IATA Annual Safety Report - 2022

Executive Summary and Safety Overview

Edition 59

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Executive Summary

Last year saw a surge in air travel compared to 2021 as most governments lifted or eased COVID-19 related travel restrictions. Just over 32 million flights were operated in 2022, an increase of 25% compared to 2021, but still 31% below the 2019 figure.

The commercial aviation industry suffered 39 total accidents[1] in 2022, an increase from 29 in 2021. The all accident rate rose from 1.13 per million sectors in 2021 to 1.21 in 2022. Overall, there was one accident for every 826,088 flights. This means that a person taking one flight every day, would need to fly for 2,263 years before experiencing an accident.

Five accidents in 2022 resulted in fatalities, compared with seven in 2021. As a result, the fatal accident rate improved from 0.27 per million sectors in 2021 to 0.16 for 2022, which was also ahead of the 5-year fatal accident rate of 0.20. Despite the reduction in the number of fatal accidents, the number of fatalities rose from 121 to 158.

The majority of fatalities occurred in a single aircraft accident in China that claimed the lives of 132 persons. The next largest loss of life occurred in an accident in Tanzania that resulted in 19 fatalities.

In three of the accidents, fatalities did not occur to passengers and crew, but rather to persons on the ground.

- In an accident at Conakry airport, Guinea, a motorcycle entered the runway as the aircraft was landing and collided with the aircraft. Both people on the motorcycle died.
- In another accident, a fire vehicle entered the runway at Lima airport in Peru as an aircraft was taking off, resulting in the deaths of two firefighters who were on the fire vehicle.
- A third accident occurred in Montgomery, AL, USA, when an airline ground worker was ingested into the engine of an aircraft shortly after the aircraft arrived at the gate but before both engines were shut down.

Of the 39 aircraft accidents in 2022, IATA member airlines had 10 non-fatal and one fatal accident. IATA member airlines continued to trend lower than the industry at 0.49 accidents per million sectors versus 1.21 per million sectors for the industry as a whole– a pattern also reflected in the five-year average rate (2018-2022) of [0.76 for IATA members vs. 1.26 for industry].

Taking a longer-term view, the industry has improved its overall safety performance over the last ten years by 48%, with an accident rate in 2022 of 1.21 accidents per million sectors, compared to 2.31 in 2013. In 2013, there were 11 fatal accidents that resulted in 173 fatalities. Over the past five years, there have been an average of about seven fatal accidents per year for commercial aircraft (passengers and cargo) resulting in an annual average of 231 fatalities. IATA continues its focus on supporting aviation stakeholders to continuously reduce the industry fatality risk.

The accident categories in 2022 listed in order of the number of fatalities (with the number of accidents in brackets) were:

- Other End State[2] (3) with 138 fatalities
- Off Runway Touchdown (1) with 19 fatalities

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[1] Commercial aviation operations, specifically scheduled/charter passenger or cargo service. Executive jet operations, training, maintenance/ test flights are all excluded. The aircraft has a certificated Maximum Take-Off Weight (MTOW) of at least 5,700KG

[2] The Other End State is used where:

- **Information available at the ACTF meeting was not enough to determine the accident end state. For example:**
  - **Aircraft is missing,**
  - **The investigation is still ongoing or report not available and the ACTF is unable to assign an end state classification**
- **The End State does not fit into other categories**

- Runway Excursions (1) with one fatality

The accident categories in 2022 listed by the frequency of nonfatal accidents were:

- Landing Gear (8)
- Runway Excursion (6)
- Tail Strike (6)
- Ground Damage (3)
- In-flight Damage (3)
- Runway Damage (2)
- Other End State (2)
- Hard Landing (1)
- Off Runway Touchdown (1)
- Loss of Control — In-flight (1)
- Off-Airport Landing/Ditching (1)
- Mid-Air Collision (0)
- Fuel Exhaustion (0)
- Controlled Flight into Terrain (0)

When considering accidents per region:

- Africa (AFI) had the highest accident rate with 8.70 accidents per million sectors in 2022. This was up from 5.66 per million sectors in 2021, and was also above the 5-year average of 5.68 accidents per million sectors; followed by Latin America & the Caribbean (LATAM/CAR) with 4.07 accidents per million sectors.
- The LATAM/CAR accident rate of 4.07 rose from 1.06 accidents per million sectors in 2021, and was also above the 5-year average of 2.24 accidents per million sectors.
- The industry witnessed a 50% reduction in the number of accidents involving Commonwealth of Independent States (CIS) operators, from 4 accidents in 2021 to 2 in 2022, neither of which involved fatalities. The region experienced 3 fatal accidents in 2021. The fatality risk improved to 0.00 from 2.29 in 2021.
- Operators in three regions: LATAM/CAR, AFI, and North Asia (NASIA) suffered fatal accidents in 2022, one of which involved jet aircraft (NASIA) and 4 of which involved turboprops.
- The jet fatality risk for NASIA operators went from 0.00 in 2021, to 0.23 in 2022. The turboprop fatality risk for LATAM/CAR went up from 0.00 in 2021, to 0.17 in 2022. AFI operators saw an improvement in the turboprop fatality risk from 7.15 in 2021, to 5.74 in 2022.
- 77% of the commercial air transport accidents in 2022 involved passenger flights.
- IATA membership and IOSA accreditation vs. non-IATA members and Non-IOSA Carriers continued a strong correlation with improved safety performance. The accident rate for IOSA-registered carriers in 2022 was lower than the rate for non- IOSA carriers. (0.70 vs 2.82).
- The jet hull loss rate per million sectors in 2022 was 0.17 vs 0.13 in 2021.
- Middle East and North African (MENA) operators have not reported a jet hull loss accident since 2015.
- The turboprop hull loss rate per million sectors in 2022 was 1.47 vs. 1.77 in 2021.
- European (EUR) and NASIA operators reported zero turboprop hull loss accidents since 2014 and 2015, respectively.
- The turboprop hull loss accident rate per million sectors for CIS in 2022 was zero vs. 42.53 in 2021.

