ICAO

SAFETY

Safety Report

2020 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 vitality of civil aviation is to ensure safe, secure, efficient and environmentally 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 environmental protection on a global basis. Today, ICAO manages over 12 000 SARPs across the 19 Annexes and five Procedures for Air Navigation Services (PANS) to the Convention on International Civil Aviation (Chicago Convention), many of which are constantly evolving in tandem with latest developments and innovations. ICAO serves as the primary forum for co-operation in all fields of civil aviation among its 193 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:

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

The ICAO Global Aviation Safety Plan (GASP) presents the strategy in support of the prioritization and continuous improvement of aviation safety. The GASP sets the goals and targets and outlines key safety enhancement initiatives (SEIs) aimed at improving safety at the international, regional and national levels.

This edition of the Safety Report is structured in alignment with the 2020–2022 edition of GASP and the new edition of the Global Air Navigation Plan (GANP), which provides global strategic guidelines to drive the evolution of the air navigation system. This report provides a summary of initiatives to improve aviation safety and provides updates on some safety performance indicators (SPIs), including accidents that occurred in 2019, and related risk factors. Results of analysis from the 2015–2019 reports are used as benchmarks for comparison, although it must be noted that numbers presented in this report may not exactly match earlier editions due to data updates during the intervening period.

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Note: The ICAO regional aviation safety group (RASG) regions are used in the report and are listed in Appendix 1. 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

Yearly accident statistics indicate an increase in both the total number of accidents as well as the global accident rate in 2019. From 2018 to 2019, there was a 16 per cent increase in the total number of accidents, as reported by States. The global accident rate of 2.9 accidents per million departures also increased by 12 per cent from the 2018 rate of 2.6 accidents per million departures. The accidents used for these statistics were reviewed and validated by the ICAO Safety Indicators Study Group (SISG), and involved scheduled commercial operations of aircraft with a certified maximum take-off weight (MTOW) of over 5 700 kg as defined in ICAO Annex 13 — *Aircraft Accident and Incident Investigation*.

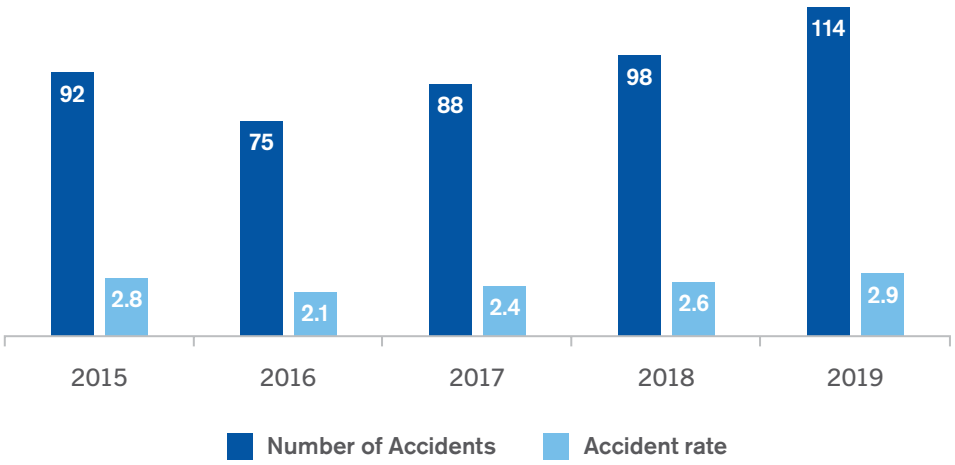


Chart 1. | Accident records: 2015–2019 scheduled commercial operations

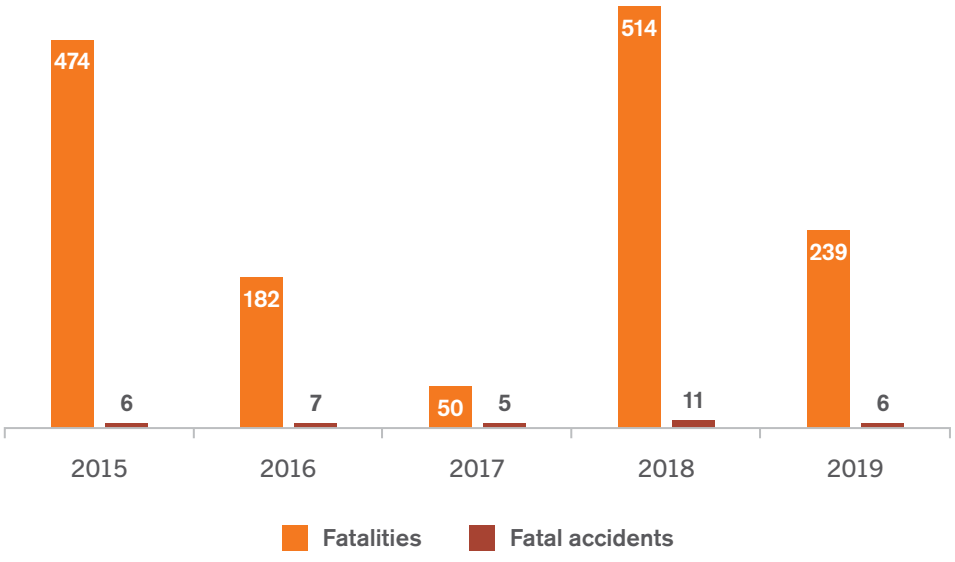


Chart 2. | Fatal accident records: 2015–2019 scheduled commercial operations

In 2019, scheduled commercial air transport accidents resulted in 239 fatalities representing a significant decrease from 514 in 2018. The number of fatal accidents also decreased from 11 in 2018 to six in 2019. Figure 1 shows the number of fatal accidents by ICAO RASG region.

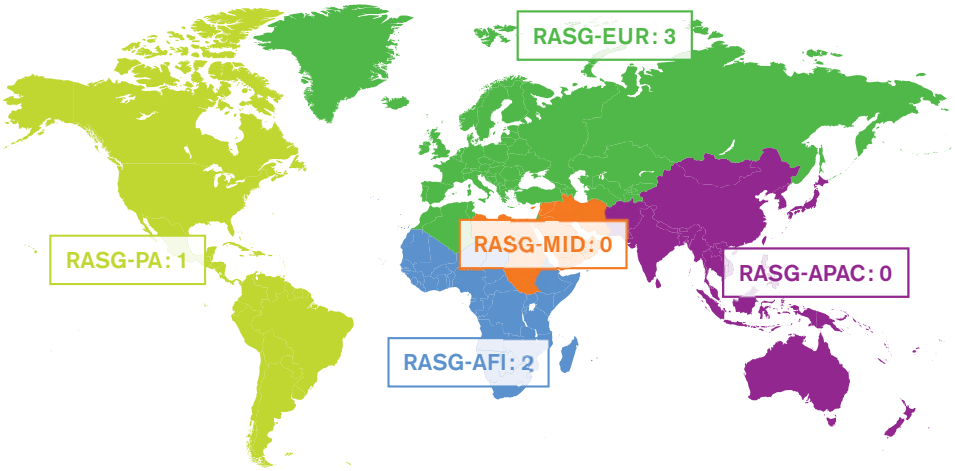


Figure 1. | Number of fatal accidents by RASG region

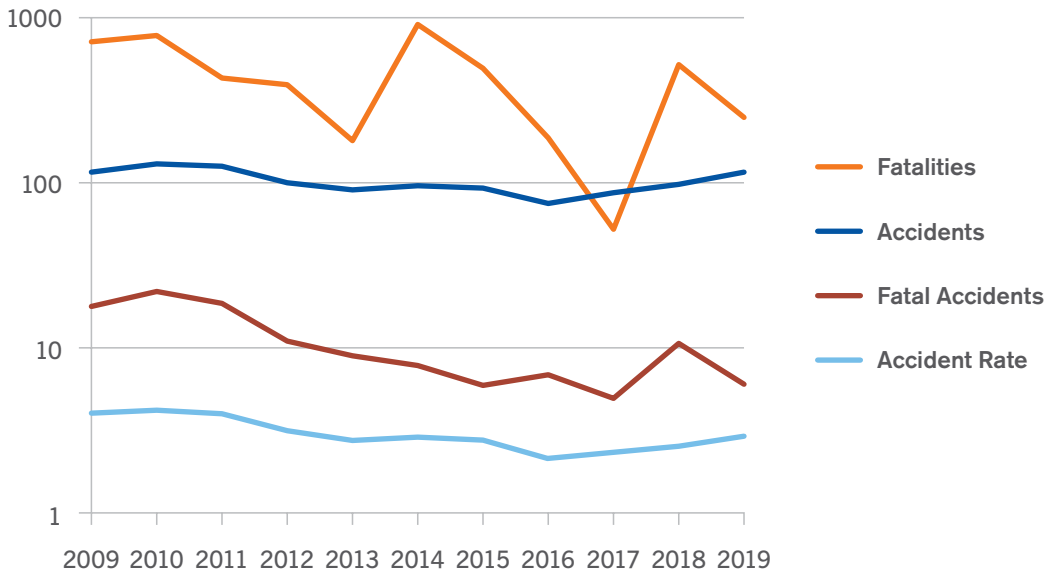


Chart 3. | Historical safety trends for scheduled commercial operations

The 40th Session of the ICAO Assembly was convened in Montréal from 24 September to 4 October 2019, during which it agreed on resolution A40-1: ICAO global planning for safety and air navigation, endorsing the 2020–2022 edition of *Global Aviation Safety Plan* (GASP, Doc 10004). The Assembly also agreed to the following safety-related resolutions:

- A40-2: Protection of accident and incident investigation records;
- A40-3: Protection of safety data and safety information collected for maintaining or improving safety and of flight recorder recordings in normal operations;
- A40-5: Regional implementation support mechanisms; and
- A40-6: Regional cooperation and assistance to resolve safety deficiencies, establishing priorities and setting measurable targets.

The third High-level Safety Conference (HLSC 2021), which has been tentatively scheduled a year ahead of the 41st Session of the ICAO Assembly, will provide a forum for technical discussions to formulate a set of high-level recommendations and decisions on main safety issues as well as selected air navigation matters. These recommendations will be taken into consideration for the preparation of the Business Plan and Budget to be presented to the 41st Assembly.

The 2020–2022 edition of the GASP presents a series of goals, targets and indicators to support its vision, which is to achieve and maintain the aspirational safety goal of zero fatalities in commercial operations by 2030 and beyond, and its mission, which is to continue to enhance aviation safety performance internationally by providing a collaborative framework for States, regions and industry.

The purpose of the GASP is to continuously reduce fatalities and the risk of fatalities. To do so, it presents five high-risk categories of occurrence (HRCs) all States need to address, namely: controlled flight into terrain (CFIT), loss of control in-flight (LOC-I), runway excursion (RE), runway incursion (RI) and mid-air collision (MAC). Through the GASP, ICAO provides safety enhancement initiatives (SEIs) to continuously reduce operational safety risks and implement regional and industry safety risk management activities to address the HRCs.

ICAO is committed to improving aviation safety and fostering cooperation and communication among stakeholders. ICAO works closely with established regional entities, such as regional aviation safety groups (RASGs), regional safety oversight organizations (RSOOs), cooperative development of operational safety and continuing airworthiness programmes (COSCAPs) and regional accident and incident investigation organizations (RAIOs), to identify hazards and mitigate regional operational safety risks.

The ICAO Universal Safety Oversight Audit Programme (USOAP) Continuous Monitoring Approach (CMA) determines States' capabilities for safety oversight by assessing and monitoring the effective implementation (EI) of the critical elements (CEs) of a safety oversight system. The global average EI increased from 67.43 per cent in 2018 to 68.83 percent in 2019, with 46 per cent of States having achieved the 2022 target of 75 per cent EI, as established in the 2020–2022 edition of the GASP. In 2019, ten ICAO Member States had a total of six Significant Safety Concerns (SSCs) in the areas of Personnel Licensing, Aircraft Operations and Air Navigation Services. As of December 2019, three State safety programme implementation assessments (SSPIAs) were conducted for three States.

Toward the end of 2019, the coronavirus disease (COVID-19) pandemic began gaining momentum and created a situation that would be very disruptive for the aviation industry. ICAO responded with the timely development of guidance material, practical checklists and tools to support States in the implementation of contingency arrangements to reduce the risks of the spread of COVID-19 and to restart the aviation system from the crisis.

In response to existing and emerging trends, 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. The 2020 edition of the Safety Report, as usual, provides a high-level summary of ICAO's achievements to enhance aviation safety in 2019 and updates key safety performance indicators with reference to the 2015–2019 time period. In addition, it includes some initiatives to support States for managing safety risks during the COVID-19 pandemic.

2020–2022 edition of the ICAO Global Aviation Safety Plan (GASP)

The *Global Aviation Safety Plan* (GASP, Doc 10004) sets forth ICAO's safety strategy, which supports the prioritization and continuous improvement of aviation safety. Its purpose is to continuously reduce fatalities, and the risk of fatalities, by guiding the development of a harmonized safety strategy and the implementation of regional and national aviation safety plans.

GASP Goals and Targets

Aspirational Safety Goal

The GASP's aspirational safety goal is to achieve and maintain zero fatalities in commercial operations by 2030 and beyond. This goal is deemed "aspirational" as it represents an ambition of achieving an even safer aviation system. The year 2030 has been selected as the period for reaching this goal as the traffic volume is forecasted to double by then. It is also the target year for the United Nations (UN) *2030 Agenda for Sustainable Development* and the GASP has been aligned with the timelines of this Agenda.

GASP Goals

A series of goals support the aspirational safety goal. These goals also contribute to the achievement of several UN Sustainable Development Goals (SDGs). The 2020–2022 edition of the GASP contains six goals as shown in Figure 2.

Figure 2. | GASP goals

GASP Targets

Each GASP goal contains one or more targets with specific desired outcomes from actions taken by States, regions and industry to achieve the goal within a set timeframe, as shown in Figure 3.

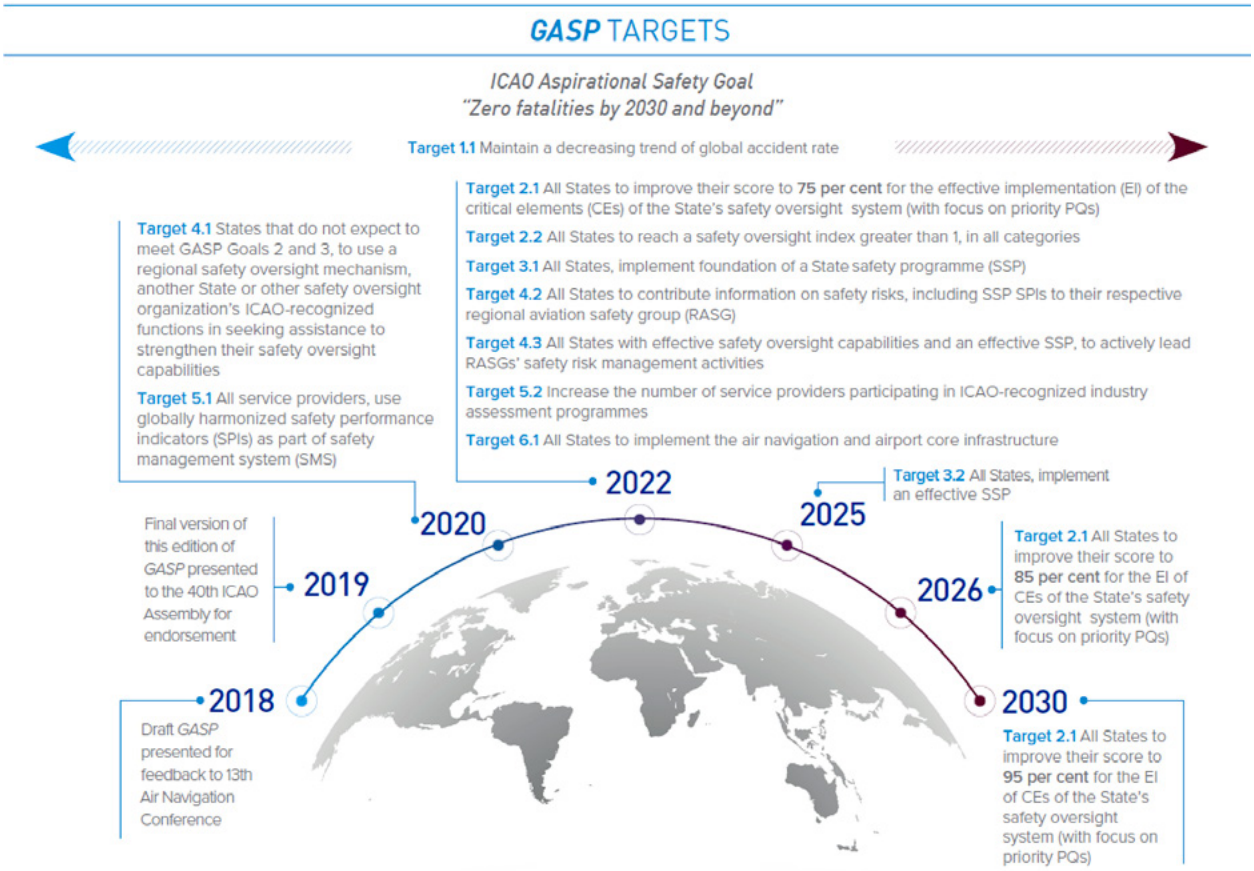


Figure 3. | GASP targets

High-risk Categories of Occurrence (HRCs)

The high-risk categories of occurrence (HRCs) need to be addressed to mitigate the risk of fatalities. The types of occurrences deemed global HRCs (previously referred to as "global safety priorities") were selected based on actual fatalities, high fatality risk per accident, or the number of accidents and incidents.

