ICAO

REGIONAL AVIATION SAFETY GROUP EUROPE (RASG-EUR)

2018 Annual Safety Report

2019 Edition

Disclaimer

Foreword

The Regional Aviation Safety Group Europe (RASG-EUR) was established in 2011 as the focal point to ensure harmonization and coordination of efforts aimed at reducing aviation safety risks in the European and North Atlantic (EUR/NAT) Regions. RASG-EUR supports the implementation of the ICAO Global Aviation Safety Plan (GASP) with the objective to address global aviation safety matters from a regional perspective.

RASG-EUR members and partners include representatives from States, regional organizations, international organizations, air operators, aircraft design organizations and manufacturers, air navigation service providers, aerodrome operators, aircraft maintenance organizations, aviation training organizations and other aviation industry representatives.

RASG-EUR area of responsibility

This report provides updates on regional safety indicators, including accidents that occurred in 2018 in the EUR/NAT Regions, and related risk factors.

Key activities undertaken or ongoing in 2018 to mitigate the identified risks, or to address emerging safety issues are presented in this report.

The report is developed fully in line with ICAO's "No Country Left Behind" initiative to support aviation improvement projects and to optimize collaboration between States, ICAO, regional stakeholders and industry.

The Annual Safety Report and other RASG-EUR related documentation can be downloaded at:
https://www.icao.int/EURNAT/Pages/EUR-and-NAT-Document.aspx

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Executive Summary

The number of accidents involving scheduled commercial operations with aircraft of maximum mass of over 5700 kg and occurring in one of the 56 States of the ICAO EUR/NAT Regions has increased in 2018 compared to 2017: 26 of such accidents occurred in 2018, including two fatal resulting in 72 fatalities. Over the same period there was an increase in scheduled commercial departures which results in a regional accident rate of 2.74 accidents per million departures, up 78% from the 2017 rate of 1.54 accidents per million departures, but at a comparable level as for years 2013 to 2016.
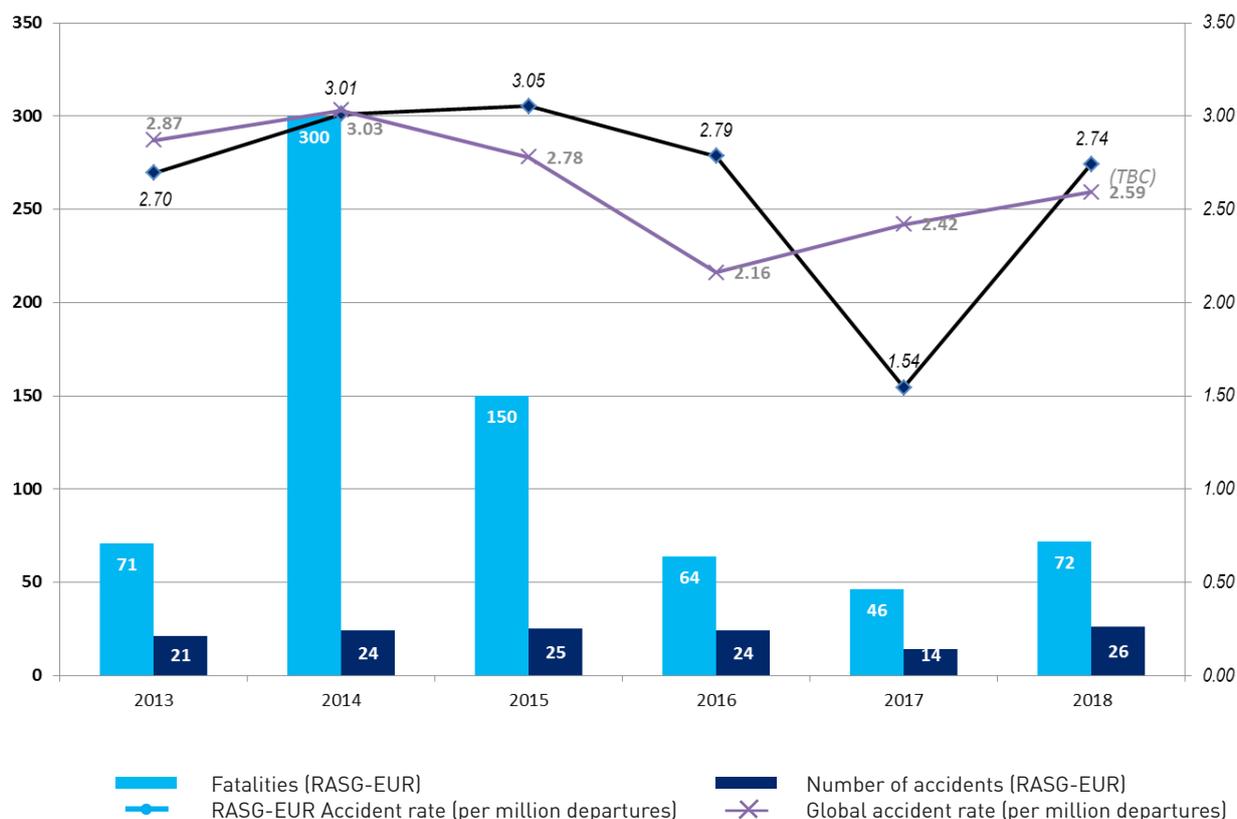