When considering Threat and Errors Management. The most common factors cited in 2022 accidents were:

- Adverse weather condition was a contributing factor in 31% of these accidents. The weather condition most often cited as a contributing factor (18% of the accidents) was wind/wind shear/gusty wind and thunderstorm.

- Aircraft malfunction was cited in 21% of the accidents.
- Failure in the landing gear/tire was cited in 15% of the accidents.
- Non-Compliance to Standard Operating Procedures (SOPs) was a contributing factor in 26% of accidents, followed by manual handling and flight control errors in 21% of the accidents
- Abrupt Aircraft Control and Vertical, Lateral or Speed Deviations were contributing factors in 15% of the accidents, followed by Unstable Approaches and long landing in 13% of the accidents.
- Lack of or inadequate management decisions, including regulatory decisions, were a contributing factor in 10% of the accidents and deficiencies in maintenance operations was also cited in 10% of the accidents.
- Overall crew performance and lack of monitoring and crossing checking, were contributing factors in 13% of the accidents. In flight Decision making was a contributing factor in 11% of the accidents.

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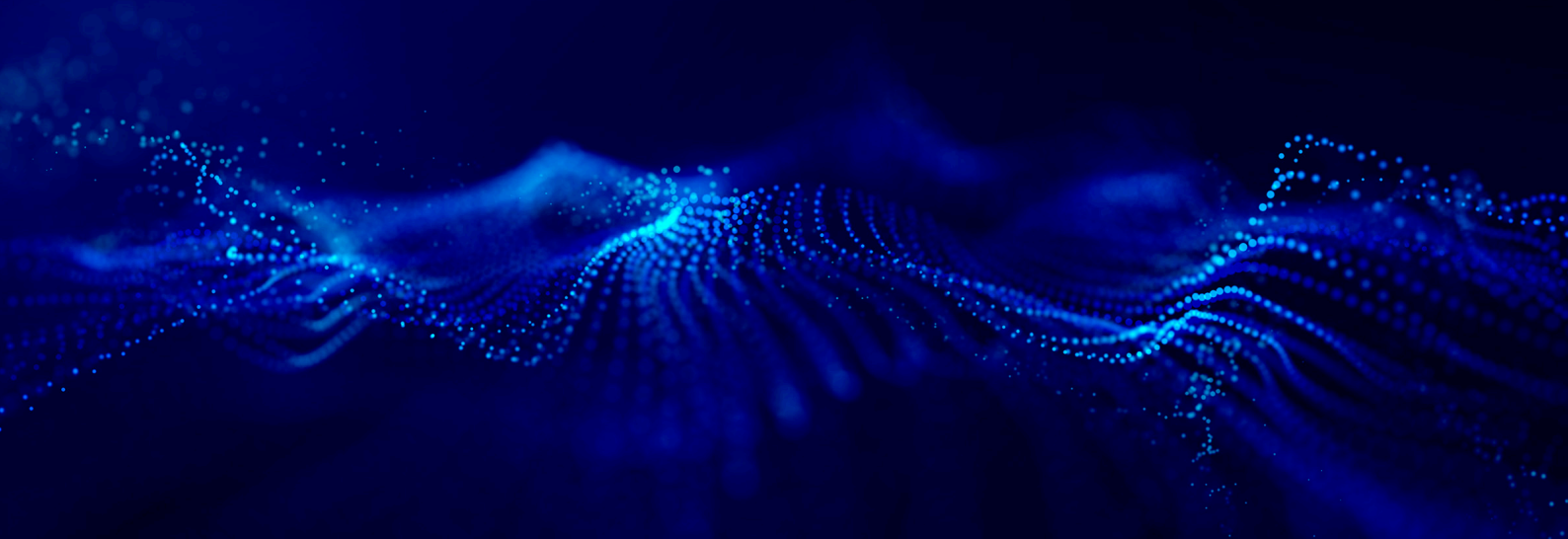
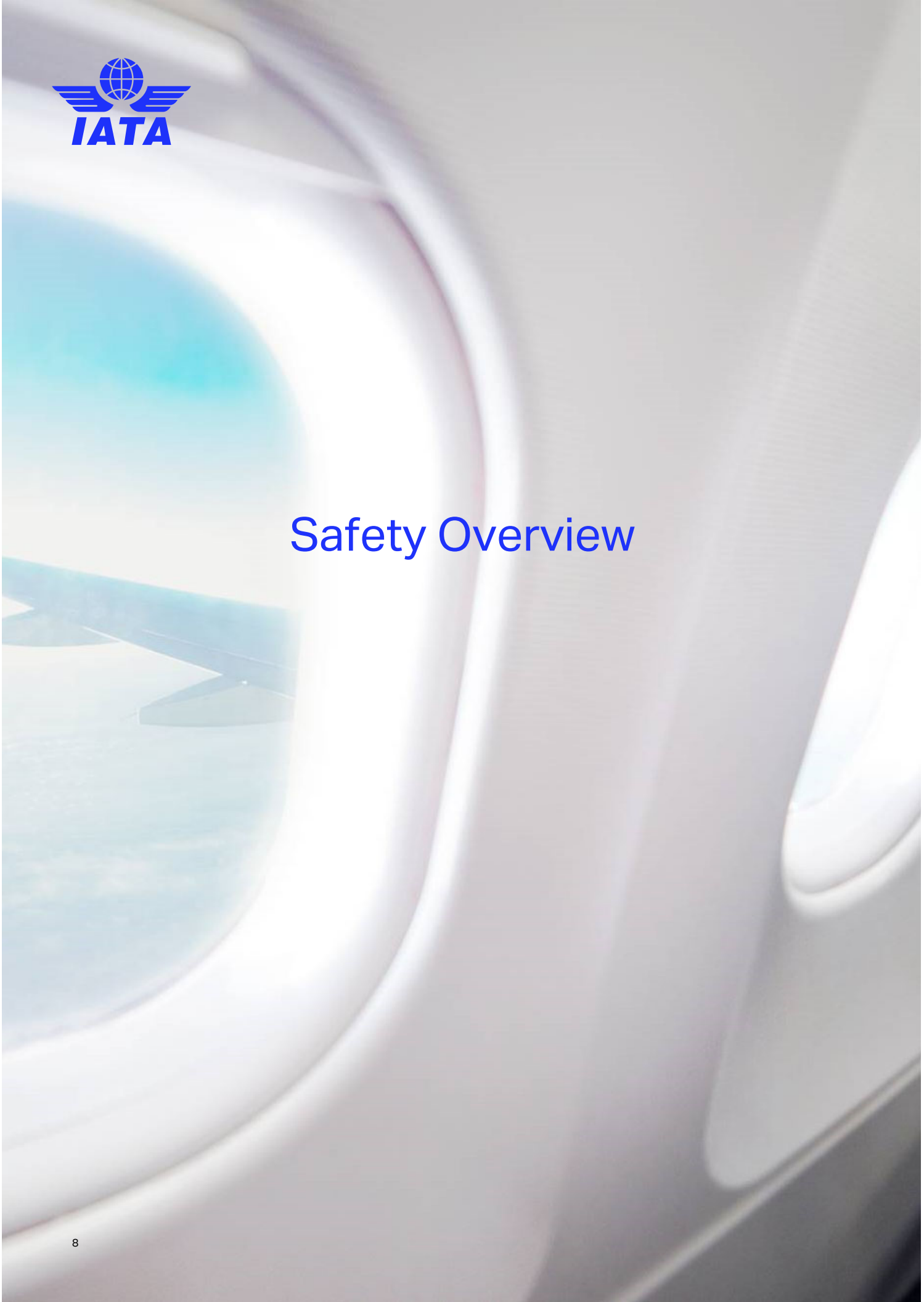
Improve Safety I Diminish Risk





