boeing 737-800	South Africa	AFI	0	BIRD
2017-04-10	Boeing 757-200	Spain	EUR	0	ARC
2017-04-12	Airbus A320-200	Portugal	EUR	0	CABIN
2017-04-14	Embraer ERJ190	United States	PA	0	TURB
2017-04-19	Airbus A320-200	Thailand	APAC	0	RAMP
2017-04-30	Boeing 737-700	Angola	AFI	0	SCF-NP
2017-05-01	Boeing 777-300	Thailand	APAC	0	TURB
2017-05-02	Airbus A320	United States	PA	0	TURB

Date	Model	State of Occurrence	RASG Region	Fatalities	Accident Category
2017-05-20	Boeing 757-200	United States	PA	0	ARC
2017-05-21	Airbus A319-100	United States	PA	0	TURB
2017-05-26	ATR 72-200	Ireland	EUR	0	RAMP
2017-05-27	Boeing 777-200	Canada	PA	0	GCOL
2017-05-27	Let L-410	Nepal	APAC	2	USOS
2017-05-31	Boeing 737	India	APAC	0	RE
2017-06-23	Airbus A321-200	United States	PA	0	ARC
2017-06-30	Airbus A321-200	United States	PA	0	GCOL
2017-07-01	Boeing 787-900	Japan	APAC	0	TURB
2017-07-02	Bombardier CL 600	United States	PA	0	SCF-PP
2017-07-18	Boeing 737-300	India	APAC	0	RE, ARC
2017-07-19	Boeing 757-300	Egypt	MID	0	EVAC
2017-07-19	Embraer ERJ 170	United States	PA	0	TURB
2017-07-20	De Havilland Dash 8-100	Canada	PA	0	WSTRW
2017-07-29	Antonov 74TK-100	Sao Tome and Principe	AFI	0	RE, BIRD
2017-08-03	ATR 72-500	India	APAC	0	GCOL
2017-08-05	Airbus 330-300	United States	PA	0	TURB
2017-08-08	Boeing 737-700	Ireland	EUR	0	CABIN
2017-08-15	Boeing 737-800	United States	PA	0	GCOL
2017-08-22	Boeing 777	Ethiopia	AFI	0	GCOL
2017-08-22	Bombardier CRJ700	United States	PA	0	TURB
2017-09-03	Cessna 680	United States	PA	0	RAMP
2017-09-04	Boeing 737-800	China	APAC	0	ARC
2017-09-04	Boeing MD90	United States	PA	0	TURB
2017-09-05	Boeing 737-800	India	APAC	0	ADRM
2017-09-08	Learjet 31	Mexico	PA	0	RE
2017-09-10	Antonov An-26B	Congo	AFI	0	RE
2017-09-12	Boeing 737	United States	PA	0	GCOL
2017-09-13	Boeing 737-800	Australia	APAC	0	TURB
2017-09-13	Bombardier CRJ-200	United States	PA	0	GCOL
2017-09-15	Airbus A321-231	Barbados	PA	0	ARC
2017-09-18	De Havilland Dash 8-400	Canada	PA	0	TURB
2017-09-25	Boeing 737-800	United States	PA	0	CABIN
2017-09-28	Airbus A321-200	Russian Federation	EUR	2	OTH
2017-09-30	Airbus A380-800	Greenland	EUR	0	SCF-PP

Date	Model	State of Occurrence	RASG Region	Fatalities	Accident Category
2017-09-30	Boeing 737-800	United States	PA	0	GCOL
2017-10-02	Boeing 737-700	United States	PA	0	GCOL
2017-10-11	De Havilland Dash 8-400	Ireland	EUR	0	SCF-PP
2017-10-13	Airbus A320	Philippines	APAC	0	RE
2017-10-14	Beech 1900D	Canada	PA	0	ARC
2017-10-15	Boeing 767-300ER	United States	PA	0	TURB
2017-10-18	Boeing 737-800	Spain	EUR	0	TURB
2017-10-22	Boeing 737-800	Japan	APAC	0	TURB
2017-10-24	Boeing 737-800	India	APAC	0	TURB
2017-10-30	Boeing 767-300	Canada	PA	0	SCF-PP
2017-11-08	De Havilland Dash 8-400	India	APAC	0	ARC
2017-11-09	De Havilland Dash 8-400	Canada	PA	0	ARC
2017-11-15	Let L-410	Russian Federation	EUR	6	LOC-I
2017-11-16	Airbus A320	Philippines	APAC	0	ARC
2017-11-19	ATR 72-600	Australia	APAC	0	WSTRW
2017-11-25	ATR 72-500	Ghana	AFI	0	RE
2017-11-27	Boeing 777	United States	PA	0	GCOL
2017-12-02	Boeing 777-300	Canada	PA	0	GCOL
2017-12-03	Airbus A319	United States	PA	0	GCOL
2017-12-05	Airbus A321	United States	PA	0	TURB
2017-12-12	Boeing MD88	United States	PA	0	RAMP
2017-12-13	ATR 42-300	Canada	PA	1	CTOL
2017-12-17	Embraer ERJ 700	United States	PA	0	AMAN
2017-12-23	Boeing 737-800	Greece	EUR	0	ARC
2017-12-23	Boeing DC-9	United States	PA	0	SCF-PP