Figure 1 – Accidents in the EUR/NAT Regions involving scheduled commercial operations with fixed-wing aircraft with a MTOW greater than 5700 kg in 2018

In line with Annex 13, whereby the State of Occurrence shall forward a notification of an accident to ICAO when the aircraft involved is of maximum mass of over 2 250 kg or is a turbojet-powered aeroplane, regardless of the type of operations (scheduled commercial or not), this RASG-EUR 2018 Annual Safety Report (ASR) is providing details of accidents to aircraft of 2 250 kg or more that have occurred in the EUR/NAT Regions. In 2018, 47 of such accidents occurred, including 7 fatal accidents, causing 98 fatalities. Runway Safety events are the most frequent, as 21 of them (47%) have occurred in the EUR/NAT Regions.

The Universal Safety Oversight Audit Programme Continuous Monitoring Approach (USOAP CMA) measures the effective implementation of a State's safety oversight system. In 2018, 17 USOAP-CMA related activities were carried out in the EUR/NAT Regions. USOAP CMA results show an average Effective Implementation (EI) score for States in the EUR/NAT Regions of 76.27%, which is above the world average of 67.03%.
USOAP CMA results also show that:

- 87.5% of the States in the EUR/NAT Regions have achieved the target of 60% EI as suggested by the Global Aviation Safety Plan (GASP)
- Accident and Incident Investigation (AIG) is the area with the lowest EI
- Technical staff qualifications and training, Critical Element (CE-4) is the top issue affecting States' oversight capabilities in the EUR/NAT Regions.

SSP Foundation data from the ICAO integrated Safety Trend Analysis and Reporting System (iSTARS) shows that, on average, States in the EUR/NAT Regions have implemented 78.72% of the USAOP CMA protocol questions considered as essential to establish a mature foundation to support effective State Safety Programme (SSP) implementation. Safety promotion is one of the weakest SSP subject for States in the EUR/NAT Regions.

As of 31 December 2018, a total of 34 Air Navigation deficiencies classified as having top priority requirements necessary for air navigation safety were identified in the EUR Region. One unresolved deficiency having a direct impact on safety and concerning the provision of safety monitoring data to the Regional Monitoring Agency was identified in the EUR Region.

Based on the above, the RASG-EUR identified safety priorities, for which safety initiatives were either undertaken, in progress or completed in 2018 to address the associated safety risks displayed below :

Safety Priorities	Safety Initiatives undertaken, in progress or completed in 2018
Runway Safety	• Conduct of one ICAO EUR/NAT Runway Safety Go-Team to Malta • Release of safety promotion videos on runway incursion risks (SKYclips) • IE-REST activities for the enhancement of SOPs for approach and landing
Loss of Control In-flight	• Competence-Based and Evidence-Based Training implementation workshop in Moscow • Scientific and practical conference on upset prevention and recovery training (UPRT) held in Gromov Flight Research Institute (GFRI) and Central AeroGydrodynamic Institute (CAGI) at Zhukovsky, near Moscow (Russian Federation). • IE-REST planning for the development and implementation of pilot instructors' standardization • IE-REST planning for the improvement of pilot training organizations • Release of safety promotion videos on startle effect and its contribution to LOC-I events (SKYclips)
Controlled Flight into Terrain	• Release of IATA Controlled Flight into Terrain (CFIT) Accident Analysis Report 2008-2017 • Review by IE-REST of recommendations from the IATA CFIT Accident Analysis Report for possible development of RASG-EUR safety advisories
Safety Oversight capabilities	• Conduct of an ICAO workshop on USOAP CMA for States in the EUR/NAT Regions • Development of standardized training programs for the safety oversight of PANS-OPS and Aeronautical Charts • Conduct of ICAO EUR/NAT Technical Assistance projects and workshops under the NCLB initiative to build oversight capability in Albania, Azerbaijan, Kyrgyzstan and Ukraine • Conduct of an aerodrome certification workshop for Maghreb States
EUR Air Navigation deficiencies and contingency plans	• Development of an IE-REST safety enhancement initiative for the monitoring of GNSS signal monitoring • Conduct of two volcanic ash exercises to improve the response to volcanic eruptions and volcanic ash contamination as well as improve the Volcanic Ash Contingency Plan for the EUR and NAT Regions
Safety Management capabilities	• Conduct of an ICAO workshop on the investigation of cabin safety aspects in accidents and incidents • Conduct of 2 ICAO SSP implementation workshops (in Montenegro and in the Republic of Moldova). • Conduct a technical assistance mission in Morocco for SMS and SSP implementation related to ANS • Safety promotion activities through the release of annual safety reports or other publications from various stakeholders in the EUR/NAT Regions, including IATA, EUROCONTROL, ENCASIA, IAC