Safety Overview

Managing Safety in Aviation

IATA Safety Strategy

IATA remains committed to improving global aviation safety performance through the reduction of accidents. The three core pillars of its Safety Strategy are Safety Leadership, Safety Risk and Safety Connect.

Safety Culture and Safety Leadership

Accident investigations have identified a poor Safety Culture as a factor that increases the probability and severity of accidents. Inversely, an effective organization Safety Culture is one, if not the most important, enabler for successful implementation of an effective Safety Management System (SMS), leading to improvements in safety performance and operational resilience. And Safety Leadership is critical to deliver this success - it ensures a clear focus on safety, despite competing pressures, and sets the tone for how safety issues are addressed in the entire organization.

To maintain visibility on this topic and ensure that safety is at the forefront of all decision-making, IATA has launched its Safety Talks, featuring industry leaders across geographies and cultures, who share their unique perspectives, highlighting the key role of Safety Leadership and Safety Culture in delivering a safer, more efficient and resilient business. As part of IATA's Safety Leadership safety strategy pillar, the IATA Safety Leadership Charter was developed by the industry to encourage and support industry executives in evolving a positive Safety Culture within their organizations through practical actions.

Safety Culture cannot be implemented overnight. It is as an outcome of combined efforts, across the organization, that evolve over time. It is built on trust.

As with any evolution, it is critical to understand where the organizational Safety Culture stands, identify gaps, implement changes, and measure progress. The IATA Aviation Safety Culture survey (I-ASC) was developed to support aviation stakeholders in assessing and understanding their Safety Culture, using a standardized methodology and performance indicators. The electronic survey provides measurable, actionable and comparable results, based on a combination of quantitative and qualitative research methods.

Safety Risk

In 2022 IATA's Global Safety Risk Management Framework (GSRMF), which is now referred to as IATA's Safety Issue Hub, evolved significantly with in excess of 50 safety issues identified and published, accompanied by guidance material and best practice documentation. Generic Safety Risk Assessments have been developed for a number of safety issues to support the assessment of the issue within an airline's own safety management system.

The Safety Issue Hub has contributed to IOSA's transition to a risk-based approach by providing risk pictures to the auditor and airlines participating in the IOSA. These risk pictures include systemic, worldwide and regional safety issues that the operator may be exposed to within their sphere of operation.

Our members and the wider industry are encouraged to continue to collaborate with IATA on identifying safety issues and associated mitigations by contributing to the Safety Issue Hub using 'Share an Issue'.

Safety Connect

IATA encourages airlines to share safety knowledge and experience so that they can more effectively identify and mitigate safety risks. In order to support these activities, IATA has developed the Safety Connect program which facilitates discussion and provides easy access to IATA's experts, guidance materials, training courses, and regular updates on our regional and global safety activities.

Currently more than 760 safety professionals from more than 250 airlines around the world have enrolled in this program. Airline safety professionals are encouraged to register and join our community to keep connected and informed.

Accident Investigation Reports

Guiding the implementation of safety strategy and no matter what the aviation accident statistics highlights, one fact remains clear that investigating into an aviation accident is essential of the overall risk management process in aviation. It identifies causes of accidents, and make recommendations as appropriate; the outcome of the investigation can be used to avoid similar circumstances from reoccurring and hence the objective is the prevention of an accident rather than to assign blame and liability.

According to the provisions laid down in the international Civil Aviation Organization (ICAO) Annex 13, States shall conduct the investigation or delegate the investigation of accidents which have occurred in their territory. It also outlines the process leading to the issuance of an accident investigation Preliminary Report (within 30 days of the of the date of the accident) and Final Report (ASAP or within 12 months of the date of the accident) following completion of the investigation. If the report cannot be made publicly available within 12 months, the State conducting the investigation shall make an interim statement publicly available on each anniversary of the occurrence, detailing the progress of the investigation and any safety issues raised.

The objective of Annex 13 is to investigate accidents for the sole purpose of preventing similar occurrences. However, this can be compromised by the lack of issuance of investigation reports. IATA desires to promote timely and complete accident reports and appropriate recommendations to pave the way for further important data driven safety improvements.

Reduce Operational Risk

IATA remains focused on safety priorities, which include among others, runway safety, Controlled Flight into Terrain (CFIT), Loss of Control–In-flight (LOC-I), Traffic Collision Avoidance System Resolution Advisory (TCAS RA), while continuing to support the implementation of safety strategy.