The following HRCs, in no particular order, have been identified for the 2020–2022 edition of the GASP:

- Controlled flight into terrain (CFIT)
- Loss of control in-flight (LOC-I)
- Mid-air collision (MAC)
- Runway excursion (RE)
- Runway incursion (RI)

Global Aviation Safety Roadmap

The GASP also includes the global aviation safety roadmap, which serves as an action plan that addresses organizational challenges (ORG roadmap) and operational safety risks (OPS roadmap) to assist the aviation community in achieving its goals through a structured, common frame of reference for all relevant stakeholders. The ORG roadmap, as shown in Figure 4, is made up of two components, which focuses on the State safety oversight system and the State safety programme (SSP). The OPS roadmap focuses on the continuous reduction of operational safety risks, and regional and industry safety risk management activities to address the HRCs.

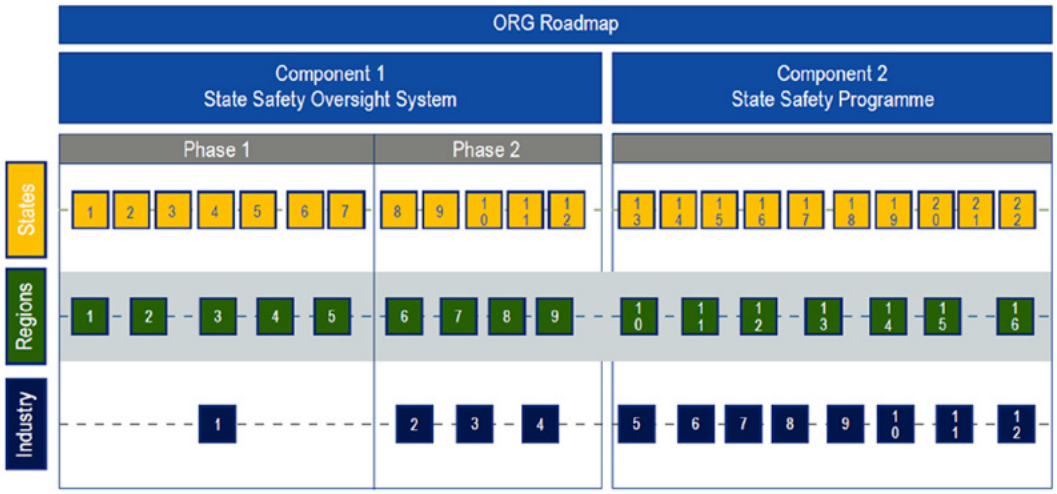


Figure 4. | GASP ORG roadmap

More information on the GASP is available at www.icao.int/gasp.

Effective Implementation of State Safety Oversight System

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

To standardize the conduct of audits under USOAP CMA, ICAO established protocol questions (PQs) based on safety-related ICAO Standards and Recommended Practices (SARPs) established in the Annexes to the Chicago Convention, Procedures for Air Navigation Services (PANS) and ICAO guidance material. Each PQ contributes to assessing the EI of one of the eight critical elements (CEs) in one of the eight audit areas. The eight CEs are:

- primary aviation legislation (CE-1);
- specific operation regulations (CE-2);
- State system and functions (CE-3);
- qualified technical personnel (CE-4);
- technical guidance, tools, 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).

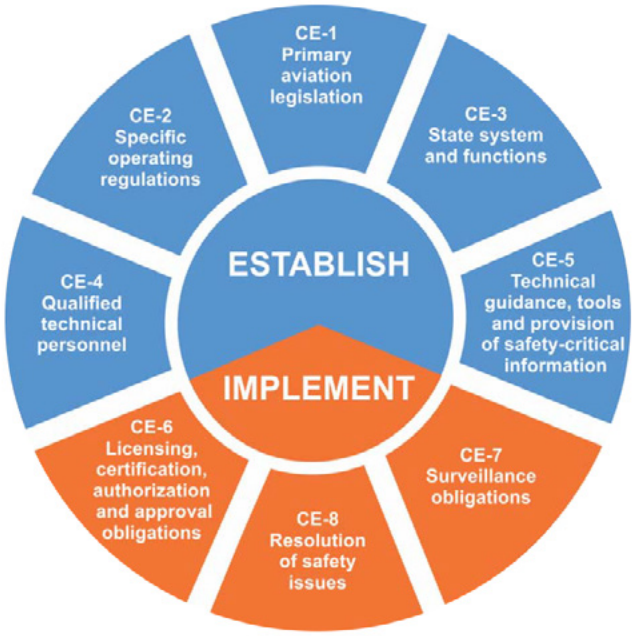


Figure 5. | Critical elements of a State's safety oversight system

The eight audit areas identified in the USOAP are:

1) primary aviation legislation and civil aviation regulations (LEG);
2) civil aviation organization (ORG);
3) personnel licensing and training (PEL);
4) aircraft operations (OPS);
5) airworthiness of aircraft (AIR);
6) aircraft accident and incident investigation (AIG);
7) air navigation services (ANS); and
8) 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.

Figure 6 shows that as of 15 March 2020, the average EI for audited States was 68.83 per cent. It was 67.43 per cent for the same period in 2019. 46 per cent of the States have an EI of above 75 per cent – all States are expected to achieve this (Target 2.1) by 2022. Figure 7 shows a map of all the ICAO Member States having an overall EI above the target. Six of ICAO's 193 Member States had not yet received a USOAP audit.

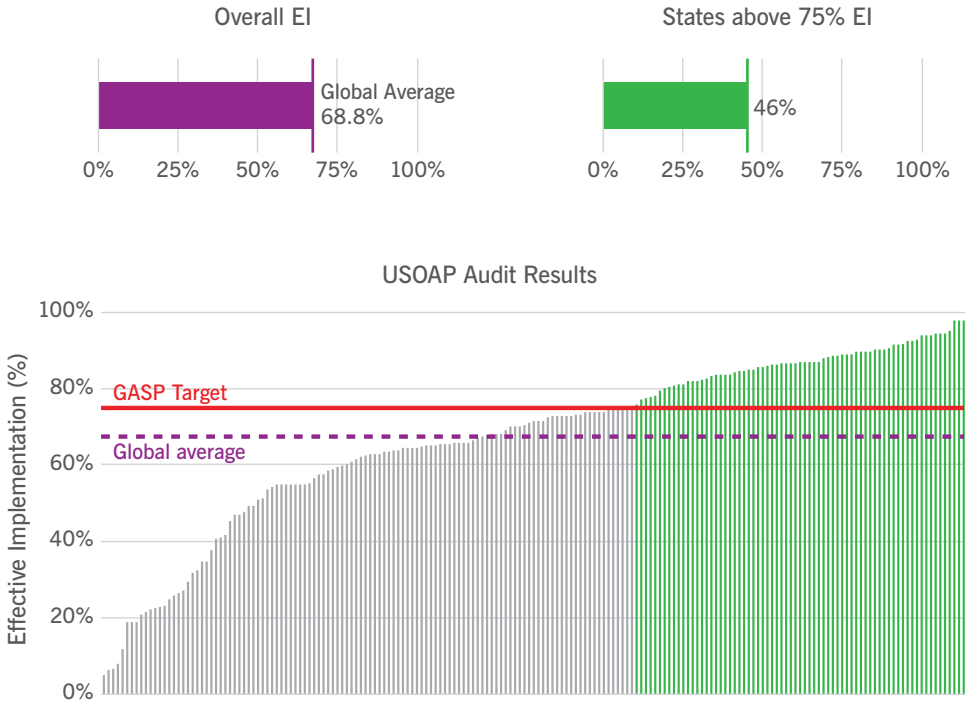


Figure 6. | Global USOAP audit results

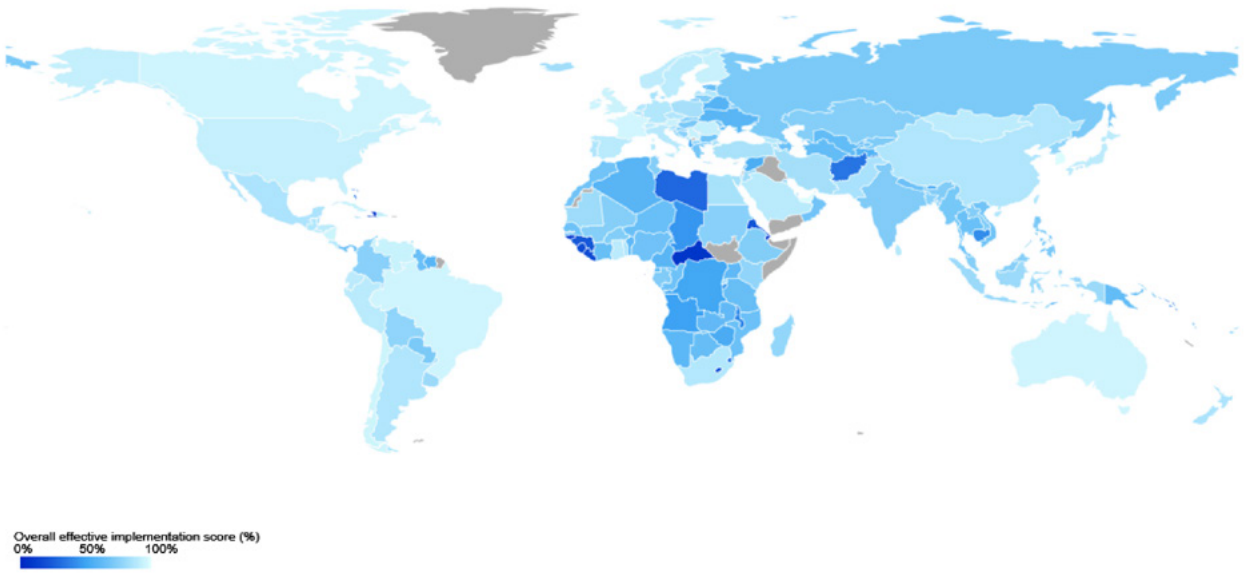


Figure 7. | Overall Effective Implementation (EI)

States, listed in alphabetical order, with an EI above 75 per cent (as of 15 March 2020)				
Argentina	Croatia	Honduras	Netherlands	Slovenia
Armenia	Cuba	Iceland	New Zealand	South Africa
Australia	Cyprus	Indonesia	Nicaragua	Spain
Austria	Czechia	Iran (Islamic Republic of)	North Macedonia	Sri Lanka
Bahrain	Democratic People's Republic of Korea	Ireland	Norway	Sudan
Bangladesh	Denmark	Israel	Pakistan	Sweden
Belgium	Dominican Republic	Italy	Peru	Switzerland
Belize	Ecuador	Jamaica	Poland	Togo
Bolivia (Plurinational State of)	Egypt	Japan	Portugal	Trinidad and Tobago
Bosnia and Herzegovina	El Salvador	Jordan	Qatar	Turkey
Brazil	Fiji	Kenya	Republic of Korea	United Arab Emirates
Cabo Verde	Finland	Kuwait	Romania	United Kingdom
Canada	France	Latvia	Rwanda	United States
Chile	Georgia	Madagascar	San Marino	Uruguay
China	Germany	Mauritania	Saudi Arabia	Venezuela (Bolivarian Republic of)
Colombia	Ghana	Mexico	Serbia	
Costa Rica	Guatemala	Mongolia	Singapore	
		Montenegro	Slovakia	

Examining the results by CE, Chart 4 shows that only CE-1 and CE-2 have achieved the target of 75 per cent. No audit areas, however, with the exception of AIR, have achieved the target of 75 per cent EI as indicated in Chart 5. More information about USOAP CMA results can be found in the latest USOAP report, which is published every three years, on the ICAO website https://www.icao.int/safety/CMAForum/Documents/USOAP_REPORT_2016-2018.pdf.

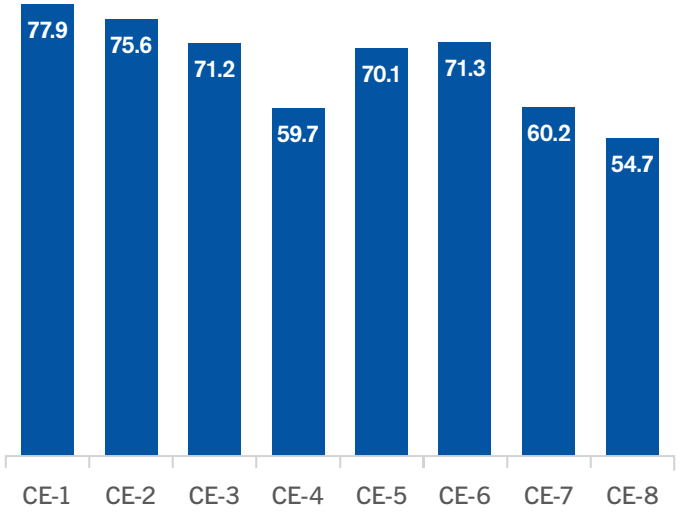


Chart 4. | Global audit results (average EI percentage by CEs)

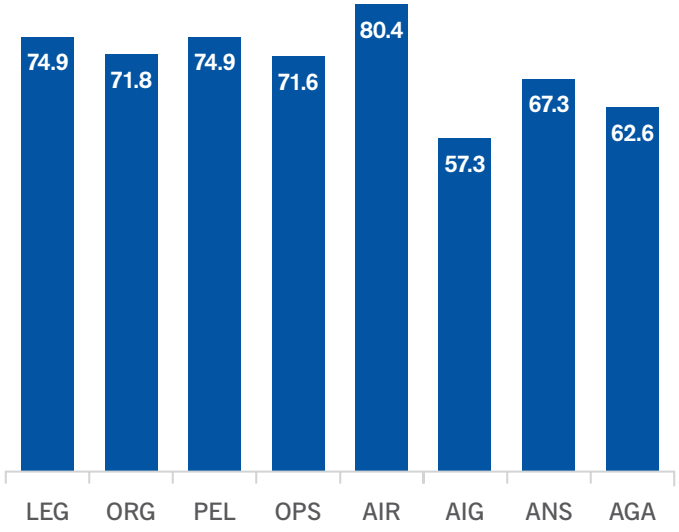


Chart 5. | Global audit results (average EI percentage by audit area)

Implementation Support for Safety Management

Safety Management Implementation website

The Safety Management Implementation (SMI) website (www.icao.int/SMI) was developed to complement the fourth edition of the *Safety Management Manual* (Doc 9859), which contains guidance to support Amendment 1 to Annex 19 – *Safety Management*. The website serves as a repository for the sharing of practical examples and tools among the aviation community in support of effective safety management implementation, including those related to safety oversight systems in support of the No Country Left Behind (NCLB) initiative.

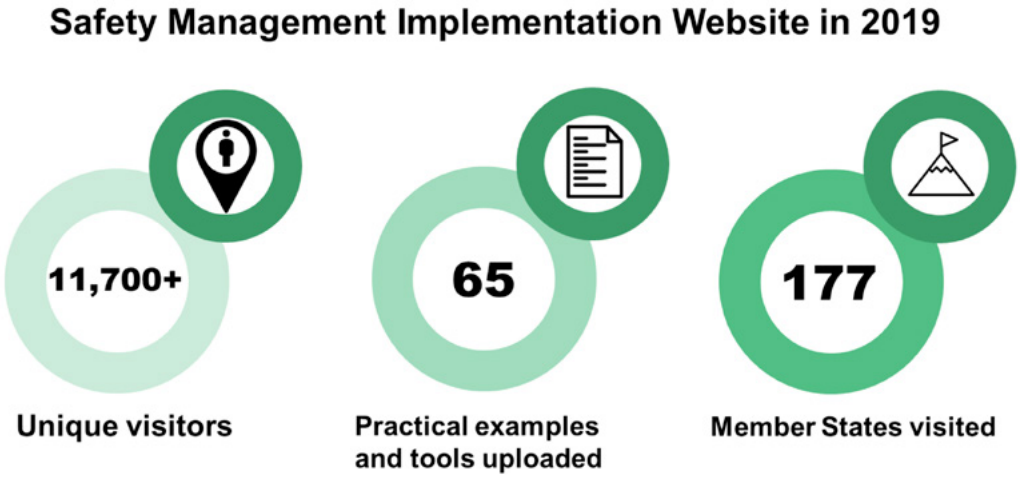


Figure 8. | SMI website statistics

As of 15 March 2020, there are 65 practical examples posted on the website. In 2019, more than 11 700 visitors from 177 Member States and all ICAO Regions visited the website. Practical examples and tools are being collected and developed on a continuous basis through coordination with relevant expert groups and once validated by the Safety Management Panel are posted on the SMI website. The goal is to have practical examples and tools demonstrating each policy, procedure, activity or process mentioned in the fourth edition of Doc 9859 by 2021.