Table 1 – Safety Priorities and Safety Initiatives undertaken, in progress or completed in 2018

1. Accident Statistics

1.1. Accident rate

ICAO's primary indicator of safety in the global air transport system is the accident rate based on scheduled commercial operations involving fixed-wing aircraft with a maximum mass of over 5 700 kg. Aircraft accidents are categorized using the definition provided in Annex 13 — Aircraft Accident and Incident Investigation and the details of each accident for which the State of Occurrence is within the EUR/NAT Regions have been reviewed by the ICAO Safety Indicator Study Group (SISG) to assure the accuracy of the data.

The accident rate for the RASG-EUR Region was 2.74 per million departures in 2018, showing a sharp increase compared with 2017, but of a value lower than the ones for years 2013 to 2016.

Year	Departures (millions)	Number of Accidents	Accident rate (per million departures)	Fatal Accidents	Fatalities
2013	7.79	21	2.70	2	71
2014	7.98	24	3.01	2	300
2015	8.19	25	3.06	1	150
2016	8.62	24	2.79	2	64
2017	9.06	14	1.54	3	46
2018	9.49	26	2.74	2	72

Table 2 – Accidents in the EUR/NAT Regions involving scheduled commercial operations with fixed-wing aircraft with a maximum mass of over 5 700 kg

1.2. Accidents to aircraft of 2250 kg or more in the EUR/NAT Regions

The term 'accident' used throughout this report has the meaning defined in ICAO's Annex 13 to the Convention on International Civil Aviation:

Accident. An occurrence associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time as it comes to rest at the end of the flight and the primary propulsion system is shut down, in which:
a) a person is fatally or seriously injured as a result of:
    -being in the aircraft, or
    -direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or
    -direct exposure to jet blast,

    except when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew; or

b) the aircraft sustains damage or structural failure which:
    -adversely affects the structural strength, performance or flight characteristics of the aircraft, and
    -would normally require major repair or replacement of the affected component,

    except for engine failure or damage, when the damage is limited to a single engine (including its cowlings or accessories), to propellers, wing tips, antennas, probes, vanes, tires, brakes, wheels, fairings, panels, landing gear doors, windscreens, the aircraft skin (such as small dents or puncture holes), or for minor damages to main rotor blades, tail rotor blades, landing gear, and those resulting from hail or bird strike (including holes in the radome); or

c) the aircraft is missing or is completely inaccessible.

Annex 13 — Aircraft Accident and Incident Investigation requires that the State of Occurrence forward a notification of an accident to ICAO when the aircraft involved is of maximum mass of over 2 250 kg or is a turbojet-powered aeroplane. This requirement is regardless of the type of operations (scheduled commercial or not).

In 2018, 47 accidents involving aircraft of maximum mass of over 2 250 kg occurred in the EUR/NAT Regions (see Appendix). Out of these 46 accidents, 7 were fatal accidents, causing 98 fatalities.