IATA continues to use data driven approach to identify high risk accident categories (HRCs), risks and common factors contributing to accidents. Together with IATA Accident Classification Task Force (ACTF), IATA developed Recommendations for Accident Prevention in Aviation to address the risks and implement actions to reduce the likelihood of the risk.

IATA is maintaining LOC-I, CFIT and Runway Excursions (REs) among the HRC, and hence has developed detailed implementation plans (DIPs) to address REs and CFIT.

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In 2022, IATA performed a safety risk assessment (SRA) and proposed measures to improve the effectiveness of Enhanced Ground Proximity Warning System (EGPWS) /Terrain Awareness and Warning System (TAWS) and pilot response to EGPWS. To download the SRA, click here. Furthermore, 2022 has generated a lot of industry advocacy activity around this topic, resulting in the endorsement of the EASPG Safety Advisory 06 (ESA-06). The document includes recommendations related to the mitigation of risk related to CFIT based on additional guidance developed by IATA.

Cabin Safety

Cabin End State

Accident classification for cabin aspects is only possible at a high level. In most cases, the cabin crew or cabin occupants have negligible impact on the aircraft itself and their actions are not always identified within the investigation report. Therefore, our classifications focus on the end state, i.e., whether an evacuation occurred, how the cabin occupants left the aircraft and how much time was available for the cabin crew to prepare.

The end state classifications within the Cabin Section of this report clearly show that in most cases, there was no significant preparation time available, and minimal cabin secure checks other than those for a standard take-off or landing were able to be conducted. This highlights that it is of utmost importance that Standard Operating Procedures for cabin secure checks prior to take-off and landing are thorough and consistently applied, as this is usually the only opportunity to prepare passengers for a potential evacuation.

Regulations require that passenger safety briefings be delivered, but there is no accompanying regulation aimed at passengers to ensure they pay attention to it or understand it. Operators must therefore train their cabin crews to focus on ensuring that briefings are delivered clearly, and not interrupted by passenger non-compliance. When it comes to educating passengers on the importance of paying attention, and the differences in equipment and procedures on the aircraft they are traveling on, success relies on their willingness to be informed, their perceived needs, and a balance of providing the information in a way which encourages them to comply but does not frighten them.

Cabin Safety Activities

IATA's activities to support airlines include risk assessment, training, publication of guidance materials and setting global standards for cabin safety.

The Cabin Operations Safety Best Practices Guide is a comprehensive guidance document covering all aspects of Cabin Safety Management. Edition eight, published in January 2023, includes new guidance material for unruly passenger management and cabin crew mental health and wellbeing and is available for purchase at the IATA online store.

The IOSA Standards Manual section 5 includes the global cabin safety standards required for IATA membership and is updated annually by IATA's Cabin Operations Safety Task Force, a team of cabin safety specialists from airlines who work closely with IATA to guide our activities each year.

IATA facilitates regular conferences, webinars, and events to ensure airlines come together to discuss important safety risks, issues, and concerns. The Cabin Operations Safety Conference was successfully facilitated during June 2022 and was the first in-person IATA event for Cabin Safety professionals following easing of travel restrictions caused by the Covid-19 pandemic. During 2023 this event will be combined with the IATA Safety Conference to create the World Safety & Operations Conference (WSOC), scheduled to take place in Hanoi, Vietnam from 19th to 21st September.

IATA Safety Issue Review Meeting (SIRM)

The Safety Issue Review Meeting (SIRM) is a scheduled IATA event which brings together industry safety experts to discuss safety issues and mitigation strategies in a safe, collaborative, and inclusive environment. In 2022 the #29 SIRM was held in Dubai and hosted by Emirates and brought together airlines, OEMs, and globally recognized safety agencies to discuss a wide range of safety topics. Safety themes for discussion included LOC-I, Runway Safety, Ground Operations, and Fuel Contamination. These topics provided opportunity for the sharing of safety events and issues from which the forum, held under the Chatham House Rule, could identify learning points. As part of wider sharing and safety promotion an SIRM bulletin is produced and can be viewed here. If you would like to participate in this forum, then please visit The SIRM webpage for more information

Global Aviation Data Management (GADM)

IATA's premier aggregated data sharing programs, Incident Data Exchange (IDX) and Flight Data Exchange (FDX), continued to grow in leaps and bounds as we remain committed to our mandate of providing critical safety, security and operational data insights to our members to support the industry data driven decision.

The IDX and FDX programs had a total membership of 228 and 176 respectively at the close of 2022.

It is our core believe that critical insights and intelligence can further be sought from the data by fusing and augmenting it with other datasets. To this end Global Aviation Data Management (GADM) has integrated additional data sets, as aeronautical, notam and weather data, that will further improve our analysis capability and offer better value proposition to our members. Data Science, statistics and applied mathematics have been leveraged to develop monitoring tools for operational and safety performance: anomaly detection and entity recognition algorithms were designed to signal emerging issues in a timely manner, to augment the classical monitoring of time series.

Enhance Quality and Compliance

Regulations must evolve as the industry grows and technologies change. The IATA audit programs aim to increase global safety performance and reduce the number of redundant auditing activities in the industry

IATA Operational Safety Audit (IOSA) – Risk-Based Approach

To contribute to the reduction of industry accidents, IOSA has been serving the industry since 20 years with its assurance activities. IOSA is now transitioning to a risk-based approach. Under this transition, IATA will conduct the audits by directly engaging the IOSA auditors.

Additionally, through a data-driven and robust approach to identifying the audit criteria (IOSA Standards and Recommended Practices, or ISARPs) most critical to an air operator's individual profile, and by performing a

deeper assessment of these, the audit will yield in greater insights regarding opportunities for safety improvements and compliance. These insights will increase the marginal safety assurance which has been decreased through the prescriptive assurance approach on the air operator.

The deeper assessment of the ISARPs will be achieved through:

- a maturity assessment of the operator's SMS and other safety-critical systems and programs
- a process-based audit approach
- additional assessment methods on high-priority ISARPs and focus on mandatory observations
- Generation of remarks and recommendations

The maturity assessment is a shift from the legacy compliance assessment which determines compliance with the standards, but does not verify how advanced an operator is in implementing them.