Accident Categories

Code	Description
ADRM	Aerodrome
AMAN	Abrupt maneuver
ARC	Abnormal runway contact
BIRD	Bird strikes
CABIN	Cabin safety events
CFIT	Controlled flight into/towards terrain
CTOL	Collision with obstacles during takeoff and landing
EVAC	Evacuation
F-NI	Fire/smoke (non-impact)
F-POST	Fire/smoke (post-impact)
GCOL	Ground collision
LOC-I	Loss of control in-flight
OTH	Other
RAMP	Ground handling
RE	Runway excursion
SCF-NP	System/component failure (non-powerplant)
SCF-PP	System/component failure (powerplant)
TURB	Turbulence encounter
USOS	Undershoot/overshoot
WSTRW	Wind shear or thunderstorm

Appendix 5

Annexes to the Convention on International Civil Aviation

Annex 1	Personnel Licensing
Annex 2	Rules of the Air
Annex 3	Meteorological Service for International Air Navigation
Annex 4	Aeronautical Charts
Annex 5	Units of Measurement to be Used in Air and Ground Operations
Annex 6	Operation of Aircraft
	Part I — International Commercial Air Transport — Aeroplanes
	Part II — International General Aviation — Aeroplanes
	Part III — International Operations — Helicopters
Annex 7	Aircraft Nationality and Registration Marks
Annex 8	Airworthiness of Aircraft
Annex 9	Facilitation
Annex 10	Aeronautical Telecommunications
	Volume I — Radio Navigation Aids
	Volume II — Communication Procedures including those with PANS Status
	Volume III — Communication Systems
	Volume IV — Surveillance and Collision Avoidance Systems
	Volume V — Aeronautical Radio Frequency Spectrum Utilization
Annex 11	Air Traffic Services
Annex 12	Search and Rescue
Annex 13	Aircraft Accident and Incident Investigation
Annex 14	Aerodromes
	Volume I — Aerodrome Design and Operations
	Volume II — Heliports
Annex 15	Aeronautical Information Services

Annex 16	Environmental Protection
	Volume I - Aircraft Noise
	Volume II - Aircraft Engine Emissions
	Volume III - Aeroplane CO2 Emissions
Annex 17	Security
Annex 18	The Safe Transport of Dangerous Goods by Air
Annex 19	Safety Management