The breakdown of accidents involving aircraft of maximum mass of over 2 250 kg which occurred in the EUR/NAT Regions in 2018 by mass groups, by flight phases and by Occurrence Categories[1] are shown on the figures below.
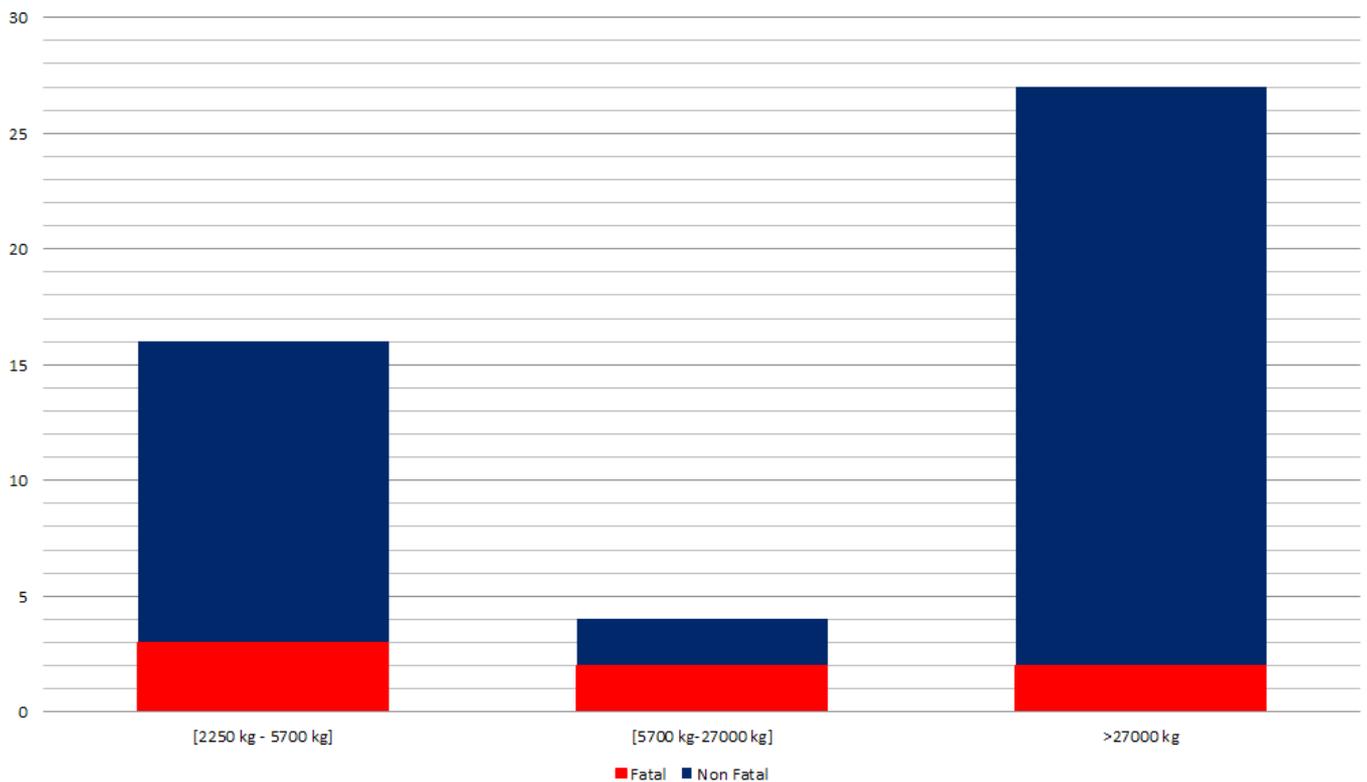
Figure 2 - Accidents involving aircraft of maximum mass of over 2 250 kg which occurred in the EUR/NAT Regions in 2018 by mass groups