IATA conducted six trial audits which largely validated the hypotheses and will refine the risk-based IOSA concept in the coming years.

Ground Operations Safety

IATA Safety Audit for Ground Operations (ISAGO)

IATA Safety Audit for Ground Operations (ISAGO) is the industry program for the global oversight of ground handling service providers (GHSPs). There are 185 GHSPs in the ISAGO Registry providing services at 309 accredited stations at 195 airports worldwide. As of 31st Dec 2022, 255 audits were completed, and 304 audits are expected in the year 2023. An average of 14 findings is raised per report, key issues being training, SMS, Ground Service Equipment (GSE) maintenance end management outsourced services, see below table:

Top 10 - 2022 findings

No	ISAGO Audit Top 10 Findings
1	SMS – integrated and implemented throughout the organization to manage ground ops safety risks
2	Management and control of external and internal documentation
3	Training program – Initial training prior to operational duties
4	SMS – Safety risk assessment and mitigation program throughout the organization
5	Training program – ensure that trained and competent staff performs basic, advanced, and specific SMS duties
6	SMS – Safety assurance program
7	Training program – recurrent training for operationally critical functions
8	QMS and Oversight program to evaluate management system and operations at all stations
9	GSE Maintenance program
10	Application of water quality standards

ISAGO provides the airlines with complementary information and a solution to strengthen their oversight programs including an opportunity for cost reduction.

The program can be used as follows:

- Complementary data to airlines' risk-based oversight system on GHSPs/Stations
- Reduction of scope/frequency/cost of oversight activities of GHSPs within the airlines' network
- Reduction of scope/frequency/cost for GHSPs' training activities as training requirements are being validated by ISAGO
- Procurement requirements during contracts' negotiation or when seeking for GHSP at alternate airports

Implementation of ISAGO provides an additional layer of control for an airline's SMS in the area of outsourced ground operations services. The program contributes to a risk reduction of loss of control in flight by addressing the ground operations root causes and contributing factors, to name a few: SOP adherence / SOP cross-verification, inadequate training, Foreign Object Damage (FOD), incorrect GSE servicing and operations etc.

As of 31st December, 2022, there were 69 operators that joined the ISAGO membership scheme for airlines.

ISAGO revamp is in progress, developing new checklists completely mirroring IATA Ground Operations Manual (IGOM) and Airport Handling Manual (AHM) provisions, allowing for remote documentation validation through the IGOM/Ops Portal and ensuring the on-site assessment is all driven by implementation and turnaround observation.

Ground Damage Report / Ground Damage Reduction Program

IATA has released its Ground Damage Report at the end of 2022.

This report provides the background of GSE damage to aircraft and introduces the concept of "enhanced GSE" as a means technically improving the GSE to avoid unintended contact with the aircraft.

Using traffic forecasts, changes in aircraft type mix in airline fleets and GSE procurement trends as well as statistical analysis, the report compares the possible GSE inflicted aircraft damage scenarios (number of incidents and costs) that will result over the next 15 years if:

a) enhanced GSE is introduced, or

b) if enhanced GSE is not adopted.

The forecast ground damage cost avoidance of between 30% to 40% is corroborated by some practical examples of user experience with enhanced GSE involving the three main types of GSE involved in aircraft ground damage (passenger stairs, high loaders and belt loaders)

Taking the 2019 annual ground damage costs as a baseline, the ground damage costs that would be avoided by using enhanced GSE would be between $1.44 Bn and 1.92 Bn globally.

We encourage readers to download the report here.

Injury Prevention Program

Following the IDX (Incident Data Exchange) data analysis (reported in 2022 Safety Report) related to personal injuries, the team reviewed the root causes and identified the gaps in the IGOM/AHM procedures. The procedures were reviewed, amended, and updated to ensure reduction in the fall from height injuries. IGOM procedures such as no-touch policy, aircraft to GSE gaps, safety rails, safety requirement of GSEs, PPE requirements, technical steps, PBB/stairs processes etc., were updated and published in IGOM edition 12.

As part of delivering the Injury Prevention Program roadmap, the next step is to share this learning and the actions taken with the industry via an awareness bulletin or newsletter. In parallel, the team will continue to review the other three injury categories in 2023, addressing any procedural and training gaps and following up on this with injury prevention promotions as per the implementation of the road map.

Loading Errors

Close to 3000 loading error events were reviewed from the reporting period of Jan 2021 – Apr 2022. The analysis was facilitated by IDX platform which helped recognize ongoing challenges in loading operations. The major areas of errors were:

- Cargo hold
- Nets improperly/not deployed (30%)
- Improperly secured cargo/baggage (18%)
- Loading checklist not performed (16%)
- Cargo/baggage exceeds fire suppression line (14%)

In addition to above, there were some high severity incidents with an important weight and/or take off MAC (Mean Aerodynamic Chord) discrepancy reported. This represents a concern as it means that the entire process had to have failed for these events to occur. IATA is working with the industry stakeholders to address these concerns and is recommending:

- Review and reinforce tools/processes/training focusing on communication process between load control and ramp staff
- Reinforce reconciliation process by enabling staff to check and document each of the steps during loading and unloading
- Implementation of digital solution to perform load reconciliation has emerged as a good solution to mitigate loading errors. Members implementing such solutions have experienced/reduced loading errors up to 80%

Ground Operations Taxonomy

As a result of IDX data analysis in various ground operations categories, some limitations as well as opportunities for improvement were identified regarding taxonomy descriptors and grouping. The current taxonomy only allows for the classification of incidents in terms of type of incidents but does not provide what processes need to be enhanced. To make the best use of IDX data and to bring value to our stakeholders, IATA is working on a strategy to map the current IATA Safety Incident Taxonomy (ISIT) with the IGOM provisions. Results of this exercise are expected in 2023.

Ground Operations Manuals

As each year, the experts participating in the Ground Operations working groups continued to develop and enhance industry best practices for ground operations to make them safer, simpler, and more efficient while also driving ongoing harmonization and standardization. All changes are reflected in AHM Ed43 (Airport Handling Manual) and IGOM Ed12 (IATA Ground Operations Manual). In 2022, close to 130 airlines joined the OPS Portal with the intent to share a comparison of their own ground operations procedures with those published in IGOM. 66 airlines published their gap analysis in 2022, providing information of their IGOM adoption rate, some without and some with variations. Variations' analysis is planned for 2023.