Appendix 6

List of the ICAO Air Navigation Commission (ANC) Panels

Panel Name	Objective
Aerodrome Design and Operations Panel (ADOP)	Develop and maintain SARPs, procedures and guidance materials for: a) Global reporting format for runway surface condition reporting for aircraft operations on contaminated runways b) installation of arresting system to address operational issues and criteria for design specification and acceptance by State c) airport collaborative decision making (A-CDM) and industry best practices d) procedures on airport operational management activities e) airport emergency response including rescue and fire fighting f) advanced surface movement guidance and control systems (A-SMGCS) g) final approach and take-off area characteristics for heliports h) obstacle limitation surfaces SARPs and related guidance material on aeronautical studies
Accident Investigation Panel (AIGP)	a) Develop and maintain provisions for accident/incident investigations in support of the GASP; b) Consider new procedures, techniques and methodologies for investigations, proposing amendments to provisions and guidance as necessary; c) Review Attachment E to Annex 13, along with other relevant provisions, and determine measures to enhance the protection of safety information gathered during investigations, in particular of certain accident and incident records; d) Identify the category of serious incidents that could be precursors to, or associated with the types of accidents having the highest rate of fatalities (e.g. LOC-I; CFIT; runway incursion/excursion) and discuss strategies for investigating those incidents; e) Consider methodologies to assist States with limited resources to conduct large scale investigations, including regional accident and incident investigation organizations (RAIOs); f) Consider strengthening protection of accident and incident records, including development of guidance on protocols and agreements between accident investigation authorities and judicial authorities; and g) Progress provisions for accident/incident investigations involving remotely piloted aircraft systems (RPASs).
Airworthiness Panel (AIRP)	Develop and maintain SARPS and guidance materials for: a) Continuing airworthiness and aircraft certification provisions of Annex 8 — Airworthiness of Aircraft. b) Maintenance related provisions of Annex 6 — Operation of Aircraft. c) Annex 7 – Aircraft nationality and registration marks d) Increasing the harmonization of the regulatory approach to airworthiness related certificate and approval recognition.
Air Traffic Management Operations Panel (ATMOPSP)	Develop strategy and coordinated solutions for air traffic management (i.e. air traffic services (ATS), airspace management (ASM), air traffic flow management (ATFM)), stemming from requirements elaborated in Aviation System Block Upgrades (ASBUs) as well as from requirements which may be elaborated by other sources, consistent with the need to ensure a harmonized global ATM operational environment. Develop and maintain Standards and Recommended Practices (SARPs), Procedures for Air Navigation Services (PANS) and guidance material for: a) air traffic services b) air traffic flow management c) procedures and phraseology for air traffic control d) airspace management e) civil military coordination

Panel Name	Objective
ATM Requirements & Performance Panel (ATMRPP)	In fulfilling its mandate and reflecting the Global Air Navigation Plan, the panel will develop concepts, Standards and Recommended Practices, as well as Procedures for Air Navigation Services and/or related guidance material supporting the concept of Flight and Flow Information for a Collaborative Environment (FF-ICE), Aircraft Access to System Wide Information Management (SWIM) and Trajectory-based Operations taking into account: • future demands on airspace and airport capacity; and • communication, navigation and surveillance systems available.
Communications Panel (CP)	1. Develop and update strategies and plans for aeronautical communications harmonization outlined in the Global Air Navigation Plan; 2. Consolidate and develop operational requirements for voice and data communications; 3. Monitor the development and implementation of ATM communication systems and facilities; and 4. Develop, as required, provisions and guidance material for : a) Air-ground and ground-ground data applications for air traffic services b) A performance-based framework for communications and surveillance c) Command and Control links for Remotely Piloted Aircraft d) ATC links for Remotely Piloted Aircraft. e) SATCOM voice f) Procedures to support ATM voice and data communications g) Provisions on cyber-security for ATM communications. h) Infrastructure to support the above.
Dangerous Goods Panel (DGP)	Develop and maintain a global strategy to address risks associated with the transport of dangerous goods by air through the development and maintenance of applicable Standards and Recommended Practices (SARPs), the Technical Instructions and its related document and guidance material for the safe transport of dangerous goods by air. This includes, but is not limited to: a) promoting inter-organizational/intermodal harmonization intended to facilitate safe transport; b) identifying gaps in dangerous goods safety regulations; c) identifying risks related to the transport of dangerous goods by air; d) developing performance-based mitigation strategies to address risks; and e) developing guidance for dangerous goods training and outreach with the goal of attaining full compliance with regulations by all entities involved.
Flight Operations Panel (FLTOPSP)	Develop and maintain SARPS and guidance materials including flight recorder related provisions to support accident and incident investigations, for: a) Commercial Air Transport operations; b) General Aviation Operations; and c) Helicopter Operations.
Frequency Spectrum Management Panel (FSMP)	a) Develop and maintain SARPs and guidance material to facilitate frequency management of communication, navigation and surveillance systems. b) Update proposals to the ICAO spectrum strategy, mapping out the future requirements for spectrum to support communication, navigation and surveillance systems, in close cooperation with the panels responsible for those systems. c) Update proposals to the detailed ICAO Policy on all relevant aeronautical frequency spectrum allocations. d) Develop the ICAO Position for upcoming ITU World Radiocommunication Conferences (WRC). e) Assist the ICAO Secretariat in developing input material for studies within the ITU Radiocommunication Sector (ITU-R) as necessary to ensure that aeronautical interests are taken care of in the development of ITU-R Recommendations and Reports and in the development of draft solutions for an upcoming WRC. f) Address issues of interference from aeronautical and non-aeronautical sources.