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1 Occurrence Categories are defined by the CICCTT taxonomy
http://www.intlaviationstandards.org/Documents/OccurrenceCategoryDefinitions.pdf
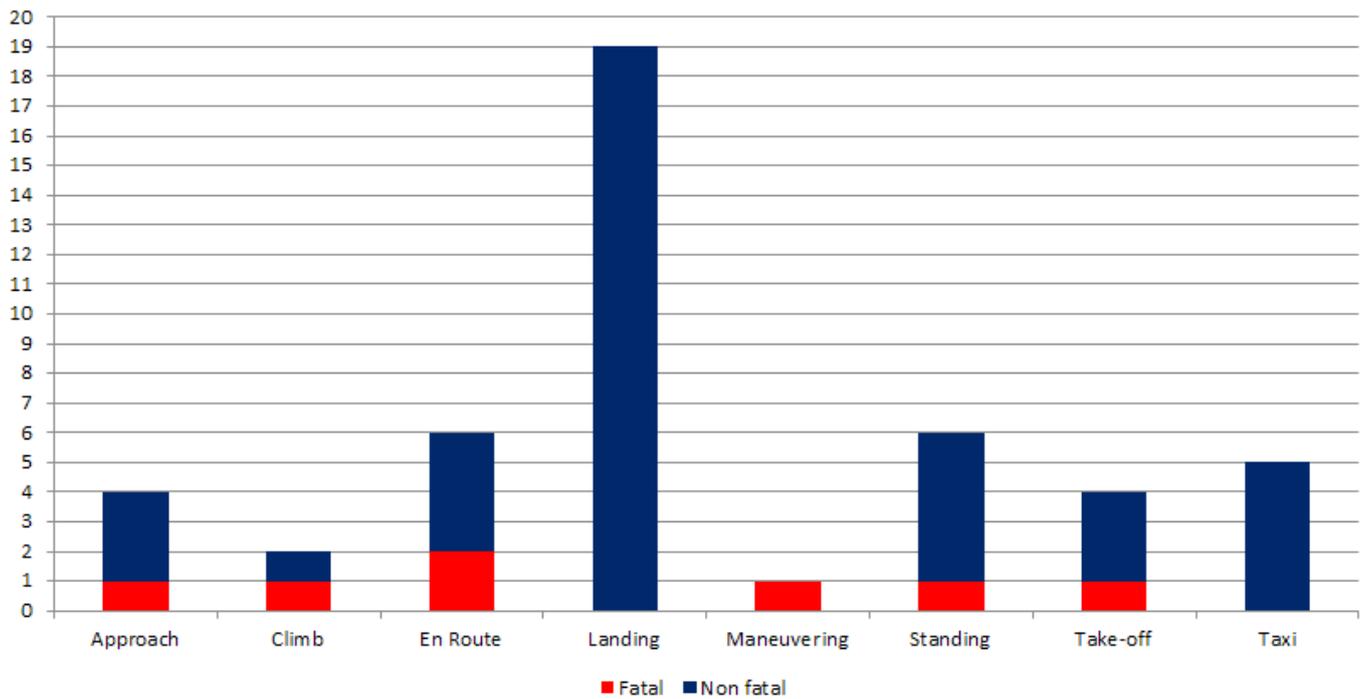
Figure 3 - Accidents involving aircraft of maximum mass of over 2 250 kg which occurred in the EUR/NAT Regions in 2018 by flight phases
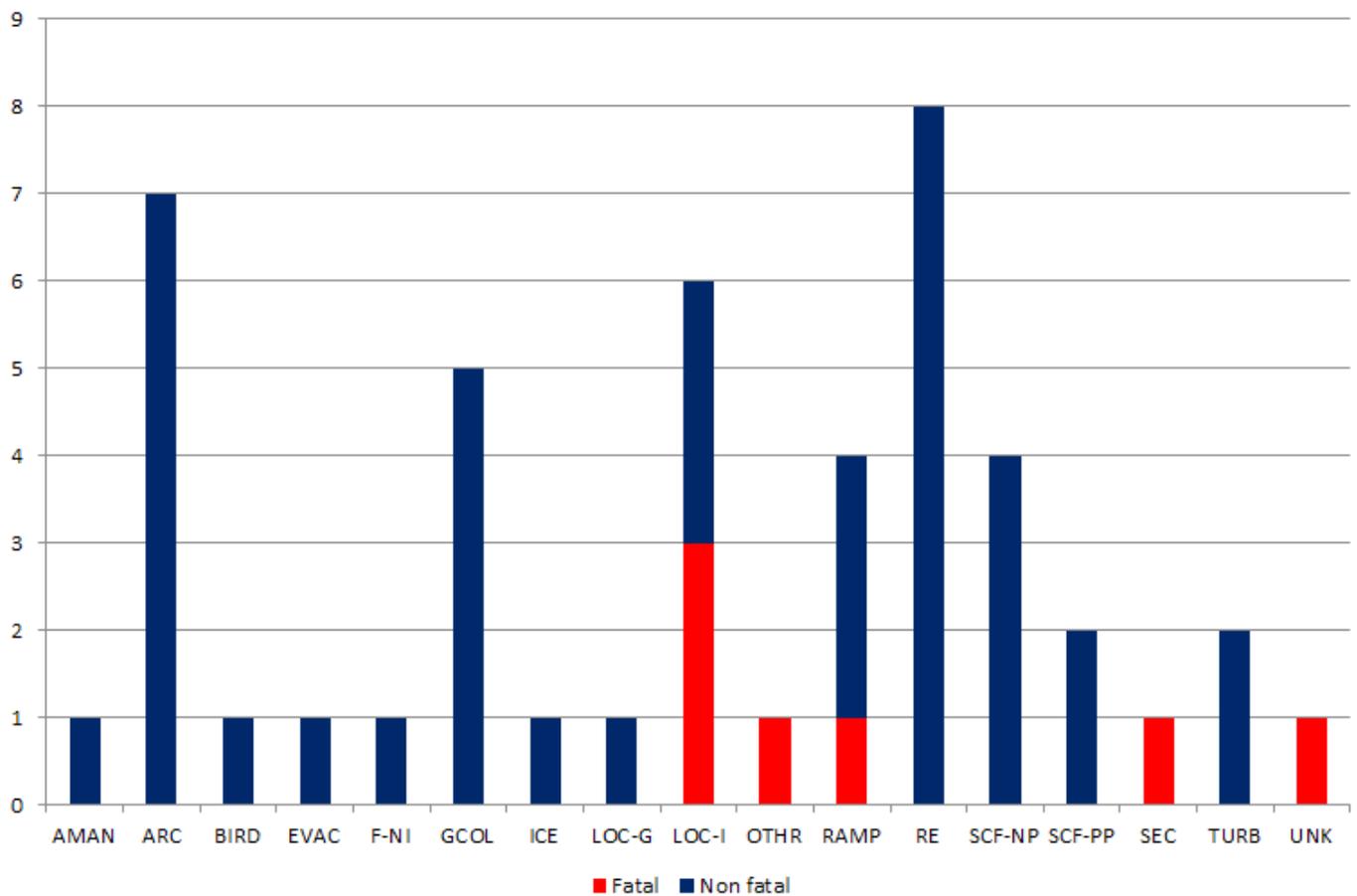