Dangerous Goods

In 2022, completed and published "Carriage of Cargo, Mail and Baggage-Guidance for Operators". This document, which is available for download from the IATA website provides information on the performance of the specific safety risk assessment operators are required to perform by ICAO Annex 6 – Operation of Aircraft, Part I – International Commercial Aircraft Transport – Aeroplanes, Chapter 15 – Cargo Compartment Safety. The IATA guidance identifies areas for consideration in the conduct of the safety risk assessment and then possible risk mitigations that operators may wish to implement. Late in 2022 work was commenced on the development of a new fire test standard for a fire involving lithium batteries for fire-resistant containers (FRC) and fire containment covers (FCC) for aircraft pallets.

Flight Crew Training and Licensing

IATA advocates for the implementation of Competency-Based Training and Assessment (CBTA) programs as a better way to develop a competent workforce than the traditional task- or hours-based training and checking.

IATA also supports the CBTA implementation by actively participating in the ICAO Personnel Training and Licensing Panel to update, standardize and create new ICAO CBTA provisions (e.g., CBTA for Advanced Air Mobility); by publishing a consistent IATA CBTA library, including the design of CBTA curriculum for pilots and instructors; and by conducting CBTA awareness sessions and workshops for States and industry, to illustrate the value of CBTA in regard to safety enhancement and training efficiency.

Advocacy for Approved Aviation Infrastructure

Air Navigation Service Providers (ANSPs) are a critical component in the aviation supply chain. They are responsible for providing safe, efficient, and cost-effective Air Traffic Management (ATM) and air navigation infrastructure for airline operators. IATA continues working with member airlines, key partners such as ICAO, the Civil Air Navigation Services Organization (CANSO), State regulators, and ANSPs to ensure ATM operations maintain the required level of safety and efficiency while maintaining a positive cost-benefit business case and supporting the reduction of CO2 emissions.

Rocket Launches and Commercial Space Operations

With the increasing number of commercial space operators, operations that intend to flow through controlled airspace to operate at the extreme upper limits or above that airspace are growing. There is also an increase in the number of aircraft operating without a pilot on board for days and months at and above FL600.

As the launch and recovery of spacecrafts increase, the amount of airspace that needs to be protected also increases. Spacecraft launches already require the reservation of an enormous amount of airspace. To block airspace, an ANSP should create Temporary Flight Restrictions, and publish a NOTAM (notice to airmen) to effectively communicate the reservation of airspace to all other users, including airlines.

There is a need for global guidance to facilitate the management of commercial space/near space operations through controlled airspace. Furthermore, there is a need to define global standards around the safety performance requirements for space vehicles and onboard equipage. IATA is working with its members to define a proposal for discussion with States and ICAO.

Unauthorized Use of Unmanned Aircraft

IATA worked with industry partners to develop guidance material to assist States, airports, and ANSPs in developing local procedures for handling events of unauthorized use of unmanned aircraft. The guidance material focuses on a collaborative risk assessment approach when making decisions about the response to an event and recovery to normal operations after an event has been contained. The guidance material was published by ICAO on their Unmanned Aviation webpage.

Global Navigation Satellite Systems (GNSS) Interference

Since last year's IATA Safety Report, IATA continues to receive concerning reports on harmful interference to Global Navigation Satellite Systems (GNSS). GNSS is a cornerstone of daily flight and ATM operations, providing fundamental position and timing information to aircraft safety systems (e.g., Ground Proximity Warning System—GPWS), air traffic services satellite communications, aircraft navigation (Global Positioning

System—GPS and Performance-based Navigation—PBN) and Automatic Dependent Surveillance-Broadcast (ADS-B) applications. Effective protections of GNSS signals and robust and timely mitigations of harmful interference to GNSS are, therefore, necessary.

IATA, in cooperation with other industry associations including the International Federation of Air Traffic Controllers' Association (IFATCA) and the International Federation of Air Line Pilots' Associations (IFALPA), has raised awareness and recommendations on this safety-critical issue to the 41st ICAO Assembly.

Additionally, the issue of harmful interference to GNSS has been brought to the attention of and for actions by the International Telecommunication Union (ITU), the United Nations' specialized agency for information and communication technologies, and the global authority on radio spectrum protections.

Protection of Aircraft Radar Altimeters from Interference

Radar altimeters (Radalts), operating at 4.2-4.4 GHz, are the only sensors on board a civil aircraft that provide a direct measurement of the clearance height of the aircraft over the terrain or other obstacles (i.e., Above Ground Level – AGL - information). The Radalt systems' input is required and used by many aircraft systems when AGL is below 2,500 ft.

Recent roll-out of 5G in some countries has been identified as safety critical due to the potential interference with Radalts. Additional information about potential interference and IATA action, as well as resources, can be found on the IATA page: Aviation and 5G

Emergency Response Planning (ERP)

In October 2022, IATA hosted the annual Emergency Response Planning (ERP) Forum in Geneva, Switzerland promoting the theme "…partnership remains our greatest opportunity for change". With over 100 attendees, more than 80 airlines represented, including United Nations agencies of the International Civil Aviation Organisation (ICAO) and the World Food Program (WFP), it was clear from the outset that new levels of partnership were required to best prepare against uncertainties that may impact the successful continuity of civil aviation.

Civil aviation safety and security are number one priorities for IATA and its members. International aviation safety performance is so safe that one accident can skew the accident rate as underscored by the IATA 2021 Safety Report. However, ERP remains a highly critical and sensitive element of any airlines safety and security management systems. A plan for when things do not go to plan is a plan that needs continuous investment and support. Specifically, the partnerships required whether that be during normal operating periods and/or times

of heightened crisis. The ERP Forum emphasized that getting to know your partners during a crisis phase is not the optimal time. Partnership is required throughout the lifecycle of any airline flight operations.