Safety Management Tools

SSP Gap Analysis

SSP Gap Analysis - SMM 4th Ed.
State Safety Programmes

The second High-level Safety Conference held in Montréal, from 2 to 5 February 2015 (HLSC 2015) recommended that States use the self-reporting SSP Gap Analysis tool, available on the ICAO integrated Safety Trends Analysis and Reporting System (iSTARS). The application was updated in 2019 to reflect Amendment 1 to Annex 19 and the fourth edition of Doc 9859. It now comprises 62 questions, which cover all the requirements of an SSP and provides project owners the opportunity to develop an implementation plan to address the gaps identified.

As of 15 March 2020, 135 Member States had created an SSP gap analysis project on iSTARS, with four States indicating completion of their SSP implementation plan at level 4. Detailed information can be found in Chart 6.

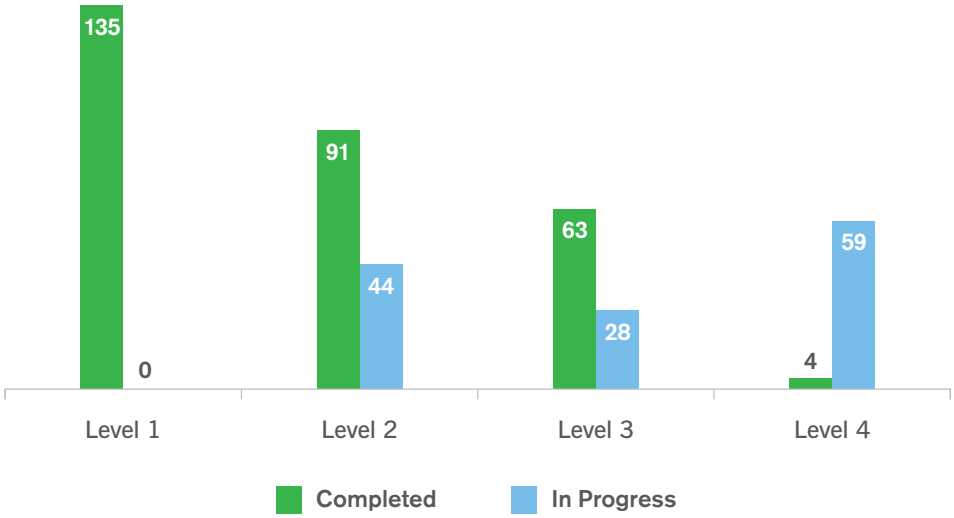


Chart 6. | SSP implementation progress – gap analysis

State Safety Programme (SSP) Implementation

ICAO measures SSP implementation in levels as follows:

- Level 1: States having started a GAP analysis
- Level 2: States having reviewed all the GAP analysis questions
- Level 3: States having defined an implementation plan to address the gaps
- Level 4: States having closed all actions and fully implemented their SSPs

SSP Foundation Protocol Questions (PQs)

SSP Foundation

Status of SSP Foundation Protocol Questions

Of the 943 USOAP Protocol Questions (PQs), 299 of these are used to assess the foundation of an effective State safety programme (SSP). They are referred to as "SSP foundation PQs" and are grouped into subject areas. States should include the resolution of these PQs as part of their SSP implementation plan. The concept of "SSP foundation" replaces the 60 per cent EI score, previously used in the GASP, as a threshold to be achieved before starting SSP implementation. Rather than serving as a prerequisite, the intent is to include these PQs as part of the SSP implementation plan to ensure the SSP will be effective and sustainable. States are expected to reach 100 per cent for this indicator, eliminating the need to achieve a prerequisite before even starting their SSP implementation. The full list of SSP foundation PQs can be found on the SSP Foundation tool, available on iSTARS since 2017. As of 15 March 2020, the global average EI of SSP Foundation PQs is 73.71 per cent, as shown in Figure 9.

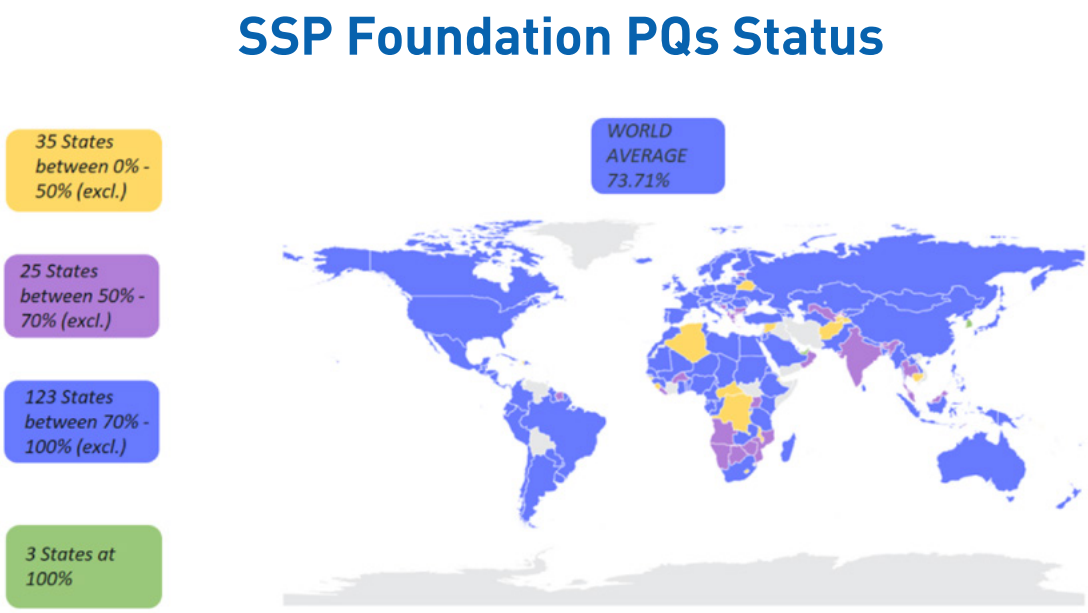


Figure 9. | SSP Foundation PQ status 2019

SSP Implementation Assessments (SSPIAs) under the USOAP CMA

ICAO has rolled out SSP implementation assessments (SSPIAs), a qualitative (non-quantitative) assessment of a State's progress in implementing an SSP, under the USOAP CMA using SSP-related PQs that have been updated to reflect Amendment 1 to Annex 19, which became applicable in November 2019, the fourth edition of Doc 9859 as well as the lessons learned from voluntary and confidential SSP implementation assessments conducted previously.

Those PQs are not linked to critical elements (CEs), but to applicable SSP components. They are broken down into eight areas:

- SSP general aspects (GEN);
- safety data analysis general aspects (SDA);
- personnel licensing and training (PEL);
- aircraft operations (OPS);
- airworthiness of aircraft, authorized maintenance organization aspects only (AIR);
- air navigation services, air traffic service aspects only (ANS);
- aerodromes and ground aids (AGA); and
- aircraft accident and incident investigation (AIG)

The relationship between USOAP CMA PQs, USOAP SSP Foundation PQs and USOAP SSP-related PQs are shown in the Figure 10 below.

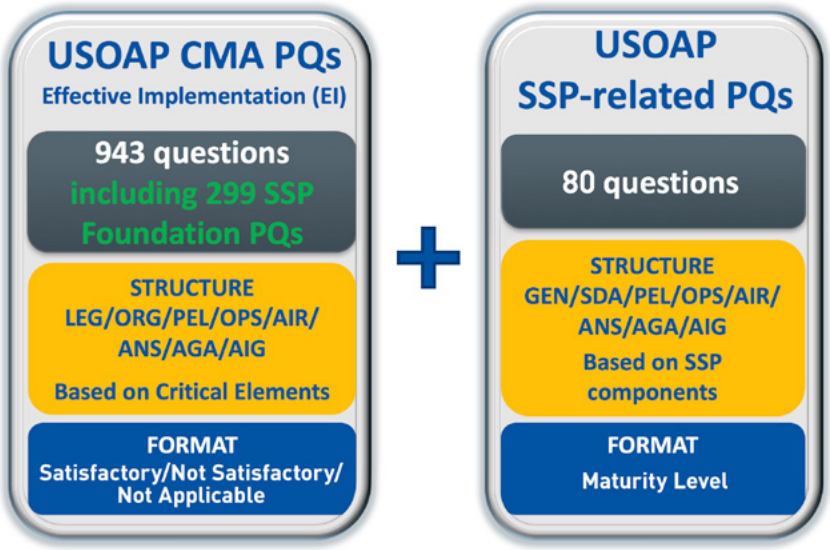
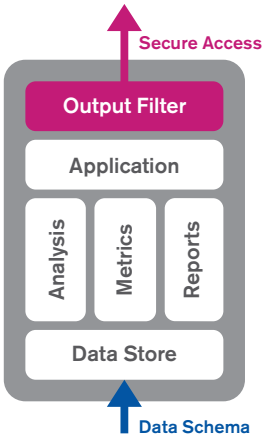


Figure 10. | Relationship between SSP Foundation PQs and SSP-related PQs

As part of Phase 1, from 2018 through 2020, ICAO is conducting voluntary and non-confidential SSPIAs. As of December 2019, three SSPIAs were completed under Phase 1 for Finland, Spain and the United Arab Emirates. The SSPIA final reports, which contain a summary of achievements in SSP implementation, is available to all ICAO Member States on the USOAP CMA Online Framework (OLF).

In 2020, ICAO will start developing guidance to support the determination of maturity level for each SSP-related PQ. Phase 2 of the SSPIAs conducted in 2021 and onwards, will use this guidance to support the determination of maturity levels. This will measure a State's progress in SSP implementation, quantitatively. The assessment tool, including SSP-related PQs and guidance will be published on the OLF at least six months in advance of the first SSPIA scheduled to be conducted under Phase 2.

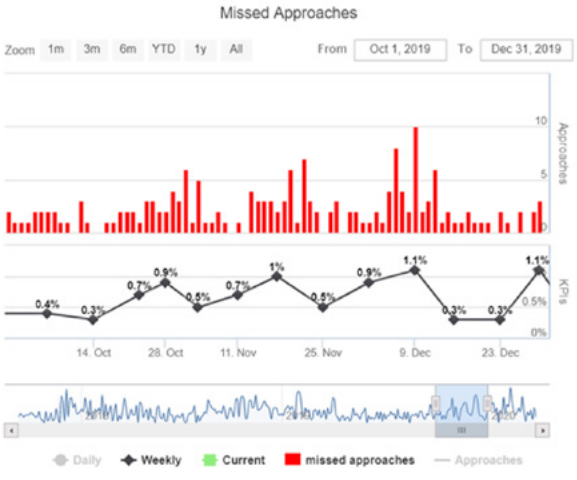
Safety Information Monitoring System



The ICAO Safety Information Monitoring System (SIMS) is a web-based safety data and information system comprised of applications that generate indicators to support ICAO Member 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 currently has more than 400 users from 70 ICAO Member States. The evolution of SIMS continues as ICAO 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; Foreign Ramp Inspections data sharing; and Occurrences Monitoring. Each application has indicators allowing States to monitor the safety performance of their State. The Foreign Ramp Inspections data sharing application, allows safety information sharing within the RASG regions.

ICAO Member States can use the SIMS platform to transform 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. It includes and encourages participation of service providers, who as per Annex 19, are expected to establish a safety management system (SMS). ICAO has collaborated 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 a SIMS legal framework that addresses, among others, data privacy and safety data protection elements.



For more information about SIMS, visit www.icao.int/safety/sims or send an email to sims@icao.int to initiate your participation.

Safety Management Capacity Building

In 2019, ICAO organized seven Safety Management Capacity Building Workshops (SMCBWs) to support States in developing the capacity needed to effectively implement a State safety programme (SSP). The five-day workshops included 12 interactive sessions, including hands-on exercises, allowing aviation professionals become familiar with the recent ICAO safety management-related provisions and assist them to overcome safety management challenges faced by their States.

In total, over two hundred participants from 130 States attended the SMCBWs, as shown in Figure 11 below.

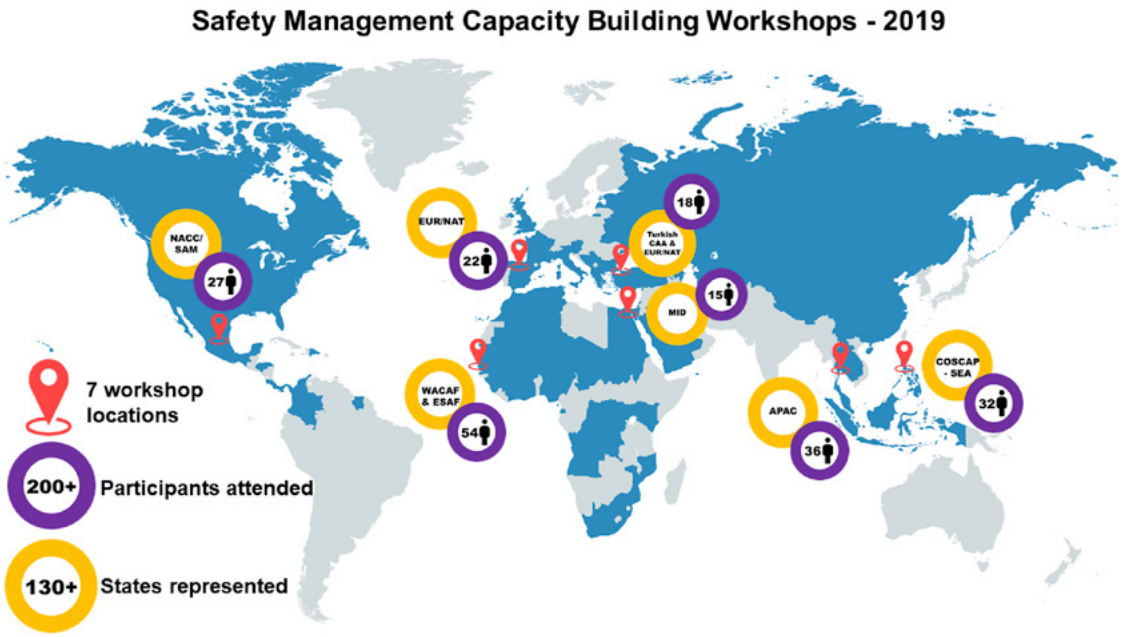


Figure 11. | Safety Management Capacity Building Workshops - 2019

Furthermore, an updated version of the ICAO Safety Management Online Course was launched early in 2019 and was recommended as a prerequisite for the SMCBWs.

In collaboration with ICAO's Global Aviation Training Office, and based on the competency-based training methodology described in the *Training Development Guide* (Doc 9941), a new ICAO SSP classroom course was developed and its validation delivery was successfully completed in January 2020. This course aims to build the participants' competencies (knowledge, skills and attitudes) to perform their tasks. Feedback obtained from the SMCBWs were used to design a mature course that meets the needs of the aviation community.

To support the selection of the appropriate course, based on the roles related to the implementation and operation of the SSP, an ICAO SSP course matrix has been developed. More information about ICAO Safety Management training can be found at https://www.icao.int/training/Pages/Safety-Management-Training-Programme-(SMTP).aspx.

ICAO Technical Assistance Activities

In line with the No Country Left Behind (NCLB) initiative, ICAO continued to provide States with technical assistance programmes in various forms, including technical assistance projects utilizing the Safety Fund (SAFE) to help States strengthen their safety oversight capacity.

In 2019, four projects were successfully completed, two were initiated, four are on-going and two are in the planning stages. Among the completed projects, Uruguay demonstrated a big success by improving its overall effective implementation (EI) of their safety oversight system by 21 per cent. By the same token, the Sierra Leone project, implemented by a third party, was successfully concluded. Supported by a strong commitment by the State, a very positive improvement is expected, which will be verified through the Universal Safety Oversight Audit Programme (USOAP) Continuous Monitoring Approach (CMA) activity planned in 2021. Two new projects launched in 2019 for the Eastern Caribbean Civil Aviation Authority (ECCAA) and Barbados are well underway, positive outcomes are anticipated once the projects are completed. In total, 33 projects have been completed since the Fund's establishment. Details about the SAFE is available at www.icao.int/SAFE.

SAFE-funded technical assistance projects have become effective vehicles for the enhancement of State safety oversight systems, including the timely resolution of Significant Safety Concerns (SSCs) in some States, as has been verified by USOAP CMA activities.

Safety Recommendations addressed to ICAO

Annex 13 — *Aircraft Accident and Incident Investigation* requires States to investigate accidents and 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 (for example, the State of Design of an aircraft) 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 Safety Recommendation, 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 Safety Recommendations addressed to ICAO are forwarded to relevant expert groups, which may lead to amendments and/or developments of ICAO documents.