Figure 4 - Accidents involving aircraft of maximum mass of over 2 250 kg which occurred in the EUR/NAT Regions in 2018 by Occurrence Categories

2. Regional Safety performance

The monitoring by the RASG-EUR of the achievement of formal safety targets (ST) indicates that the availability of financial and qualified human resources for CAAs remains a challenging area. Certification, surveillance and resolution of safety concerns scored less than in 2017. The progress of SSP implementation continues to be a concern and is not sufficient to achieve the targets set out in the GASP, as only 41% of the RASG-EUR States have a defined implementation plan and none have fully implemented their SSP.

The 8 Critical Elements (CE) of a State Safety Oversight System are presented in Appendix II.

	Value for reference period	Value for 2018
ST1 – Accident rate in scheduled commercial air transport	2009-2013 regional average: 3.84 accidents per million departures (for aircraft with maximum mass above 5,700 kg) 2009-2013 moving five-year regional average number of accidents: 25.2 (for aircraft with MTOW above 27000kg)	2014-2018 average: 2.61 accidents per million departures (for aircraft with maximum mass above 5,700 kg) 2014-2018 moving five-year regional average number of accidents: 18 (for aircraft with MTOW above 27000kg)
ST2 – CAA resources	52.97%	62.80%
ST3 – Certification, surveillance and resolution of safety concerns	CE-6: 81.52% CE-7: 67.23% CE-8: 70.39% Average EI: 73.05%	CE-6: 78.88% CE-7: 59.90% CE-8: 60.87% Average EI: 66.55%
ST4 – SSC resolution	Unresolved SSC: 0 New SSCs not resolved within 2 years from publications in ICAO: 0	Unresolved SSC: 1 New SSCs not resolved within 2 years: 1
ST5 – SSP implementation	N/A	"Gap analysis started": by 78% of States above 60% EI
		"Gap analysis completed": by 62.50% of States above 60% EI
		"Implementation plan defined": by 41% of States above 60% EI
		"SSP implementation completed": by 0% of States above 60% EI
ST6 – Accident investigations	There were 21 accidents reported to ICAO in 2013 with State of occurrence in EUR/NAT Regions. 19 accidents were found to have investigations launched. For the residual 2, no information was found if the investigation is launched, i.e. the rate was 90.48%	An investigation was instituted for 46 of the 47 accidents involving aircraft of maximum mass of over 2 250 kg occurring in the EUR/NAT Regions in 2018 i.e. the rate was 98%