Through the collaboration of the ERP Forum attendees were able to adopt a lessons-learned approach to strengthening an airline's ability to respond, coordinate and continue safe and secure flight operations. Two airlines specifically spoke about their accident experiences and shared insights that could have only been done through the trusted ERP Forum community of attendees and strategic partners. Furthermore, the ERP Forum produced several key outcomes that are be progressed via the IATA Emergency Response Planning Task Force (ERPTF).

One of the major outcomes focused on the coordination of airports emergency preparedness and specifically the humanitarian aspects of any emergency/crisis plan. Airports were well represented at the ERP Forum and provided a balanced perspective when taking into consideration from a master planning to operational point of view the requirements of airlines. In this connection, IATA's strategic partners shaped conversation and demonstration where partnership is required in the early hours of a major response effort and/or subsequent in the days and weeks following.

In addition, IATA released the Integrated Risk and Resilience Manual (IRRM), which represents a consolidation of best practices including ERP, and modern approaches to integrated risk and resilience management. More information can be access here.

The 2023 version of the ERP Forum will be integrated with the Safety and Operations Conference has begun and several outcomes need to be worked on in the time between Forums. IATA will continue its outreach with strategic partners to take advice and guidance where needed in the delivery and implementation of certain outcomes. In the words of US notable Senator, "…it might seem like all has been said, but I assure you, not everyone has said it". A quote that is seemingly apt when working in partnership on efforts as a durable as ERP.

IATA Turbulence Aware (ITA)

IATA continues to grow data within it's Turbulence Aware program with more than 30 million reports in 2022 from over 1700 aircraft. Turbulence Aware is a repository which enables access to worldwide objective turbulence data collected from multiple airlines around the globe providing airline pilots, dispatchers and operations center personnel with real-time, very detailed turbulence awareness. Turbulence Aware data is improving airline safety performance by decreasing turbulence-related injuries, optimizing fuel burn and gaining additional operational efficiencies through more accurate flight planning based on improved forecast, real-time turbulence, wind and temperature data.

Regional Insight

Asia-Pacific Region (ASPAC)

2022 saw a continued improvement in Asia – Pacific's historical accident fatality risk rates. No fatal accidents were registered in the region last year.

As part of a broader review of Regional Coordinating Group (RCG) priorities, the ASPAC Safety Strategy was aligned with the IATA Safety Strategy and its three strategic priorities: Safety Leadership, Safety Risk and Safety Connect.

- The Safety Leadership pillar was promoted in the first IATA regional safety seminar and in regional ICAO meetings and initiatives.
- ASPAC promoted Safety Connect through sharing various safety-related publications and documents on the Safety Connect Platform.

Despite a delayed post-pandemic regional recovery, Asia-Pacific operators continued to make significant contributions to the IATA GADM Programs both Incident Data Exchange IDX and FDX, with 17 new operators joining across both programs (7 new operators in IDX and 10 new operators in FDX).

It is also pleasing to note that ASPAC operators were the major contributors to the FDX Program in 2022, with one-third of the global flights analysed by FDX in 2021 originating from operators in the region.

At a high level, FDX analysis indicates that Asia-Pacific operators performance rates were better than the industry rates in most of the FDX Safety Performance Indicators. However, the region must address issues related to EGPWS alerts and some regional deficiencies identified during the first IATA ASPAC Safety Seminar.

Throughout 2022 the IATA regional team continued working with the Asia-Pacific Regional Aviation Safety Team (APRAST) on the continual development of Safety Enhancement Initiatives (SEIs). Other key groups for the delivery of IATA's safety priorities are the ICAO Cooperative Development of Operational Safety and Continuing Airworthiness Programme South-East Asia (COSCAP-SEA), the ICAO South East Asia Regional Aviation Safety Team (SEARAST) and the ICAO Regional Airspace Safety Monitoring Advisory Group (RASMAG).

The IATA Asia-Pacific regional team has also been particularly active in promoting the IATA Safety audit programs with the first targeted IATA Standard Safety Assessment (ISSA) workshop in Indonesia attended by five airlines. An increase in the number of regional airlines joining ISSA looks promising for 2023.

The Americas Region (Latin America & the Caribbean [LATAM/CAR] and North America [NAM])

Improving safety in The Americas region which includes the North Atlantic (NAT) and South Atlantic (SAT) high oversea areas. Initiatives are being worked on with NAT and SAT regional safety groups to ensure risk reduction and mitigation with defined safety targets, including the goal of not exceeding the target level of safety (TLS) for the applicable oceanic regions. In the Pan American region, a focus on known operational safety high risk category areas and emerging risks such as turbulence and GPS signal outage amongst other safety issues, are being addressed within the Pan-American Aviation Safety Group (PA-RASG) and the region's Commercial Aviation Safety Teams (CAST)/Collaborative Safety Teams (CST's) will remain as primary drivers to address fatality risk by developing, implementing, and monitoring safety enhancements.

Europe Region (EUR) and Commonwealth of Independent States (CIS)

In the European Region (EUR) the implementation of the global IATA Safety Strategy is based on long-standing cooperation with regional organizations. Together with the European Union Aviation Safety Agency (EASA), IATA is co-chairing the ICAO EUR/NAT EASPG Regional Expert Safety Team (EASPG RESG) and contributed to several regional safety enhancement initiatives. In line with the IATA Controlled-Flight-into-Terrain Detailed Implementation Plan, IATA EUR submitted via the RESG a proposal at the ICAO European Region Aviation Systems Planning Group (EASPG) meeting (Paris, 29 November – 1 December 2022) to amend the EASPG Safety Advisory ESA-06 Guidance Material on Measures to Improve the Effectiveness of Enhanced Ground Proximity Warning

System (EGPWS)/ Terrain Awareness Warning System (TAWS) and include recommendations from the IATA and Honeywell Guidance on Performance Assessment of Pilot Compliance to EGPWS. The amended Safety Advisory has been published at the ICAO EUR/NAT website here.