Panel Name	Objective
Instrument Flight Procedures Panel (IFPP)	Develop and maintain flight procedures SARPs and guidance material (e.g., PANS-OPS, Docs 8697, 9905 and 9906) leading to enhanced safety, increased terminal airspace capacity and utilization, improved airport/heliport accessibility in all weather conditions, and more efficient transitions to/from en-route airspace. Specifically this includes: a) new instrument flight procedure (IFP) design criteria to address improvements in air navigation, evolving aircraft capabilities and new operational concepts; b) instrument flight procedure oversight requirements; c) harmonization of charting criteria, databases, and avionics systems guidance with IFP design standards and the facilitation of an efficient communication between ATC and Flight Crews; d) necessary consequential amendments to impacted Annexes and ICAO Documents as a result of changes to IFP design SARPs and criteria
Information Management Panel (IMP)	1) Define the Global Interoperability Framework (including a minimum set of global 'artefacts') which should include the items further described hereafter. 2) Define and elaborate on the ATM information management concepts, functions and processes required including business model to provide accredited, quality-¬ assured and timely information required by actors within the air navigation system and used to support operations (including Full FF-¬ICE, digital MET information exchange and NOTAM system review) on a system-¬wide basis, including avionics. 3) Identify the Quality of Service requirements necessary to maintain ATM information security, integrity, confidentiality and availability and to mitigate the risks of intentional disruption and/or changes to safety critical ATM information. 4) Develop an ATM information service architecture. 5) Identify the requirements for SARPS and changes to existing SARPS that will provide an interoperable environment that will support the information requirements of all ANS stakeholders in accordance with the blocks and operational improvements outlined in the Global Air Navigation Plan and: a) Develop those SARPs necessary to enable SWIM in accordance with the Roadmap outlined in the Global Air Navigation Plan; and b) Provide suitable objectives and requirements to serve as the basis for SARP development by other groups where appropriate. c) Update and maintain the Information Management Roadmap. 6) Develop transition strategies and guidance necessary for the implementation of global SWIM and new information exchange formats, including future avionic requirements. 7) Plan for anticipated data and information flows in relation with future ATM requirements and capabilities and assess the capacity of appropriate facilities to support them.
Meteorology Panel (METP)	The METP shall conduct its work in keeping with the following objectives: a) to define and elaborate concepts for aeronautical MET service provision consistent with the identified operational requirements, including the functions and processes necessary to provide quality assured, cost-effective aeronautical MET services and information supporting the future globally interoperable air traffic management system through system-wide information management (SWIM); b) to identify the scientific and/or technological capabilities necessary to fulfil the identified operational requirements; c) to develop and/or maintain ICAO provisions necessary for meteorological service for international air navigation; d) to develop and/or maintain aeronautical MET integration roadmaps (or similar) that provide transition strategies for aeronautical MET services and information consistent with the GANP; and e) to develop proposals fostering interoperability through appropriate collaborative arrangements for global, multi-regional, regional, sub-regional and national/local MET systems and services.

Panel Name	Objective
Navigation Systems Panel (NSP)	1) Develop and update strategies and plans for global navigation harmonization outlined in the Global Air Navigation Plan; 2) Monitor the development and implementation of aeronautical navigation systems and facilities in order to facilitate worldwide coordination of implementation; 3) Develop, as required, Standards and Recommended Practices (SARPs), Procedures for Air Navigation Services (PANS) and guidance material relating to: a) evolution of GNSS core constellation, including the introduction of new constellations (Galileo, Beidou) and the modernization of existing ones (GPS, GLONASS); b) evolution of GNSS augmentation systems (SBAS, GBAS, ABAS, including advanced receiver autonomous integrity monitoring); c) GNSS vulnerability issues, in particular with regard to RF interference issues and space weather effects, including consideration of alternative position, navigation and timing infrastructure; d) rationalization of the conventional navigation infrastructure; e) testing of radio navigation aids; f) maintenance of/resolution of issues with existing ICAO provisions for navigation systems.
Remotely Piloted Aircraft Systems Panel (RPASP)	1) Serve as the focal point and coordinator of all ICAO RPAS related work, with the aim of ensuring global interoperability and harmonization; 2) Develop an RPAS regulatory concept and associated guidance material to support and guide the regulatory process; 3) Review ICAO SARPs, propose amendments and coordinate the development of RPAS SARPs with other ICAO expert groups; 4) Assess impacts of proposed provisions on existing manned aviation; and 5) Coordinate, as needed, to support development of a common position on bandwidth and frequency spectrum requirements for command and control of RPAS for the International Telecommunications Union (ITU) World Radio Conference (WRC) negotiations.
Separation and Airspace Safety Panel (SASP)	In fulfilling its mandate and reflecting the Global Air Navigation Plan, the panel will develop Standards and Recommended Practices, Procedures for Air Navigation Services and/or related guidance material supporting separation minima, taking into account: a) future demands on airspace and airport capacity b) communication, navigation and surveillance systems available, and c) agreed levels of safety.
Safety Management Panel (SMP)	Develop and/or maintain the ICAO safety management provisions to: a) assist States in systematically managing aviation safety risks; and b) support the continued evolution of a proactive strategy to improve safety performance.
Surveillance Panel (SP)	1) Develop and maintain SARPS and guidance materials covering the procedural and technical aspects of: a) airborne and ground based aeronautical surveillance systems b) airborne collision avoidance systems (ACAS) c) related facilities and systems d) airborne surveillance capabilities (e.g. AIRB, VSA and SURF) e) advanced airborne surveillance applications (e.g. interval management and airborne separation)[UM1] f) ground based safety nets 2) Develop provisions for detect and avoid capability for Remotely Piloted Aircraft (RPA) in coordination with the RPASP