Table 3 – RASG-EUR Safety Targets

ST1 - 5-year moving average accident rate in scheduled commercial air transport since 2013 (for aircraft with a maximum mass above 5,700 kg)
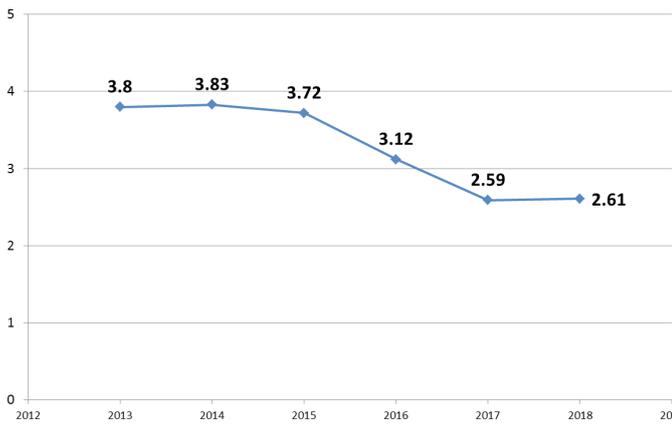
ST1 - Moving average of the number of accident involving scheduled commercial operations with aircraft of maximum mass of over 27 000 kg
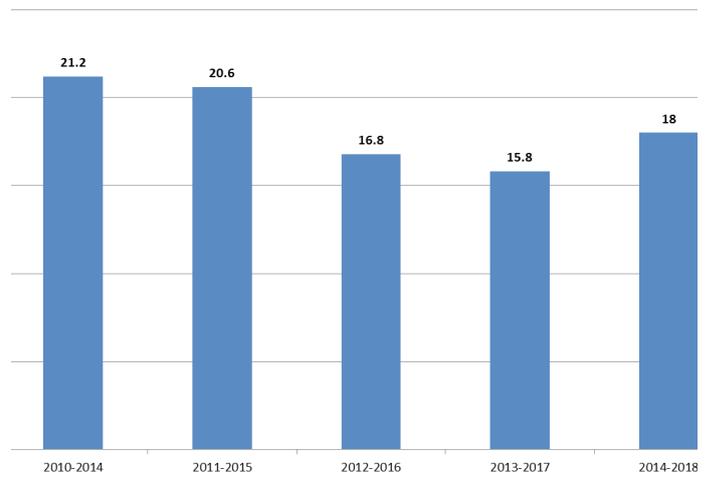
ST2 - CAA ressources
ST3 - Certification, surveillance and resolution of safety concerns since 2013
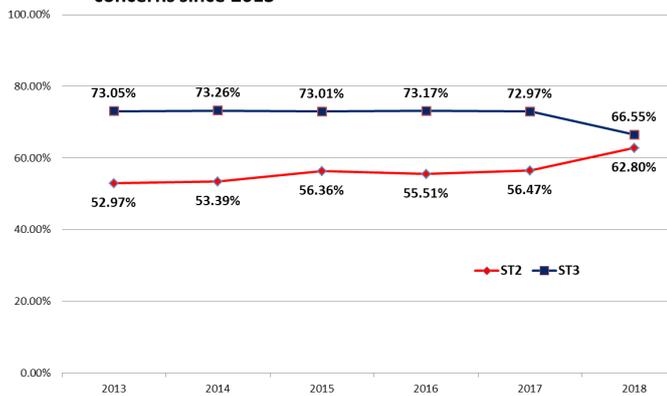
ST4 - Number of unresolved SSC
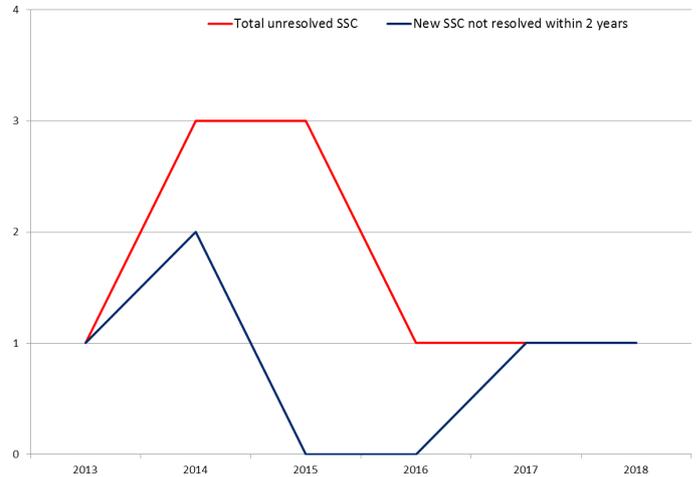
ST5 - SSP Implementation of States in EUR/NAT regions having an EI 60% or above
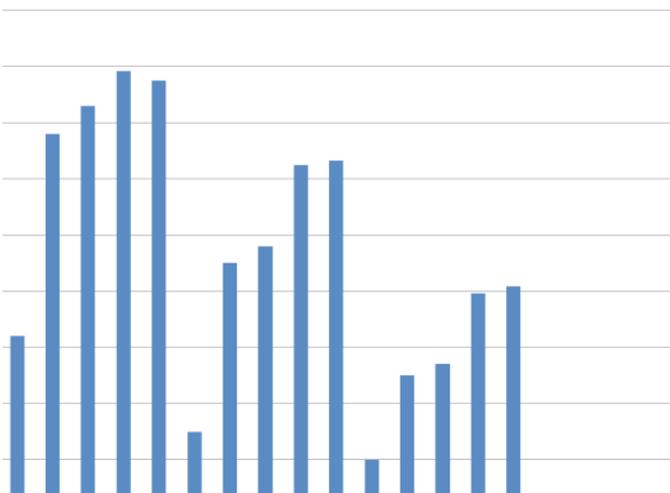
ST6 - Ratio of investigations instituted into accidents involving aircraft of maximum mass of over 2 250 kg in EUR/NAT Regions
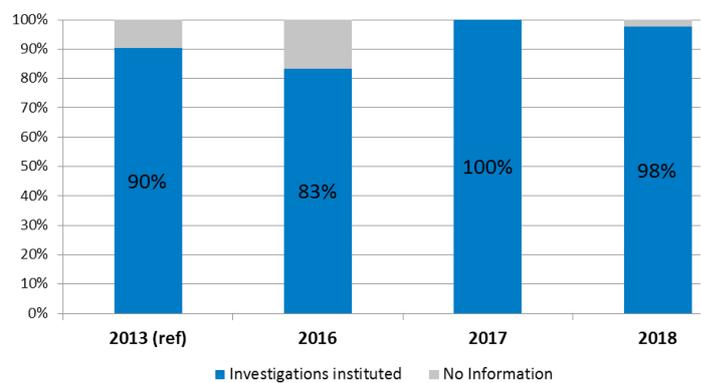