The IATA EUR team has highlighted the IATA Safety Strategy and the Global Safety Risk Management Framework (Safety Issue Hub) in various industry events and conferences: EASA Safety Week, EASA Safe 360, ECAC ACC (Air Accident and Incident Investigation Group of Experts). The team has raised the awareness of the Risk Based IOSA in the aviation safety community in Europe as well as the multiple cases of GNSS outage in the Region.

Enhancing safety awareness is one of the priorities of IATA EUR team, especially in the Commonwealth of Independent States (CIS) part of the Region, where safety performance is still uneven, as compared to the EASA-regulated States. In 2022 IATA conducted a Ground Handling webinar for ground handling service providers (November 22) and contributed as speakers to the following regional events: Conference on Aviation Personnel Training in SMS at National Aviation Infrastructure Systems (NAIS) Expo, Russia (February 10), and events conducted under the ICAO-IAC RER/01/901 Project: on Safety Culture (February 24-25) and hybrid workshop on Competency-based Training and Assessment (CBTA)/Evidence-based Training (EBT) (October 19-20, Baku).

Africa & The Middle East (Middle East and North Africa [MENA] and Africa [AFI])

IATA regional team continues to provide significant contributions to both the Regional Aviation Safety Group-Middle East (RASG–MID) and Regional Aviation Safety Group-Africa (RASG–AFI), occupying the Vice- Chair positions of both groups, thus creating a solid presence to drive the interests of IATA's airline members operating within the region.

The continuous disruption to aviation caused by safety, operational, and security events in the region caused by geopolitical tensions created an unstable environment throughout the course of 2022 and, like the previous year, has seen no reprieve.

The RASG -MID Safety Report identified the main aviation safety risks in the Middle East Region and proposed actions for enhancing aviation safety in a coordinated manner. Implementation of State Safety Program (SSP) is one of the main challenges faced by the State in the MID Region.

The improvements of SSP implementation in the MID Region is one of the top Safety Enhancement Initiatives (SEIs) that focus on the development of the MID Region Safety Management Implementation Roadmap and the establishment of the Safety Management Implementation Team (SMIT) to support MID States with the implementation of the SSP.

The identified regional safety priorities and risks for the MID Region are:

- Loss of Control-In Flight (LOC-I)
- RE and ARC during landing
- Mid-Air Collision (MAC)
- Controlled Flight into Terrain (CFIT); and
- Runway incursion (RI)

GNSS Outages/ Vulnerability

GPS vulnerability, including intentional and unintentional signal interference, has been identified as a significant safety issue. Flight Data Exchange analysis showed that most of the GPS Signal Losses were detected within or in the vicinity of Turkish airspace (Ankara FIR and Istanbul FIR) and in the Eastern Mediterranean area. Compared to the previous analysis, the identified hot spots have expanded into the Anatolian peninsula, including Istanbul FIR (LTBB).

Call Sign Confusion | Alpha Numerics

IATA has been collaborating with concerned stakeholders to implement measures to mitigate call sign similarity and confusion which has been identified as a safety issue by several airlines within MENA.

Large Height Deviations

The operational risk associated with Large Height Deviation (LHD) continues to be of significant concern, particularly on the MID/East Africa interface, and the development of mitigation measures to reduce LHD occurrences is required as a priority. IATA, ICAO Regional Offices MID, and Eastern and Southern African (ESAF), in addition to Middle East Regional Monitoring Agency (MIDRMA), AFI Regional Monitoring Agency (ARMA), and the States, are engaged to address as priority the areas of concern.

The IATA regional team continues to be active in various capacities under the auspices of RASG AFI and resides as the current Vice-Chair within the Steering Committee (RASC) as well as being Chair of the Annual Safety Report Team (ASRT).

Aeronautical Information

Deficiencies in Aeronautical Information in the AFI region continue to be of significant concern. Through RASG-AFI and AFI Planning and Implementation Regional Group (APIRG), IATA ensured that the significant risk to operation safety was highlighted and recommended that Aeronautical Information was adopted as a regional safety priority for AFI States. Adoption by the RASG as a priority will ensure there is focus where needed

Abuja Safety Targets (ASTs)

The Abuja Safety Targets have remained unachievable and unattained, without a mechanism to deliver agreed targets. IATA addressed the failure of the ASTs. IATA requested that the ASTs were reviewed and adjusted to achievable and actionable goals endorsed by the RASG. This activity is in progress under the governance of African Civil Aviation Commission (AFCAC).

Aviation Safety Data

Safety Data is the foundation for achieving safe, secure operations, identifying risks, improving levels of safety, reducing operational costs, providing essential information for flight operations, and strategic decision-making. One of the most critical elements missing in Africa is the provision of and access to reliable, complete, de-identified, aggregated safety data. Despite the growth in IATA's GADM programs, the region is lagging significantly behind that of others, the result of which is the inability to participate in information sharing/data exchange programs or to undertake predictive and proactive safety data analysis/management/mitigation.

Somalia

One of the main Safety achievements for the region was the reclassification of airspace over Somalia (Mogadishu FIR). IATA was the driver behind the establishment of a special coordination team, brought together to ensure the safe transition from Class G to Class A Airspace.

North Asia Region (NASIA)

North Asia (NASIA) continues to implement a risk-based, data-driven safety strategy to promote the overall safety performance within of the region, and keep close cooperation with member airlines, authorities and other stakeholders to implement the IATA Safety Strategy and core pillars. The followings are the achievements highlighted in 2022. Airlines are welcomed to register to the IATA Safety Connect site to access to the North Asia module.

Similar to the IATA Safety Audit of Ground Operations (ISAGO) workshops held in NASIA, the Risk-Based IATA Operational Safety Audit (IOSA) on-line webinar was also held. It was attended by more than 130 participants from airlines and stakeholders in the region. The introduction of the risk-based approach of IOSA as well as the IOSA Support Program updates, latest version of IOSA Standard Manual (ISM) and related data were presented by NASIA and received positive feedback.

The IATA Cabin Safety Best Practices Guide (Ed.7) has been translated to Chinese language It was supported by Civil Aviation University of China (CAUC). The guide will be shared with airlines which is of importance during the North Asia market recovery period. Edition 8 has been released in English language on the IATA online store, to order a copy, please click here.