In 2019, ICAO received four Safety Recommendations from four States. These recommendations may be accessed at https://www.icao.int/safety/airnavigation/AIG/Pages/Safety-Recommendations-addressed-to-ICAO.aspx. Chart 7 below depicts the number of safety recommendations addressed to ICAO in the past five years.

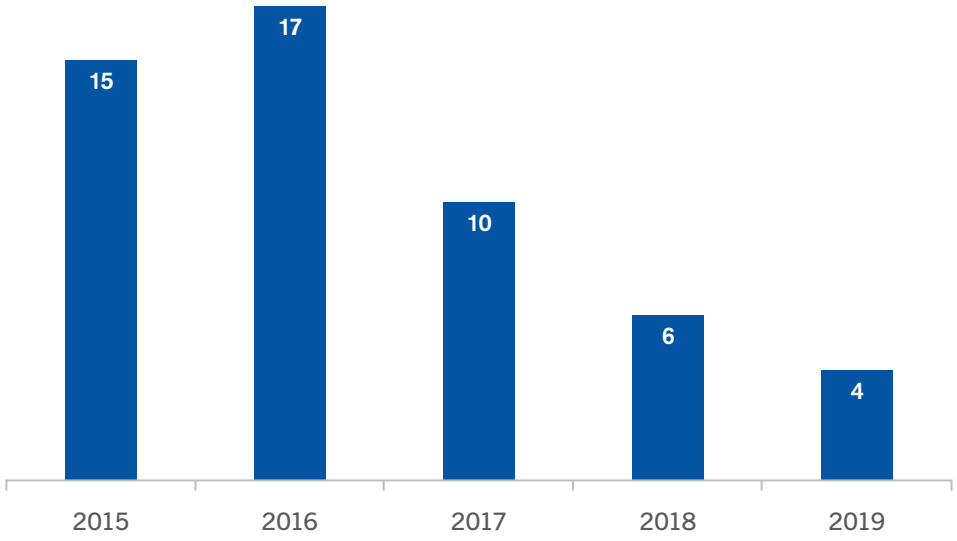


Chart 7. | Safety Recommendations received by ICAO (2015–2019)

Accident Statistics and Analysis – Scheduled Commercial Air Transport

The safety performance of the GASP is measured by a series of metrics as defined by the GASP indicators. Goal 1 of the GASP is to achieve a continuous reduction of operational safety risks. This reduction is achieved by a series of actions targeting the high-risk categories of occurrence (HRCs). The target associated with this goal (Target 1.1) is the decrease of the global accident rate for commercial scheduled operations. Several indicators are linked to this target including number of accidents, fatal accidents and fatalities by State, region or globally, as well as accident rates (i.e. number of occurrences per million departures). GASP indicators also include the percentage of occurrences related to the HRCs.

Overall Safety Performance Indicator – Global Accident Rate

ICAO's global accident rate provides an overall indicator of safety performance for air transport operation. The accident rate is based on scheduled commercial operations involving fixed-wing aircraft with a maximum take-off weight (MTOW) above 5 700 kg. Aircraft accidents are reviewed and validated by the ICAO Safety Indicators Study Group (SISG) using definitions provided in Annex 13.

Data on departures is collated by ICAO's Air Transport Bureau and comprises scheduled commercial operations that involve the transportation of passengers, cargo and mail for remuneration. Estimates are made where data has not been provided by States, and as new data is provided to ICAO, it will be incorporated into the database. It is worth noting that this may cause small changes to the calculated rates from year to year.

Chart 8 below shows the global accident rate trend (per million departures) over the previous five years, with 2019 having an accident rate of 2.9 accidents per million departures, an increase of 12 per cent from the previous year.

Scheduled commercial accidents in 2019 are listed in Appendix 2.

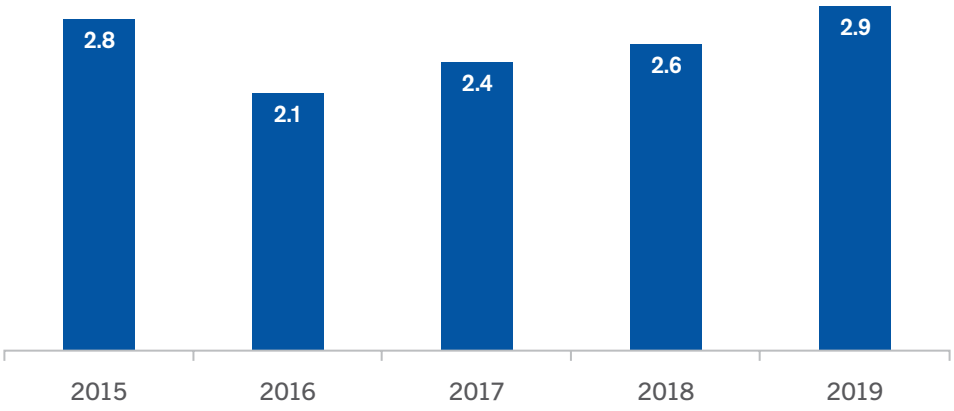


Chart 8. | Global accident rates (accidents per million departures)

Accident and Fatality Trend

The number of worldwide accidents and fatal accidents on scheduled commercial flights during the 2015–2019 period are shown in Chart 9.

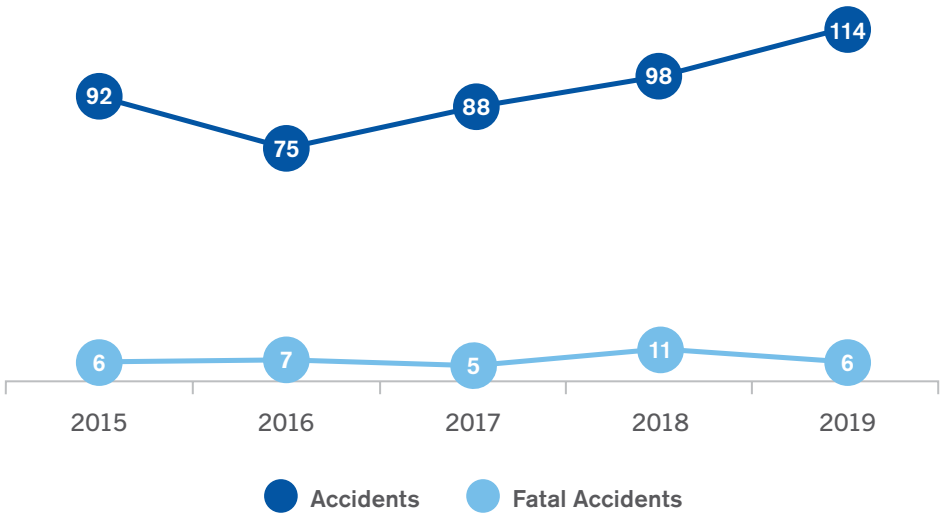


Chart 9. | Accident trend

Between the years 2015 to 2019, the trend of the annual number of accidents has increased. The lowest count recorded was 75 accidents in 2016 and the highest was 114 in 2019. However, the number of fatal accidents per year significantly decreased from 11 in 2018 to 6 in 2019. Chart 10 shows the number of fatalities associated with the above-mentioned fatal accidents decreased more than half from 514 in 2018 to 239 in 2019.

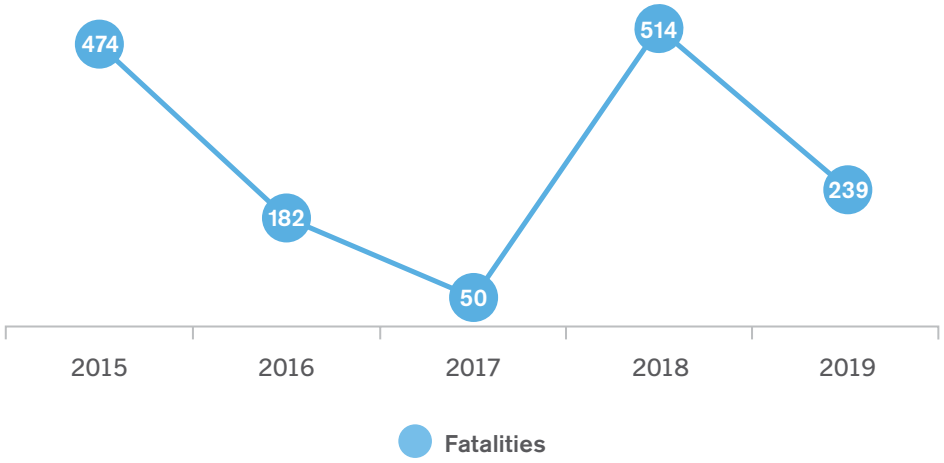


Chart 10. | Fatalities trend (2015–2019)

Accidents Overview by Occurrence Category

ICAO Member States are required to report accidents and serious incidents in accordance with Annex 13 through the ICAO Accident/Incident Data Reporting (ADREP) system. The SISG validates and categorizes the accidents for commercial operations, including scheduled and non-scheduled, involving aircraft with MTOW over 5 700 kg using the Commercial Aviation Safety Team (CAST)/ICAO Common Taxonomy Team (CICTT) taxonomy for occurrence categories.

Chart 11 shows an accidents overview for scheduled commercial operations by CICTT occurrence categories. The occurrence category of turbulence encounter (TURB) accounted for the most accidents that caused serious injuries to aircrews or passengers in 2019. All the fatal accidents involved the following categories: loss of control in-flight (LOC-I); runway excursion (RE); icing (ICE); and system/component failure or malfunction (non-powerplant) (SCF-NP) as indicated in Chart 12. The occurrence category of SCF-NP includes the accident of an Ethiopian Airlines Boeing 737-8 (MAX) aircraft on 10 March 2019. A similar accident occurred with a Lion Air Boeing 737-8 (MAX) aircraft on 29 October 2018. The United States National Transportation Safety Board (NTSB) participated in the investigation of both above-mentioned accidents and on 19 September 2019, issued the Safety Recommendation Report "*Assumptions Used in the Safety Assessment Process and the Effects of Multiple Alerts and Indications on Pilot Performance*". These two accidents resulted in the grounding of the global fleet to the present time.

Detailed information about the CICTT occurrence category can be found in Appendix 2.

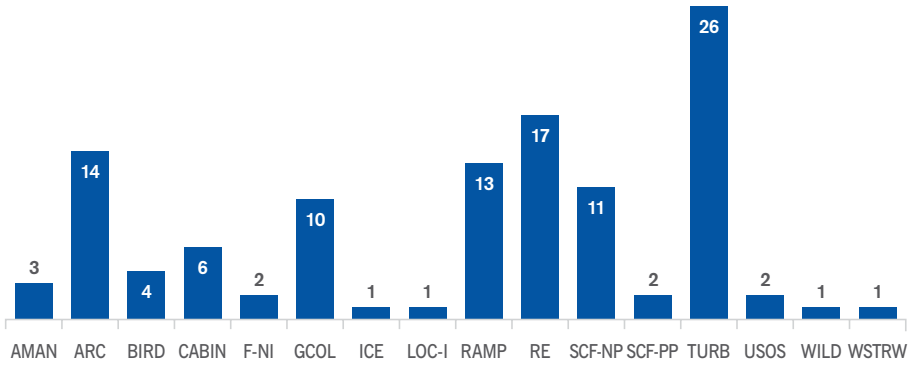


Chart 11. | Accidents overview by occurrence category

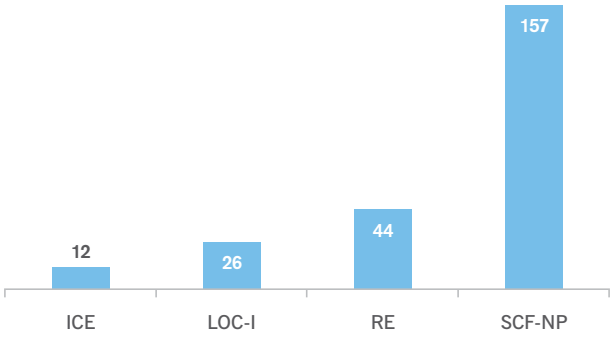


Chart 12. | Total fatalities by occurrence category

High-risk Categories of Occurrence

Based on actual fatalities, high fatality risk per accident or the number of accidents and incidents, as well as results from the analysis of safety data collected from proactive and reactive sources of information from ICAO and other non-governmental organizations, ICAO has identified five high-risk categories of occurrence (HRCs) as global safety priorities in the 2020–2022 edition of the GASP:

a) controlled flight into terrain (CFIT);
b) loss of control in-flight (LOC-I);
c) mid-air collision (MAC);
d) runway excursion (RE); and
e) runway incursion (RI).

ICAO uses these HRCs as a baseline in its safety analysis to achieve a continuous reduction of operational safety risks (Goal 1) and its linked targets and indicators, as presented in the GASP.

Chart 13 below shows that in 2019, the five HRCs for scheduled commercial air transport operations represented 29 per cent of all fatalities, 67 per cent of fatal accidents, 16 per cent of the total number of accidents and 24 per cent of the accidents that destroyed or caused substantial damage to aircraft.

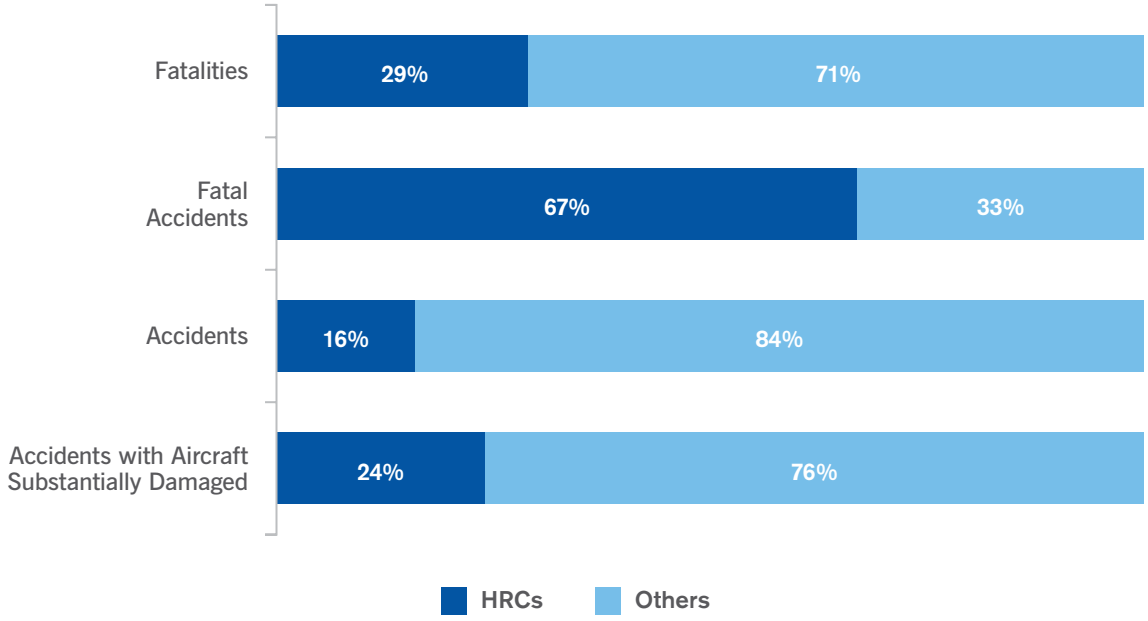


Chart 13. | HRC accident distribution

A breakdown of the five HRCs in 2019 and the respective distribution of fatalities, fatal accidents and accidents are shown in Chart 14 below. Accidents related to runway excursion (RE) accounted for 14.9 per cent of all accidents in 2019, and included half of all fatal accidents with 44 fatalities. There was one fatal accident related to loss of control in-flight (LOC-I) that represented 16.7 per cent of fatal accidents with 26 fatalities. There were no accidents related to controlled flight into terrain (CFIT), mid-air collision (MAC) and runway incursion (RI) in 2019. In addition, there were 80 HRCs of serious incidents reported by ICAO Member States as required by Annex 13 in 2019.