Appendix 7

Panel Memberships* Distribution among States

State	%	State	%	State	%
ARGENTINA	1.51	GERMANY	5.03	PHILIPPINES	0.25
AUSTRALIA	4.27	GREECE	0.50	POLAND	0.25
AUSTRIA	0.50	GUATEMALA	0.25	PORTUGAL	0.25
AZERBAIJAN	0.25	HUNGARY	0.25	REPUBLIC OF KOREA	2.26
BAHRAIN	0.25	ICELAND	0.75	ROMANIA	0.25
BELGIUM	0.25	INDIA	2.76	RUSSIAN FEDERATION	4.52
BRAZIL	4.52	IRAN (ISLAMIC REPUBLIC OF)	0.50	SAUDI ARABIA	3.52
CAMEROON	0.25	IRELAND	0.75	SENEGAL	0.50
CANADA	5.28	ISRAEL	0.50	SINGAPORE	4.52
CHILE	0.25	ITALY	3.27	SOUTH AFRICA	3.52
CHINA	5.03	JAPAN	4.77	SPAIN	2.26
COLOMBIA	0.25	JORDAN	0.25	SWEDEN	1.76
COSTA RICA	0.50	KENYA	1.51	SWITZERLAND	1.76
COTE D'IVOIRE	0.50	MALAYSIA	0.25	THAILAND	0.75
CUBA	0.25	MAURITANIA	0.25	TURKEY	1.51
CURACAO	0.25	MEXICO	0.25	UNITED ARAB EMIRATES	2.51
DENMARK	0.25	NETHERLANDS	2.01	UNITED KINGDOM	5.53
DOMINICAN REPUBLIC	0.50	NEW ZEALAND	0.75	UNITED STATES OF AMERICA	5.28
EGYPT	1.76	NIGERIA	0.75	VENEZUELA (BOLIVARIAN REPUBLIC OF)	0.50
FINLAND	0.50	NORWAY	0.25		
FRANCE	5.28	PAKISTAN	0.25		

* Data as of 31 December, 2017

Panel Memberships* Distribution among RASG Regions

Panels	Members				
	AFI (48**)	APAC (39)	EUR (56)	MID (15)	PA (34)
ADOP		6	12	1	5
AIGP	4	4	7	4	7
AIRP		6	6	3	3
ATMOPSP		4	7	4	3
ATMRPP	1	4	5	2	4
CP-DCIWG	3	6	9	2	4
CP-OPDLWG		5	9		3
DGP	1	4	6	1	3
FLTOPSP	1	5	6	2	4
FLTOPSP-FLIRECSWG		3	6	1	2
FSMP	3	5	6	1	3
IFPP	1	5	7	1	3
IMP	1	6	5	2	3
METP	3	5	4	2	6
NSP	1	5	9	1	4
RPASP	1	6	12	1	5
SASP	2	7	10	3	3
SMP	3	5	9	2	7
SP	3	7	9	1	4
SPACELG	1	5	9	1	2
GRAND TOTAL	**29**	**103**	**153**	**35**	**78**
PARTICIPATION RATE	**0.60**	**2.64**	**2.73**	**2.33**	**2.29**

* Data as of 31 December, 2017; ** Number of RASG States.

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