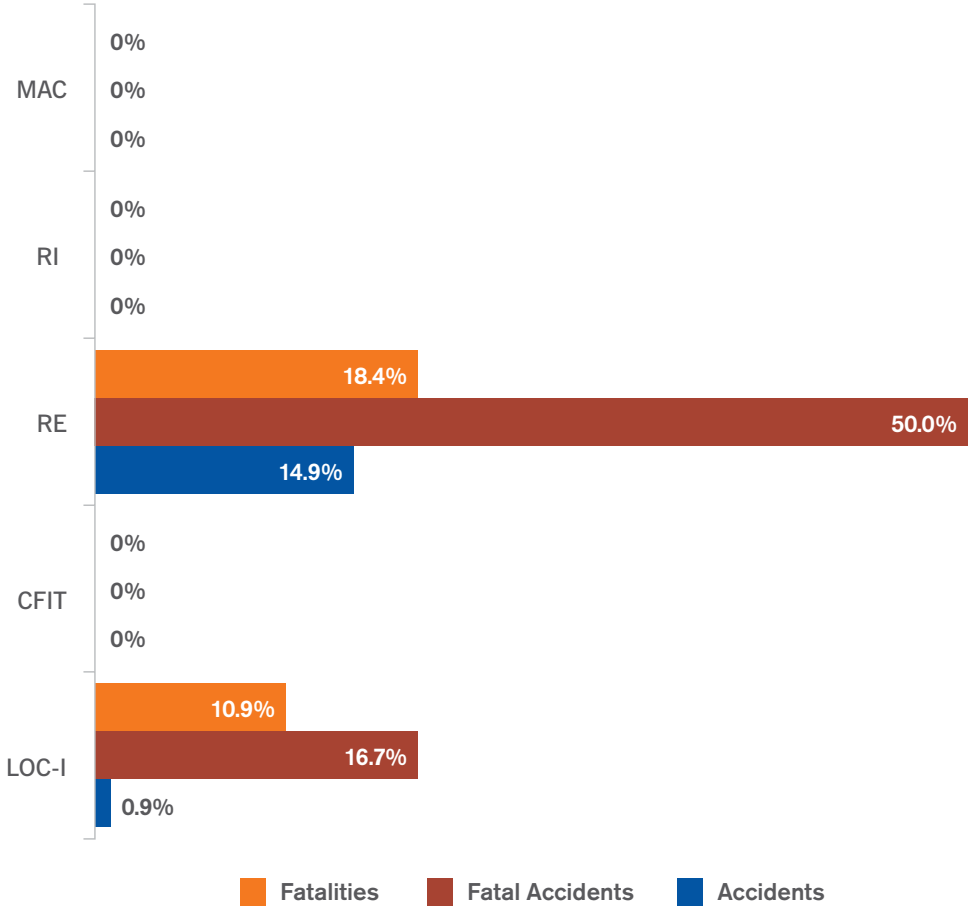


Chart 14. | High-risk category accident overview

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 region, by State of Occurrence. Tables 1 and 2 below provide details on the state of aviation safety in different RASG regions for 2019 in the context of global outcomes. The States included in each RASG region used in this report can be found in Appendix 1.

It is worth noting these statistics are based on ADREP data reported by the State of Occurrence in 2019. Partly due to the small number of departures, some regions experience a large fluctuation in the accident rate from year to year. For this reason, these numbers should be considered in relation to the total number of accidents to gain an overall perspective.

RASG Region	Estimated Departures	Number of Accidents	Accident Rate (per million departures)	Fatal Accidents	Fatalities
AFI	1,130,861	9	8.0	2	183
APAC	12,663,222	17	1.3	Nil	Nil
EUR	9,826,990	29	3.0	3	55
MID	1,311,340	2	1.5	Nil	Nil
PA	13,856,870	54	4.0	1	1
International waters	n/a	3	n/a	Nil	Nil
WORLD	**38,789,283**	**114**	**2.9**	**6**	**239**

Table 1. | Departures, accidents and fatalities by RASG region based on State of Occurrence

RASG Region	Share of Traffic (%)	Share of Accidents (%)	Share of Fatalities (%)
AFI	2.9	7.9	76.6
APAC	32.6	14.9	Nil
EUR	25.3	25.4	23.0
MID	3.4	1.8	Nil
PA	35.7	47.4	0.4

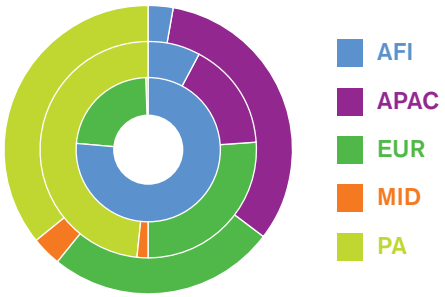


Table 2. | Share of traffic, accidents and fatalities by RASG region based on State of Occurrence

Accidents by RASG Region

Chart 15 below shows the percentage of accidents and related fatalities for each ICAO RASG region based on State of Occurrence for scheduled commercial operations in 2019. States included in each RASG region are listed in Appendix 1.

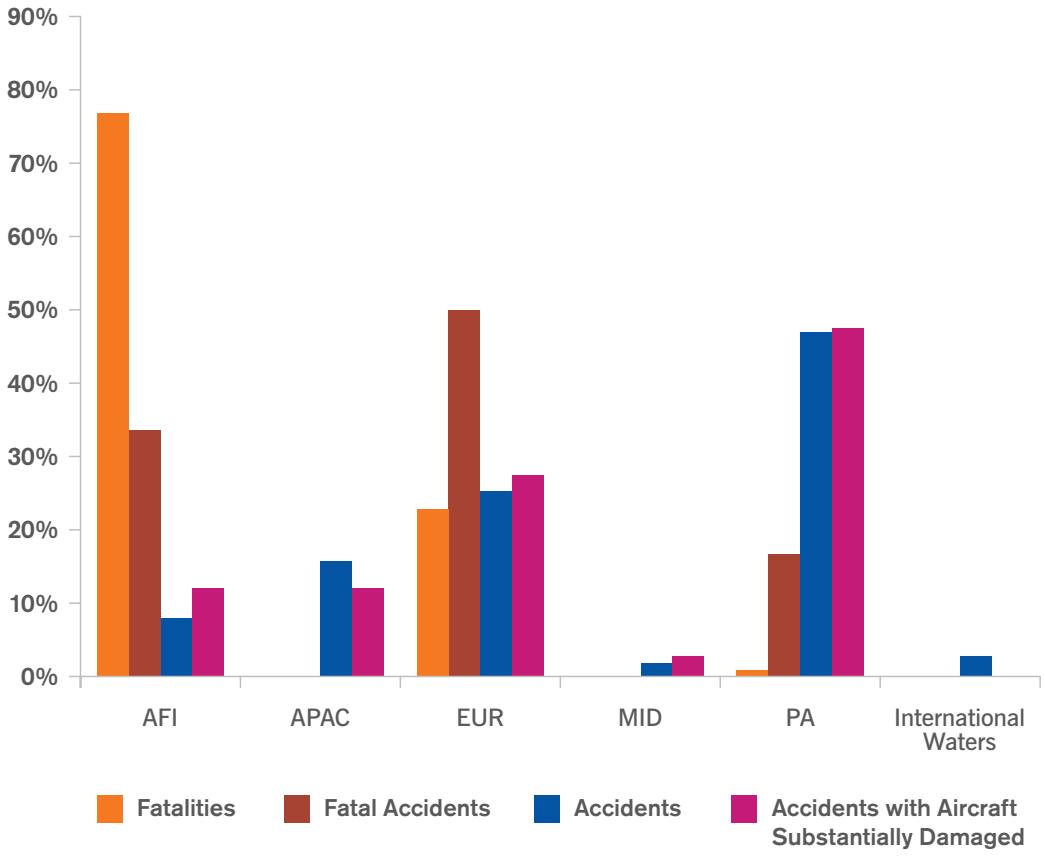


Chart 15. | Accident overview by RASG region

In 2019, the Asia and Pacific (APAC) and Middle East (MID) Regions did not experience fatal accidents, and one fatal accident with only one fatality occurred in the Pan American (PA) Region. Three accidents occurred over international waters in 2019.

GSIE Harmonized Accident Rate

In the spirit of promoting aviation safety, the United States, the European Commission, 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 at the beginning of 2011. This was accomplished through close cooperation between ICAO and IATA to align accident definitions, criteria and analysis methods used to calculate the harmonized accident rate, which is considered a key safety indicator for commercial aviation operations worldwide. The joint analysis includes accidents following the ICAO Annex 13 criteria for all typical commercial airline operations for scheduled and non-scheduled flights. These accidents were reviewed and validated by the ICAO Safety Indicators Study Group (SISG).

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 Accident

A total of 135 accidents were considered as part of the harmonized accident criteria in 2019. These comprise scheduled and non-scheduled commercial operations, including ferry flights for aircraft with an MTOW above 5 700 kg. The GSIE harmonized accident rate for the period from 2015 to 2019 is shown in Chart 16 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.

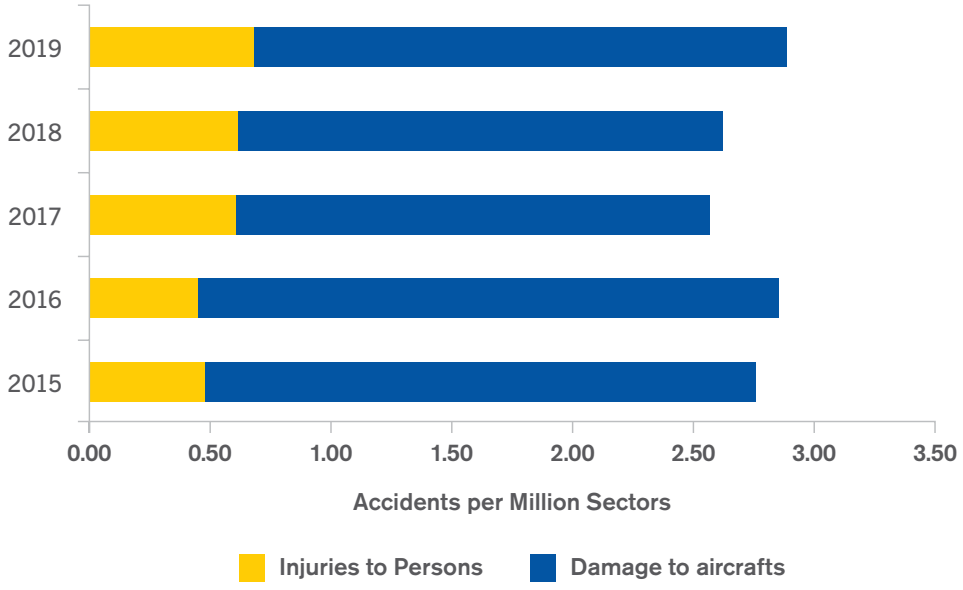


Chart 16. | GSIE harmonized accident rate (accidents per million sectors)

Definitions and Methods

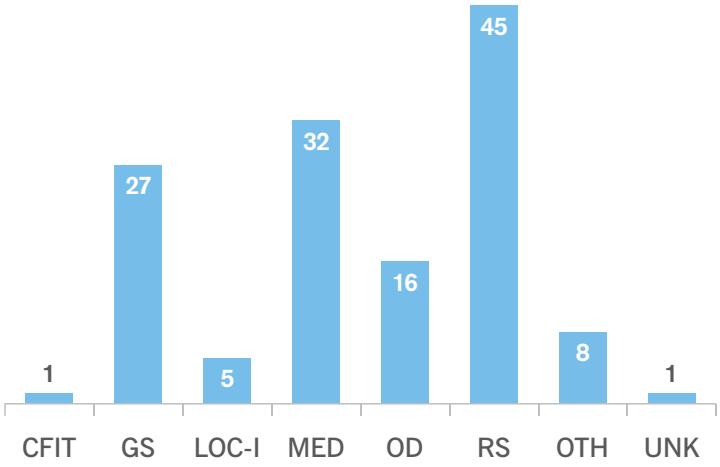
In order to build upon the harmonized accident rate presented in the last five safety reports, ICAO and IATA worked closely to develop a common taxonomy that would allow for a seamless integration of accident data between the two organizations. A detailed explanation of the harmonized accident categories and how they relate to the Commercial Aviation Safety Team (CAST)/ICAO Common Taxonomy Team (CICTT) occurrence categories can be found in Table 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 the accident criteria to be used. The breakdown of accidents by harmonized category is shown below.

Full details of categories can be found in Table 3.

Number of Accidents by Category

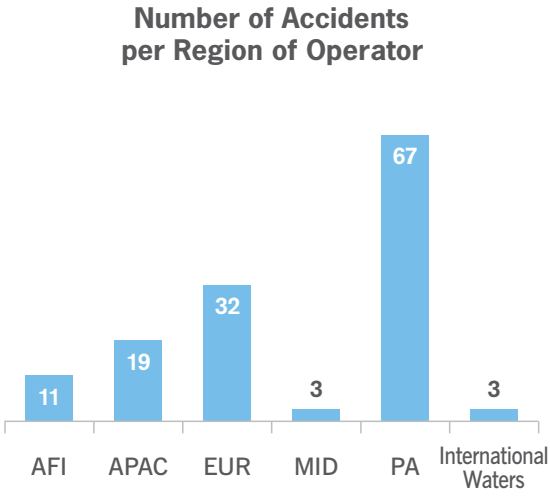


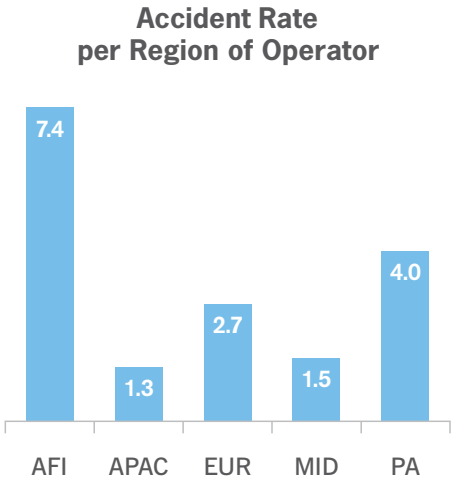
Accident Categories	
CFIT	Controlled Flight into Terrain
GS	Ground Safety
LOC-I	Loss of Control in-Flight
MED	Injuries to and/or Incapacitation of Persons
OD	Operational Damage
RS	Runway Safety
OTH	Other
UNK	Unknown

Note: IATA ACTG classified only four accidents as LOC-I, the fifth one could not be assigned an End state due to insufficient data. ICAO SISG categorized two accidents in the LOC-I arena as one being ICE and the other one as SCF-NP. IATA ACTG did not categorize any CFIT accidents in 2019. The one CFIT accident that was assigned by ICAO SISG, IATA ACTG categorized it as Other End State.

Accidents by Region of Occurrence

A harmonized regional analysis is provided by the ICAO RASG regions based on the State of Occurrence. The number of accidents and harmonized accident rate by region are shown in the charts 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.

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 obstacles on takeoff 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 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	LOC-I
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 from IATA Safety Report)
Other (OTH)	All other CICTT Occurrence Categories	All other IATA End States
Unknown (UNK)	UNK	Insufficient Data

Table 3. | GSIE harmonized accident categories

Safety Enhancement Initiatives

ICAO continues to develop and implement safety initiatives to support States to meet the goals and targets set in the GASP and improve global aviation safety. This includes guidance to support States for managing safety during the coronavirus disease (COVID-19) pandemic.

Regional cooperation and GASOS

Aviation safety has improved globally through the regional collaboration of organizations such as regional safety oversight organizations (RSOOs), regional accident and incident investigation organizations (RAIOs) and cooperative development of operational safety and continuing airworthiness programmes (COSCAPs). Despite the continuous development of regional collaboration, many of these organizations still face some specific challenges.

To support these regional efforts, ICAO established the RSOO Cooperative Platform (RSOO CP) in 2017 to facilitate the sharing of experiences and best practices between RSOOs and their interfacing with ICAO. Further, ICAO established a programme known as the Global Aviation Safety Oversight System (GASOS) that presents a standardized set of criteria upon which regional organizations can be assessed and measure their improvement against.

During its 217th Session, the ICAO Council approved GASOS and subsequently the Assembly, at its 40th Session, adopted Resolution A40-6 — *Regional cooperation and assistance to resolve safety deficiencies, establishing priorities and setting measurable targets*. This resolution approved the implementation and further development of GASOS to help strengthen, assess and support RSOOs, RAIOs and COSCAPs with the goal of assisting Member States in improving safety oversight, accident and incident investigation, and safety management functions.

Since the 40th Assembly, ICAO has made significant strides in advancing GASOS and ensuring that any legal and liability issues are being properly mitigated, including the creation of a template of a Memorandum of Understanding (MoU) that addresses any outlying liability risks associated with the implementation of GASOS, as it is currently constituted.

In addition to the MoU, ICAO developed the necessary processes and procedures to successfully launch the GASOS programme, including the *Global Aviation Safety Oversight System Manual* (to be published as Doc 10143) and a quality management system (QMS), which comprises a quality management manual along with the necessary documented processes, procedures and guidance for the proper operation of GASOS.

Furthermore, three GASOS pilot assessments undertaken within the last two years have already proven to be beneficial. ICAO conducted pilot assessments on three RSOOs in the areas of: generic aspects (GEN); aircraft operations (OPS); airworthiness of aircraft (AIR); aerodromes and ground aids (AGA); and air navigation services (ANS). These assessments were based on a robust set of objective criteria, which consists of a total of 1 093 assessment questions.

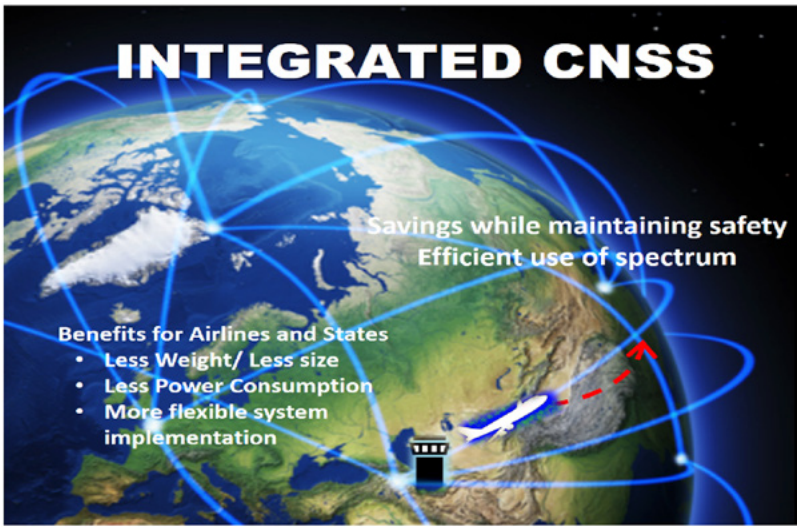
To further support regional cooperation, the RSOO CP has been working to strengthen and promote RSOOs in order for them to better support their States. To further advance these efforts, the RSOO CP in September 2019 adopted a three-year work programme focused on exchanging information, providing guidance, coordinating assistance and building partnerships. These initiatives will continue to strengthen the capacities of RSOOs and actively contribute to ICAO's global and regional programmes and activities. The RSOO CP and GASOS, working in parallel, equip ICAO with the necessary tools to better identify where deficiencies may occur within these organizations. The two programmes allow ICAO and its partners, where possible, to focus resources through the Aviation Safety Implementation Assistance Partnership (ASIAP) by coordinating and cooperating on technical assistance activities in order to improve identified deficiencies, thus strengthening regional cooperation and improving aviation safety around the world in an efficient and effective manner. Information on GASOS can be found at https://www.icao.int/safety/GASOS/Pages/default.aspx.

The future of aviation Communications, Navigation, Surveillance and Frequency Spectrum

Existing aeronautical communications, navigation and surveillance (CNS) systems are dated, proven and possess exceptional long active lifespans – beyond fifty years, in comparison with any other industry. However, considering the current state of the art of radio system, the aeronautical CNS systems are not particularly frequency spectrum efficient. Hence, ICAO and the aviation industry need to develop an action plan to progress as well.

Frequency spectrum is a finite and limited resource, managed by the International Telecommunication Union (ITU) through its four yearly World Radiocommunication Conference (WRC) process. Availability of the necessary protected radio frequency spectrum is a critical prerequisite for the safe and efficient implementation of CNS/air traffic management (ATM) systems. However, as demand for radio spectrum from non-aviation users keeps growing, aviation faces an ever-increasing competition for the limited available spectrum, in particular from mobile and broadband wireless access services.

The 13th Air Navigation Conference (AN-Conf/13), held in Montréal from 9 to 19 October 2018, approved Recommendation 2.2/1 c), which instructed ICAO to "launch a study, built on a multidisciplinary view of the C, N and S elements and frequency spectrum, to evolve the required CNS and frequency spectrum access strategy and systems roadmap in the short, medium and long term, in a performance-based and service-oriented manner, to ensure that CNS systems remain efficient users of the spectrum resource". ICAO has now initiated this work under the Integrated Communication Navigation Surveillance and Spectrum (ICNSS) and Annex 10 — *Aeronautical Telecommunications* streamline project.



Unless aviation can continue to prove that the aeronautical CNS systems are spectrum efficient, aviation will be forced to share the protected aeronautical frequency allocations with non-aeronautical users, with resulting reduction in quality of service due to interference or may even lose access altogether to certain frequency bands, critical to the current provision of CNS. Ultimately, this could result in an overall reduction in the safety and efficiency of the aeronautical system as a whole. A better way forward is to

facilitate a continuing and timely evolution of the aeronautical CNS systems. This will be necessary for two interrelated reasons, the first, to make more efficient use of the spectrum as per the ITU directive and the second, to make way for growth in air traffic from traditional airspace users as well as the explosive growth expected from new entrants such as the drone industry. The ICNSS project was conceived to deal with these issues.

The ICNSS project will have two streams, the ICNSS Roadmap and the CNS Standards. The roadmap stream will develop the CNSS roadmap on flexible and continuing technical evolution. The standards stream will define performance standards versus technical specifications, which will contain means of compliance. Alongside these streams, candidate frameworks for governance, prioritization and business cases will be developed.

It is envisaged that the future avionics providing for aeronautical safety CNS and their supporting ground systems will be built on integrated CNS system elements, facilitating efficient use of the valuable frequency spectrum resource. Utilizing the state of the art technologies, such as software defined radios, the avionics and their ground counterparts will have the capability to evolve as technology advances, with minimum costs to States, air space users and aerospace industry.

Cabin Safety

Cabin safety contributes to the prevention of accidents and incidents, the protection of the aircraft's occupants through proactive safety management including hazard identification and safety risk management, and the increase of survivability in the event of an emergency situation. The main role of cabin crew focuses on the evacuation of an aircraft in the event of an accident. This role contributes to the aspirational safety goal of zero fatalities set forth in the *Global Aviation Safety Plan* (GASP, Doc 10004) by ensuring passenger safety. In addition, cabin crew members also play an important proactive role in managing safety, which can contribute to the prevention of accidents. This role includes, but is not limited to:

a) preventing incidents from escalating in the cabin, such as smoke or fire;

b) informing the flight crew of abnormal situations observed in the cabin or relating to the aircraft, such as pressurization problems, engine anomalies and contamination of critical surfaces; and

c) preventing unlawful interference and managing passenger events that can compromise safety and security of the flight, such as hijackings.

The ICAO Cabin Safety Group (ICSG) is an international, joint industry-regulatory group composed of cabin safety experts from civil aviation authorities, airlines, aircraft manufacturers and non-governmental organizations. The ICSG serves as the expert group, providing advice to ICAO on cabin safety-related matters and assisting in the development or revision of requirements, guidance material and implementation support to enhance cabin safety on a global scale. Since the creation of ICAO's dedicated cabin safety initiative in 2012, ICAO has developed several guidance materials, including:

- Doc 10002, *Cabin Crew Safety Training Manual*;
- Doc 9481, *Emergency Response Guidelines for Incidents Involving Dangerous Goods* (updated to include cabin crew procedures for dealing with Lithium battery fires);
- Cir 340, *Guidelines for the Expanded Use of Portable Electronic Devices;*
- Doc 10049, *Manual on the Approval and Use of Child Restraint Systems* (second edition published);
- Cir 344, *Guidelines on Education, Training and Reporting Practices Related to Fume Events* (which includes cabin crew-related procedures and training);
- Doc 10062, *Manual on the Investigation of Cabin Safety Aspects in Accidents and Incidents* (which focuses on survival factors in investigations);
- Doc 10072, *Manual on the Establishment of Minimum Cabin Crew Requirements;*
- Doc 10086, *Manual on Information and Instructions for Passenger Safety* (including brace positions);
- Doc 10111, *Manual on the Implementation and Use of Cabin Electronic Flight Bags*;
- Cir 352, *UN OHCHR-ICAO Guidelines for Training Cabin Crew on Identifying and Responding to Trafficking in Persons*, developed in conjunction with the United Nations (UN) Office of the High Commissioner for Human Rights (OHCHR); and
- Cir 356, *Guidelines on Digital Learning for Cabin Crew Training* (including use of virtual reality).

Further information about ICAO's cabin safety initiatives can be found at www.icao.int/cabinsafety.

Runway Safety – 2019 Success Story

Runway safety (RS) continues to remain aviation's biggest safety challenge, representing more than half of accidents reported to ICAO for commercial operations, including scheduled and non-scheduled, involving aircraft with a certified MTOW over 5 700 kg in 2019 as shown in Chart 17.

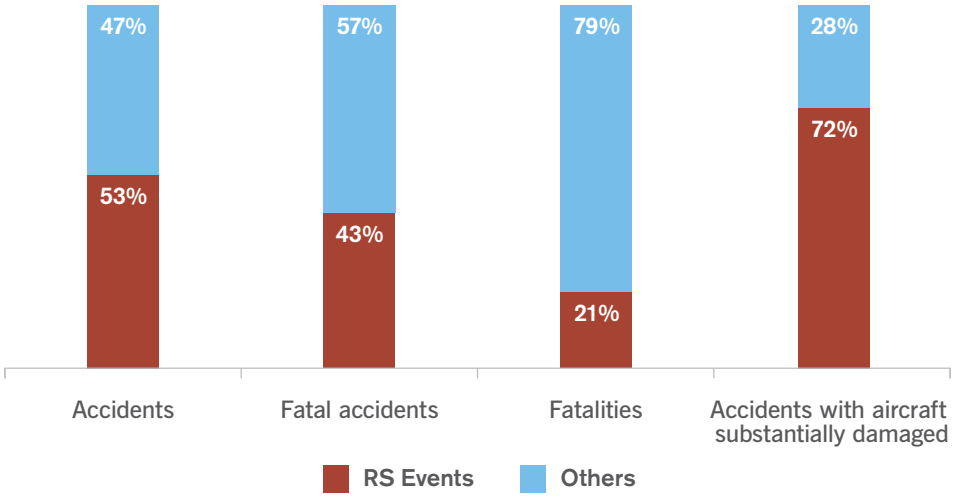


Chart 17. | Runway safety-related accidents overview 2019

Note: Events related to runway safety include the following CICTT occurrence categories: abnormal runway contact, bird strike, runway excursion, runway incursion, loss of control on ground, ground collision, ground handling, collision with obstacles, aerodrome and undershoot/overshoot.

Since 2011 the ICAO-led Runway Safety Programme (RSP) has been collaborating on initiatives to reduce runway safety-related accidents and incidents worldwide. A key initiative is the Global Runway Safety Action Plan (GRSAP), which provides recommended actions for all runway safety stakeholders aimed at reducing the risks related to runway safety, in particular runway excursions and runway incursions.

ICAO and its RSP partners also continue to support the establishment of effective airport Runway Safety Teams (RSTs) as a way to improve runway safety through Runway Safety Go-Team missions. The Runway Safety Go-Teams are comprised of ICAO and RSP partner organization experts, which perform multi-disciplinary technical assistance visits to requesting international airports to assist in establishing and improving the effectiveness of the airport RST. In 2019 there were eight Go-Team missions completed at airports in Azerbaijan, Belarus, Botswana, Cameroon, Lebanon, Morocco and Ukraine. In total there have been 40 ICAO Runway Safety Go-Team missions conducted since the launch of this initiative in 2014.

The Global Reporting Format (GRF) for runway surface conditions is another important runway safety-related initiative. ICAO continues to support States and stakeholders with their preparations for the 4 November 2021 applicability date. In March 2019 a global symposium was hosted in Montréal, with 350 delegates from 48 Member States and seven international organizations attending. This has been followed-up by a series of focused regional seminars, with eight hosted during 2019. In parallel, training courses for airport, airline and air traffic control (ATC) staff were under development through ICAO's Trainair Plus programme, in cooperation with Airports Council International (ACI), International Air Transport Association (IATA) and Civil Air Navigation Services Organisation (CANSO), respectively. The course for airport operations staff was delivered in 2019, and those for flight crew and ATC staff would be ready in 2020.

A competency-based approach to dangerous goods training and assessment

The Council approved amendments to the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284), which will be incorporated in the 2021–2022 Edition of the Technical Instructions. The amended provisions support a competency-based approach to dangerous goods training and assessment based on the principles provided in the *Procedures for Air Navigation Services — Training* (PANS-TRG, Doc 9868). They have been several years in the making and take into account feedback from States, international organizations and industry that was provided throughout the process. While the objective of ensuring personnel are trained to perform their dangerous goods functions commensurate with their responsibilities has not changed, the new provisions remove some of the prescriptive requirements of dangerous goods training, which may not always target specific training needs. The new provisions focus on the intent of dangerous goods training, which is to ensure personnel are competent to perform any function for which they are responsible prior to performing them.

New guidance material has been developed to support a competency-based approach to dangerous goods training and assessment. Since ICAO regions and Member States have differing regulatory, operational, technical and organizational environments, it does not prescribe a “one-size-fits-all” training programme. Instead, it provides generic tools to develop dangerous goods training programmes that can be adapted for specific needs. It is based on the more detailed material provided in the PANS-TRG.

ANC Talks

In January 2020, the newly elected President of the Air Navigation Commission (ANC), Mr. Nabil Naoumi, launched "ANC Talks", an open forum where the ANC and aviation stakeholders discuss challenges and opportunities encountered in the aviation sector. This initiative allows for discussions on implementation issues, and the talks are structured in such a way that communication is improved and work with aviation stakeholders is promoted, ultimately enhancing the relationship between ICAO, the aviation industry and other aviation stakeholders.

The outcome of ANC Talks is made available to the general public. An article summarizing discussions is published after each meeting on the ICAO Uniting Aviation Blog (https://www.unitingaviation.com). The President of the ANC also holds separate interview meetings with invited stakeholders, available on the ICAO TV (https://www.icao.tv).

Below is the list of articles published in the ICAO Uniting Aviation Blog and the associated date of publication. Interview videos can be accessed through the same link:

Published Articles on the ICAO Uniting Aviation Blog	Date of publication
ANC Talks: ICAO's Air Navigation Commission	5 February 2020
ANC Talks: Issues that Affect Airports	19 February 2020
ANC Talks: The Airbus 220 Aircraft	24 March 2020
ANC Talks: SITA brings cybersecurity to the discussions	29 April 2020
ANC Talks: Competency-based Training and Assessments in Aviation	12 May 2020
ANC Talks: Loon and Airbus Zephyr take Aviation to New Heights	21 May 2020
ANC Talks with EASA: As Innovation Grows, so does Aviation	27 May 2020
ANC Talks with EUROCONTROL: European Aviation, COVID-19 and the Recovery	12 June 2020
ANC Talks: A new digital era of aviation and the path forward for airspace and traffic management	19 June 2020
ANC Talks: How does business aviation contribute to economic and societal development?	29 June 2020

COVID-19 pandemic – The ICAO Council Aviation Recovery Task Force

From the onset of the COVID-19 crisis, the aviation system has faced ever-growing challenges. Following the ICAO Council *Declaration on the novel coronavirus* (COVID-19) adopted on 9 March 2020, the ICAO Council Aviation Recovery Task Force (CART) was established. The CART, which is composed of representatives from States, and international, regional and industry organizations, and supported by the ICAO Secretariat, was tasked to identify and recommend strategic priorities and policies to address these challenges and to provide global guidance for a safe, secure and sustainable restart and recovery of the aviation system.

The CART has since published the CART Report (https://www.icao.int/covid/cart/Pages/CART-Report--Executive-Summary.aspx) and the *Take-off: Guidance for Air Travel through the COVID-19 Public Health Crisis* (https://www.icao.int/covid/cart/Pages/CART-Take-off.aspx) to support Member States and the aviation industry.

CART Report

A safe, secure and sustainable restart and recovery of the global aviation sector is best supported by an internationally harmonized approach based on the following 10 principles outlined in the CART Report:

1. **Protect people: harmonized but flexible measures.** States and industry need to work together to put in place harmonized or mutually accepted risk-based measures to protect passengers, crew and other staff throughout the travel experience.
2. **Work as one aviation team and show solidarity.** The respective plans of ICAO, States, international and regional organizations, and the industry should complement and support each other. While national and regional needs may require different approaches, States should harmonize responses to the extent possible, in line with ICAO's Standards, plans and policies.
3. **Ensure essential connectivity.** States and industry should maintain essential connectivity and global supply chains, especially to remote regions, isolated islands and other vulnerable States.
4. **Actively manage safety-, security- and health-related risks.** States and industry should use data-driven systemic approaches to manage the operational safety-, security-, and health related risks in the restart and recovery phases, and adapt their measures accordingly.
5. **Make aviation public health measures work with aviation safety and security systems.** Health measures must be carefully assessed to avoid negatively impacting aviation safety and/or security.
6. **Strengthen public confidence.** States and industry need to work together, harmonizing practical measures and communicating clearly to ensure passengers are willing to travel again.

7. **Distinguish restart from recovery.** Restarting the industry and supporting its recovery are distinct phases which may require different approaches and temporary measures to mitigate evolving risks.
8. **Support financial relief strategies to help the aviation industry.** States and financial institutions, consistent with their mandates, should consider the need to provide direct and/or indirect support in various proportionate and transparent ways. In doing so, they should safeguard fair competition and not distort markets or undermine diversity or access.
9. **Ensure sustainability.** Aviation is the business of connections, and a driver of economic and social recovery. States and industry should strive to ensure the economic and environmental sustainability of the aviation sector.
10. **Learn lessons to improve resilience.** As the world recovers, the lessons learned have to be used to make the aviation system stronger.

The CART Report also outlines the measures compatible with safety and security requirements to be taken and the recommendations to follow up at the international, national and local level.

These measures are grouped into four categories:

a) **Aviation safety-related measures.** States may temporarily depart from ICAO Standards but must do so in a manner that does not compromise safety and security, and which is duly reported to ICAO. These departures should not be retained beyond the crisis.
b) **Aviation public health-related measures.** States should establish public health procedures aligned with the guidance included in the Take-off: Guidance for Air Travel through the COVID-19 Public Health Crisis. The necessity of these measures should be regularly reviewed. The measures which are no longer relevant should be discontinued when the need for their application has ceased to exist.
c) **Security- and facilitation-related measures.** States should enhance cross-sectoral coordination by establishing a national air transport facilitation committee or equivalent, and systematically use the passenger health locator form as a reference. It is States' responsibility to maintain security across all operations.
d) **Economic and financial measures.** These should be inclusive, targeted, proportionate, transparent, temporary and consistent with ICAO's policies, while striking an appropriate balance of interests without prejudice to fair competition.

The CART Report contains the following 11 recommendations:

Recommendation 1: During the global COVID-19 outbreak, Member States should continue updating COVID-19 Contingency Related Differences (CCRDs) in the Electronic Filing of Differences (EFOD) subsystem.

Recommendation 2: Member States should avoid retaining any COVID-19 related alleviation measures as soon as normal operations are resumed. Differences that remain after the contingency if any should be filed in the EFOD system.

Recommendation 3: Member States should expedite the development of guidance for safety management of new operations or operation change during this crisis.

Recommendation 4: Global and regional harmonization of procedures is essential to strengthen public and passenger confidence in air travel. To that end, Member States should establish aviation public health procedures aligned with the guidance in the Take-off: Guidance for Air Travel through the COVID-19 Public Health Crisis.

Recommendation 5: In order to support the fastest possible return to normal aviation operations, Member States should regularly review the necessity of continuing the application of risk mitigation measures as the risk of COVID-19 transmission diminishes; and measures which are no longer needed should be discontinued.

Recommendation 6: Member States that have not done so should immediately establish a National Air Transport Facilitation Committee (or equivalent) as required by Annex 9 to increase national level cross-sectoral coordination.

Recommendation 7: Member States should systematically use a Passenger Health Locator Form to ensure identification and traceability of passengers to help limit the spread of the disease and resurgence of the pandemic.

Recommendation 8: While temporarily adapting their security-related measures, using the guidance provided, Member States should strengthen their oversight system to ensure these measures are consistently applied with the objective of protecting aviation against acts of unlawful interference.

Recommendation 9: Member States should take measures to ensure that relevant personnel are provided training to identify and manage unruly passenger situations related to non-respect of essential aviation public health and safety measures.

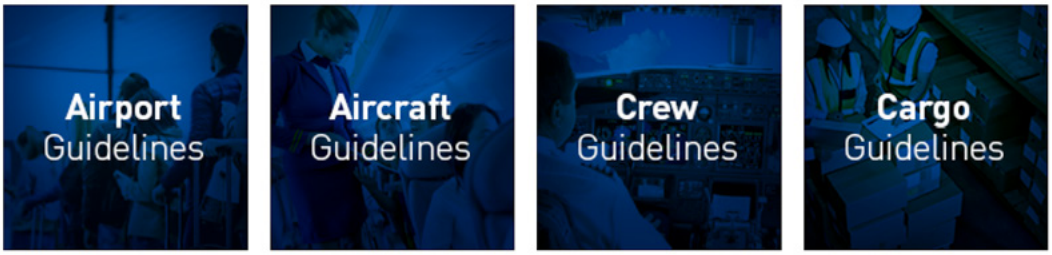
Recommendation 10: Member States should consider appropriate extraordinary emergency measures to support financial viability and to maintain an adequate level of safe, secure and efficient operations, which should be inclusive, targeted, proportionate, transparent, temporary and consistent with ICAO's policies, while striking an appropriate balance among the respective interests without prejudice to fair competition and compromising safety, security and environmental performance.

Recommendation 11: Member States should facilitate information-sharing and exchange on their actions and best practices by contributing to an ICAO database of measures.

The CART recommendations and guidelines are continuously reviewed and updated based on the latest medical and operational advice, and are intended to harmonize and not replace the COVID-19 recovery roadmaps currently established by States, regions or industry groups.

Take-off: Guidance for Air Travel through the COVID-19 Public Health Crisis

The CART Take-off guidance includes a section on public health risk mitigation measures, in addition to four operational modules relating to airport guidelines, aircraft guidelines, crew guidelines and cargo guidelines.



This document provides a framework for addressing the impact of the current COVID-19 pandemic on the global aviation transportation system. The appendix to this document includes mitigations needed to reduce public health risks to air passengers and aviation workers while strengthening confidence among the travelling public, the global supply chain and governments. This will assist in accelerating demand for essential and non-essential air travel impacted by COVID-19.

With help and guidance from the civil aviation stakeholder community, ICAO recommends a phased approach to enable the safe return to high-volume domestic and international air travel for passengers and cargo. The approach introduces a core set of measures to form a baseline aviation health safety protocol to protect air passengers and aviation workers from COVID-19. These measures will enable the growth of global aviation as it recovers from the current pandemic.

More information about the CART can be found at https://www.icao.int/covid/cart/Pages/default.aspx.

COVID-19 pandemic – CAPSCA and the Public Health Corridor

The ICAO Collaborative Arrangement for the Prevention and Management of Public Health Events in Civil Aviation (CAPSCA) programme, established in 2006 in response to the severe acute respiratory syndrome (SARS) crisis, is a voluntary multi-sectoral platform combining resources and expertise from both aviation and public health sectors to support the preparedness for, and management of, public health events affecting civil aviation. The CAPSCA network links ICAO, the World Health Organization (WHO) and other United Nations (UN) entities, international aviation organizations, civil aviation authorities and public health organizations at global, regional and national levels.

CAPSCA recommends the implementation of a "Public Health Corridor" (PHC) concept to ensure continued flight operations with minimal restrictions, whilst preventing the spread of infection of COVID-19 through air travel and protecting the health and safety of crew and passengers. The PHC has been developed using a risk-based approach, taking into account safety management principles. The key elements of this strategy are the use of "clean" crew, "clean" aircraft, "clean" airport facilities, "clean" cargo and transporting "clean" passengers. "Clean" in this context refers to implementing measures to ensure as far as possible a "COVID-19 free" status.

Given the absence of a vaccine and definitive treatment, and the limitations on testing and resources, the risk of contracting COVID-19 when travelling by air cannot be completely eliminated, however, the risk to crew and passengers can be mitigated significantly by implementing various layers of measures. CAPSCA guidance material and supporting activities will be adjusted periodically based on new scientific developments to ensure that the implemented measures mitigate risk as far as possible.

CAPSCA and the PHC are mechanisms for implementing the ICAO Council Aviation Recovery Task Force (CART) guidance material relating to general public health measures as well as the specific recommendations specified in the airport, aircraft, crew and cargo modules. Assistance is provided at global, regional and national levels to support States and industry for the restart and recovery of the aviation system.

CAPSCA activities in response to the COVID-19 pandemic include:

- **Developing guidance material**, including Electronic Bulletins supporting the CART and contributing to WHO guidance material development.
- **Sharing guidance material**, including ICAO guidance material and information, WHO and other public health guidance material and publication of CAPSCA members' best-practices papers and other associated guidance material on the CAPSCA website.
- **Tools development and review**, including online surveys, forms to ensure uniform implementation of guidance material, review of the CAPSCA assistance visit checklist, data-driven applications and analysis of information shared by Member States.
- **Capacity-building and training**, including the current CAPSCA on-line training package to develop capacity to conduct CAPSCA assessment visits, training through regional CAPSCA meetings which is currently being conducted on-line and through webinars and supporting WHO regional training activities.
- **Providing subject matter advice** on an ad-hoc basis upon request to support States in their activities and the implementation of guidelines.

- **CAPSCA assistance visits** assessing preparedness and response plans, conducting a gap analysis, assess implementation of the International Health Regulations and ICAO health-related SARPs, providing recommendations for improvement.
- **Developing templates and procedures** to facilitate the implementation of the PHC.

The PHC expands on CAPSCA activities and focuses on implementation activities, including:

- implementation of guidance material through the i-Package on the PHC;
- implementation of new tools such as online tools and smartphone applications;
- enhancing capacity-building and training, including the PHC online course and PHC webinars; and
- assessment of and information-sharing regarding implementation of CAPSCA and CART guidance in collaboration with public and private stakeholders to facilitate harmonized implementation and mutual recognition of implemented measures.

More information about CAPSCA can be found at https://www.icao.int/safety/aviation-medicine/Pages/CAPSCA.aspx.

COVID-19 pandemic – Update on operational safety activities

Meeting the obligations of the Convention

The initial priority of States' response to the COVID-19 pandemic has included ensuring that international operations, albeit in limited capacity, can continue unhindered. Due to restrictions with access to training and medical facilities, States are offering operators alleviations from medical and training requirements that have resulted in the need to record temporary differences. A method to allow States to file temporary differences to Standards and Recommended Practices (SARPs), as well as the provision of clear information on what differences they are prepared to accept from other States, has become essential to allow operations to continue.

The relevant articles of the Convention are:

> **Article 38** – *Departures from international standards and procedures*, which requires States to notify ICAO of any differences to the SARPs that arise;
>
> **Article 39** – *Endorsement of certificates and licenses*, which states that any aircraft or person that does not satisfy in full applicable Standards or conditions shall have endorsed on or attached to relevant certificate or license a complete enumeration of the details or particulars in respect of which the aircraft or person does not satisfy such requirements or conditions; and
>
> **Article 40** – *Validity of endorsed certificates and licenses*, which provides that no aircraft or personnel having certificates or licenses so endorsed shall participate in international navigation, except with the permission of the State or States whose territory is entered.

ICAO carried out a thorough review of all Annexes and identified a set of SARPs that included explicit references to renewal periods or recency requirements. To support States in filing and accessing the required information, the COVID-19 Contingency Related Differences (CCRD) (available at www.icao.int/safety/COVID-19OPS/Pages/ccrd.aspx), a sub system of the Electronic Filing of Differences (EFOD) system, has been developed to allow States to file temporary differences to SARPs and to publish the differences they are prepared to accept from other States. The system ensures continued operations in compliance with Articles 38, 39 and 40 of the Convention. On 3 April 2020, ICAO issued State letter AN 11/55-20/50 informing States of the establishment of the CCRD and requested that information be provided to facilitate continuance of international air transport while respecting the requirements of the Convention. To date, a total of 181 States have provided information in the CCRD, an unprecedented number of responses; this has supported the continued operations of aircraft.

Additional SARPs have since been subsequently identified and included in the CCRD tool. Although these SARPs do not explicitly have limitations contained in the text, they have been considered to be of sufficient importance for States to review and document their differences. An example of such is the requirement in Annex 6 — *Operation of Aircraft* for the continued validity of the approval for approved maintenance organizations. This does not specify the means to demonstrate continued validity; many States, however, require a biannual on-site inspection, which has not been possible to comply with.

Developing guidance

To support civil aviation authorities (CAAs) in the decision-making process for the issuance of alleviations, ICAO has developed a number of "Quick Reference Guides" (QRG) describing State and industry best practices on a variety of subjects. These guides have been designed to be published quickly and updated as often as required, depending on the circumstances. Maximum use has been made of ICAO expert groups (panels, task forces, study groups, etc.), although the time-sensitive nature of the work requires that the usual process of review, comment and publication have been expedited.

Guidance has also been developed on conducting risk assessments to support the State alleviations, including the publication of the first edition of the *ICAO Handbook for CAAs on the Management of Aviation Safety Risks related to COVID-19* (Doc 10144). To complement the content of the Handbook, ICAO is collecting and sharing examples and tools through a dedicated page created under the Safety Management Implementation (SMI) website (www.icao.int/SMI-COVID19SRM).

Webinars, training and tools

Additional information has been provided to States and industry via a series of webinars, based on the QRG subject areas, which allow for more detailed explanations of the issues involved and facilitate question and answer sessions responding to specific areas of interest to participants.

States and operators also needed to be able to plan for the lifting of COVID-19 related extensions and exemptions, and anticipate the needs as a result of deferred certificate validity renewals backing up. In line with safety management principles, ICAO has developed the monitoring and planning tool (MPT) to support States and organizations in their planning activities related to the aftermath of COVID-19 alleviation measures.

The primary context of the tool is the management of the likely backlog due to reduced activities during the COVID-19 crisis. The tool also helps States visualize the alleviations granted and establish a dialogue with operators to better anticipate the demand of services.

Implementation packages

On 17 July 2020, ICAO issued Electronic Bulletin 2020/40 informing States of the availability of implementation packages (iPacks) to support States in their response, recovery and resilience efforts following the COIVD-19 outbreak. The iPack contents include standardized guidance material, training, workshops, tools and subject matter expert support which aim to facilitate and guide the implementation of the applicable ICAO provisions by State entities. iPacks on aviation safety risk management and aerodromes restart are two such examples.

COVID-19 pandemic – Safety Risk Management

ICAO has developed the *Handbook for CAAs on the Management of Aviation Safety Risks related to COVID-19* (Doc 10144). The terminology is aligned with ICAO Doc 9859 and can be applied by States at any level of SSP implementation.

The guidance outlines important aspects for CAAs to consider at different stages of the pandemic. It discusses the assessment and prioritization of risks based on collection and analysis of data, application of safety management principles to support risk-based decision-making, and management and monitoring of CAA approvals in light of the flexibility needed across the aviation system to continue safe operations. It also introduces concepts such as the plan-do-check-act (PDCA) cycle as shown in Figure 12.

The successful management of the pandemic requires the assessment and management of risks that extend beyond the boundaries of managing aviation safety risks as defined in Annex 19. To that end, integrated risk management tools are being considered to support States, taking into account different risk domains, including safety, security, environment and financial.

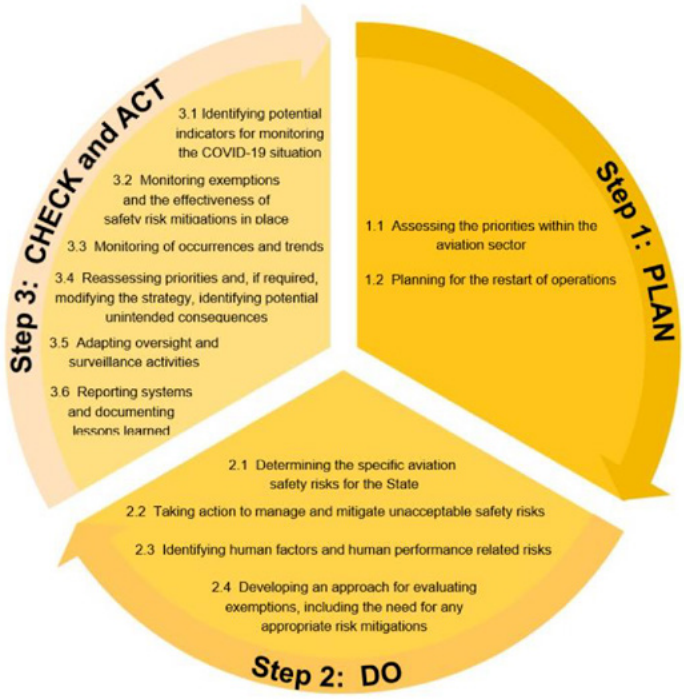


Figure 12. | PDCA cycle for managing aviation safety risks during COVID-19

Once the pandemic is over, CAAs should capitalize on their efforts to apply lessons learned during the COVID-19 pandemic to continue building on their SSP implementation, making further progress towards addressing contingency planning and improving the effectiveness of their safety management functions. The Handbook is available at no cost and can be downloaded at www.icao.int/COVID-19-SRM. Webinars and online training were developed to support the application of this content.

COVID-19 pandemic - Strategies for UAS

The COVID-19 pandemic has presented circumstances to the world that require ongoing diligence and resources. The global spread commands innovative solutions and among those solutions, unmanned aircraft systems (UAS) can play a vital role.

A delivery logistics company is using UAS to transport COVID-19 samples in urban areas of Ghana and Rwanda, and transporting an expanded mix of products to meet health facilities' critical needs as demand surges. The protocols were formalized identifying the precise movement of each COVID-19 sample. Allocation of specific UA was made for transporting to and from the health facilities as well as required procedures for sanitizing the UA and the flight operations environment. Personnel received training on proper sample packaging, marking and use of proper protective equipment according to WHO recommendations.

Transport Canada is presently evaluating multiple prospective operation types submitted by Canadian UA operators. The various operation types involve transporting biological samples and medicines to isolated communities; delivery of essential goods and medicines to indigenous communities; or transporting supplies to food banks. Canada has asked the fundamental question as to how it can best adapt its current transportation model to accommodate the many distribution needs efficiently and effectively. As Transport Canada evaluates its UA transportation options, it does so with the consideration of less congested skies, which is another result from the current health crisis.

States throughout the world have acquired experience with UAS operations that are similar in nature to one another. Testing corridors have been established and trial delivery operations have ensued. In some States, training is underway on different types of UA, health applications and collecting and processing data. All of these activities from personal protective equipment (PPE) delivery to mapping data that will help model the spread of a virus are invaluable for the current pandemic and especially effective during future health events, with refined coordination and preparation.

ICAO brought together experts from several States, United Nations System agencies and non-governmental organizations to assist in producing guidance material for emergency response. ICAO has published Humanitarian Aid and Emergency Response guidance for UAS and has developed UAS model regulations. ICAO is currently working on a cohesive UAS roadmap to assist States with implementation of these provisions. The need to harmonize UAS regulations amongst Member States for operations across borders and within regions is a key consideration.

The COVID-19 pandemic is teaching all of us about the degree to which coordination and preparation is necessary to respond to this and future outbreaks. ICAO's U-AID webpage provides guidance material to assist States in preparing for emergency response events insuring a holistic approach. Under supporting material, government ministries, agencies and local entities with whom coordination is vital are provided as well as mission planning samples, carriage of dangerous goods information and establishing methods for societal communications. The link to ICAO's Humanitarian Guidance and Emergency Response material can be found at: https://www.icao.int/safety/UA/UAID/.

An important aspect of adequate crisis planning is training. Training in advance of a crisis is paramount. Knowledge and skill of UA flight operations; how to handle, package, label and record medical samples for transport; and how to properly collect, process and assess data collected by UA are all areas that require training in preparation for an emergency response.

The ICAO guidance can be used for the COVID-19 pandemic or any other natural or manmade emergency situation. The key is to be prepared. Review of the model regulations and guidance material which provide foundational information for States will assist personnel in the necessary preparation. These materials will be updated over time, as knowledge and experience expand. For specific questions or concerns on emergency preparedness by UAS, please contact us at RPAS@icao.int.

COVID-19 pandemic – Aerodrome Operations and Infrastructure

Aerodromes are a unique ecosystem in the aviation industry where interaction takes place among passengers, with staff and with other authorities in a common space. With the rapid spread of COVID-19, aerodromes were forced to shut down or operate with reduced capacity. In this context, it is important for States to be prepared to cope with various challenges during these unprecedented times.

ICAO published, on its COVID-19 website, guidance for States concerning issues pertaining to issuance/renewal of aerodrome certificates, need for stakeholder engagement before closing aerodromes and a sample safety checklist for resuming aerodrome operations.

Aerodrome Certification

Aerodrome certification is an effective tool to ensure safe and efficient aerodrome operations. During the COVID-19 pandemic, States were advised of the options to provide interim aerodrome certificates or extend the validity of aerodrome certificates, where required for a defined period based on established guidelines.

Aerodrome Closures

Uncoordinated aerodrome closures will affect the aviation industry especially for aircraft in a state of emergency, operations related to humanitarian aid, medical and relief flights, and alternate aerodromes for en-route operations. States were advised to coordinate with the public health authorities, aircraft operators, ANSPs, aerodrome operators, etc., to address the needs and concerns of all the stakeholders, before initiating any action to close an aerodrome.

Resuming Aerodrome Operations

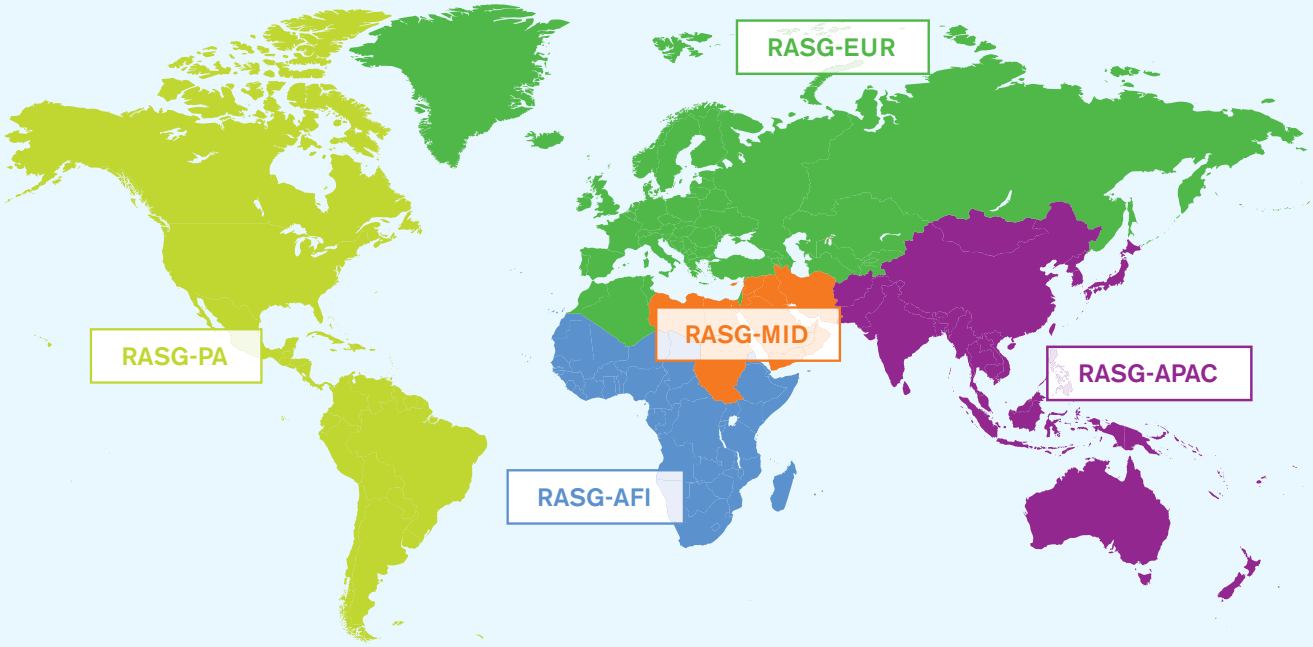
Resuming aerodrome operations after a full or partial aerodrome closure involves extensive preparatory checks to ensure safety and efficiency. To this end, States were provided with a sample checklist to facilitate a quick recovery for aerodromes by checking key elements in areas such as aerodrome infrastructure, aerodrome operations, certification and compliance, and coordination and collaboration.

More information can be found at https://www.icao.int/safety/COVID-19OPS/Pages/aga.aspx.

Appendix 1

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
- Cabo Verde
- Central African Republic
- Chad
- Comoros
- Congo
- Côte d'Ivoire
- Democratic Republic of the Congo
- Djibouti
- Equatorial Guinea
- Eritrea
- Eswatini
- 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
- Togo
- Uganda
- United Republic of Tanzania
- Zambia
- Zimbabwe

Appendix 1

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
Czechia
Denmark
Estonia
Finland
France
Georgia
Germany
Greece
Hungary
Iceland
Ireland
Israel
Italy
Kazakhstan
Kyrgyzstan
Latvia
Lithuania
Luxembourg
Malta
Monaco
Montenegro
Morocco
Netherlands
North Macedonia
Norway
Poland
Portugal
Republic of Moldova
Romania
Russian Federation
San Marino
Serbia
Slovakia
Slovenia
Spain
Sweden
Switzerland
Tajikistan
Tunisia
Turkey
Turkmenistan
Ukraine
United Kingdom
Uzbekistan

RASG-MID (15)

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

RASG-PA (35)

Antigua and Barbuda
Argentina
Bahamas
Barbados
Belize
Bolivia (Plurinational State of)
Brazil
Canada
Chile
Colombia
Costa Rica
Cuba
Dominica
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 (Bolivarian Republic of)

Appendix 2

List of Scheduled Commercial Accidents in 2019

Local Date	Model	State of Occurrence	RASG Region	Fatalities	Occurrence Category
2019-01-03	Embraer ERJ190-100	United States	PA		CABIN
2019-01-08	Airbus A320-200	United States	PA		RAMP
2019-01-17	Boeing 737-800 & Boeing 737-800	Malta	EUR		GCOL
2019-01-18	Boeing 777-200	South Pacific ocean	International water		TURB
2019-01-23	de Havilland DHC8-100	Canada	PA		RE
2019-01-26	ATR 72-600	India	APAC		ARC
2019-01-28	ATR 72-200	Spain	EUR		RE
2019-01-28	Boeing 727-200	United States	PA		ARC
2019-01-29	Boeing 737-800	Germany	EUR		SCF-NP
2019-02-03	Boeing 787-8	United States	PA		CABIN
2019-02-05	Boeing 737-800	Costa Rica	PA		TURB
2019-02-08	Airbus A321-200	Denmark	EUR		ARC
2019-02-13	Embraer ERJ170	United States	PA		TURB
2019-02-17	Boeing 737-800	United States	PA		TURB
2019-02-27	Boeing B777-200	United States	PA		TURB
2019-02-28	Embraer ERJ 190-200	United Kingdom	EUR		F-NI, EVAC
2019-03-01	Airbus A320-200	United Kingdom	EUR		SCF-PP, EVAC
2019-03-02	de Havilland DHC8-400	United Kingdom	EUR		GCOL
2019-03-03	Beechcraft 1900D	Algeria	EUR		SCF-NP
2019-03-03	Airbus A320-200	Brazil	PA		USOS
2019-03-04	Embraer EMB145	United States	PA		USOS
2019-03-07	Boeing 737-300	Bolivia (Plurinational State of)	PA		SCF-NP
2019-03-08	ATR 42-500	Russian Federation	EUR		RE
2019-03-10	Boeing 737 MAX 8	Ethiopia	AFI	157	SCF-NP, LOC-I
2019-03-10	Boeing 737-800 & Boeing 757-300	United States	PA		GCOL
2019-03-10	Bombardier CL600 2C10 & Bombardier CL600 2D24	United States	PA		RAMP
2019-03-19	Fokker 28 MK100	Iran (Islamic Republic of)	MID		SCF-NP, ARC
2019-03-21	ATR 72-200	Sao Tome and Principe	PA		RAMP
2019-03-23	Airbus A320-200	United Kingdom	EUR		SCF-NP, RAMP

List of Scheduled Commercial Accidents in 2019 (continued)

Local Date	Model	State of Occurrence	RASG Region	Fatalities	Occurrence Category
2019-03-27	Boeing 737-700	United States	PA		BIRD
2019-04-03	Airbus A320-200	United Kingdom	EUR		RAMP
2019-04-04	Boeing MD88	United States	PA		GCOL
2019-04-04	de Havilland DHC8-400	Austria	EUR		ARC, WSTRW
2019-04-08	BAe Jetstream 4100	Dominican Republic	PA		ARC
2019-04-10	Airbus A321-200	United States	PA		ARC
2019-04-11	Boeing 737-900	United States	PA		CABIN
2019-04-22	Airbus A320-200	Thailand	APAC		TURB
2019-05-02	Boeing 737-800	Japan	APAC		TURB
2019-05-03	Boeing DC-3	Canada	PA		SCF-PP
2019-05-05	Sukhoi Superjet 100-95B	Russian Federation	EUR	41	ARC, WSTRW, RE, F-PI, EVAC
2019-05-08	de Havilland DHC8-400	Bangladesh	APAC		ARC, RE
2019-05-10	de Havilland DHC8-300	Canada	PA		GCOL
2019-05-13	Boeing 737-900	Republic of Korea	APAC		TURB
2019-05-24	Airbus A320-200	Indonesia	APAC		RAMP
2019-05-25	Boeing 737-800	United States	PA		TURB
2019-05-28	Airbus A320-200	United States	PA		CABIN
2019-06-09	Boeing 737-900	United States	PA		ARC
2019-06-15	ATR 42-300	Brazil	PA		SCF-NP, ARC, EVAC
2019-06-15	Boeing 757-200	United States	PA		ARC, RE
2019-06-17	Boeing 737-800	United States	PA		RAMP
2019-06-18	Airbus A330-200	China	APAC		TURB
2019-06-23	Airbus A320-200	Italy	EUR		CABIN
2019-06-27	Antonov An-24RV	Russian Federation	EUR	2	RE, SCF-PP, F-POST
2019-07-02	Boeing 737-800	India	APAC		RE
2019-07-09	Boeing 737-800& Airbus A320-200	Netherlands	EUR		RAMP
2019-07-10	Airbus A380-800	Indian Ocean	International water		TURB
2019-07-12	ATR 42-500	Greece	EUR		RE
2019-07-12	ATR 72-200	Nepal	APAC		RE
2019-07-17	Bombardier CL 600 2B19	United States	PA		GCOL
2019-07-19	de Havilland DHC8-400	Canada	PA		ARC
2019-07-20	ATR 42-500	Pakistan	APAC		RE
2019-07-22	Boeing 767-300	United States	PA		TURB

List of Scheduled Commercial Accidents in 2019 (continued)

Local Date	Model	State of Occurrence	RASG Region	Fatalities	Occurrence Category
2019-07-23	Boeing 737-300	Nigeria	AFI		ARC
2019-07-23	Boeing 757-300	United States	PA		RAMP
2019-07-24	Boeing 777-300	France	EUR		RAMP
2019-07-30	Airbus A319-100	Germany	EUR		RAMP
2019-07-31	Bombardier CL600 2D24	United States	PA		RAMP
2019-08-02	Airbus A330-200	Atlantic ocean	International water		TURB
2019-08-02	ATR 72-200	Myanmar	APAC		ARC
2019-08-02	Boeing 787-8 & Airbus A340-300	Canada	PA		GCOL
2019-08-03	Boeing 737-300	Bolivia	PA		SCF-NP, ADRM
2019-08-06	Boeing 737-900ER & Airbus A320-200	United States	PA		GCOL, ADRM
2019-08-08	Airbus A320-200	United States	PA		TURB, CABIN
2019-08-08	Airbus A321-200	United States	PA		ARC, WSTRW
2019-08-12	Boeing 787-9	United Kingdom	EUR		RAMP
2019-08-15	Boeing 787-8	China	APAC		TURB
2019-08-15	Airbus A321-200	Russian Federation	EUR		BIRD
2019-08-16	de Havilland DHC 8-200	Kenya	AFI		WILD
2019-08-21	Airbus A340-600	Turkey	EUR		TURB
2019-08-26	Boeing MD88	United States	PA		TURB
2019-08-26	ATR72-200	Iran (Islamic Republic of)	MID		ARC
2019-08-27	Airbus A330-300	China	APAC		F-NI
2019-08-27	Airbus A320-200	United States	PA		TURB
2019-09-06	Airbus A319-100	United States	PA		TURB
2019-09-07	ATR72-200	Columbia	PA		ARC
2019-09-09	Airbus A319-100	Germany	EUR		TURB
2019-10-01	Boeing 777-300	Indonesia	APAC		TURB
2019-10-11	Fokker F50	Kenya	AFI		RE
2019-10-12	ATR 42-500	Japan	APAC		AMAN
2019-10-12	Embraer EMB110	Bahamas	PA		SCF-NP, ARC, RE
2019-10-17	Saab 2000	United States	PA	1	RE
2019-10-29	De Havilland DHC8-400	United States	PA		BIRD
2019-11-03	Boeing B787-8	Spain	EUR		AMAN
2019-11-11	Embraer EMB145	United States	PA		RE
2019-11-16	Boeing 777-300 & Airbus A330-200	Germany	EUR		GCOL

List of Scheduled Commercial Accidents in 2019 (continued)

Local Date	Model	State of Occurrence	RASG Region	Fatalities	Occurrence Category
2019-11-21	Boeing 737-800	Ukraine	EUR		RE
2019-11-23	Boeing 737-800	Germany	EUR		RAMP, OTHR
2019-11-23	Boeing 737-400	Colombia	PA		SCF-NP, ARC
2019-11-24	Dornier 228-200	Democratic Republic of Congo	AFI	26	LOC-I
2019-11-25	de Havilland DHC8-300	Zambia	AFI		WSTRW
2019-11-25	Airbus A330-300	Myanmar	APAC		ARC
2019-11-27	Airbus A350-900 & Airbus A330-200F	Democratic Republic of Congo	AFI		GCOL
2019-12-10	de Havilland DHC8-400	South Sudan	AFI		RE
2019-12-14	Bombardier CL600 2D24	United States	PA		CABIN
2019-12-15	Embraer EMB145	United States	PA		TURB
2019-12-16	Airbus A330-200	Spain	EUR		TURB
2019-12-16	Embraer EMB135	United States	PA		TURB
2019-12-18	Embraer ERJ190	United States	PA		TURB
2019-12-19	Boeing 737-900	United States	PA		AMAN
2019-12-21	Boeing 737-700	United States	PA		BIRD
2019-12-22	Boeing 737-800	United States	PA		SCF-NP, ARC
2019-12-25	Airbus A320-200	Japan	APAC		TURB
2019-12-27	Fokker F28 Mk0100	Kazakhstan	EUR	12	ICE, LOC-I
2019-12-28	Let L410	Democratic Republic of Congo	AFI		RE

CICTT Occurrence Categories

Code	Description
ADRM	Aerodrome
AMAN	Abrupt Maneuver
ARC	Abnormal runway contact
BIRD	Bird
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
ICE	Icing
LOC-I	Loss of control in-flight
LOC-G	Loss of control-ground
OTHR	Other
RAMP	Ground handling
RE	Runway excursion
SCF-NP	System/component failure (non-powerplant)
SCF-PP	System/component failure (powerplant)
TURB	Turbulence encounter
UNK	Unknown or undetermined
USOS	Undershoot/overshoot
WILD	Wildlife
WSTRW	Wind shear or thunderstorm

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