Figure 5 – RASG-EUR Safety Targets

3. Safety oversight auditing activities

3.1. ICAO USOAP CMA activities

3.1.1. List of USOAP CMA related activities completed in 2018

In 2018, 19 USOAP CMA-related activities were planned for States in the EUR/NAT Regions. Seventeen were carried out and two were postponed.

The main activities under USOAP CMA are:

- **Audit**: this activity is performed on-site to conduct a systematic and objective assessment of a State's safety oversight system. It can be a full or limited scope.

- **ICAO Coordinated Validation Mission (ICVM)**: this activity is performed to assess a State's effective corrective actions addressing previously identified findings related to PQs not requiring an on-site activity.

- **Off-site validation activity:** this activity is performed to assess a State's effective corrective actions addressing previously identified findings related to PQs not requiring an on-site activity.

- **State Safety Programme Implementation Assessment (SSPIA).**

	State/Organization	Type of activity	Dates	Status
1.	Azerbaijan	ICVM	2-11 July 2018	Completed
2.	Bosnia and Herzegovina	Off-site validation activity	February 2018	Completed
3.	Bosnia and Herzegovina	ICVM	25 Sep – 2 Oct 2018	Postponed to 2019
4.	Bulgaria	Audit	16-26 April 2018	Completed
5.	Denmark	Audit	6-13 February 2018	Completed
6.	Estonia	Off-site validation activity	July 2018	Completed
7.	Estonia	Off-site validation activity	October 2018	Completed
8.	Finland	Off-site validation activity	February 2018	Completed
9.	Finland	SSPIA	5-15 November 2018	Completed
10.	Georgia	ICVM	13-20 March 2018	Completed
11.	Greece	Off-site validation activity	July 2018	Completed
12.	Hungary	Off-site validation activity	November 2018	Completed
13.	Malta	Off-site validation activity	May 2018	Completed
14.	Malta	Off-site validation activity	June 2018	Completed
15.	Norway	ICVM	28 May – 1 June 2018	Completed
16.	Poland	Audit	24 September – 2 October 2018	Completed
17.	Slovenia	Off-site validation activity	May 2018	Completed
18.	Spain	Off-site validation activity	September 2018	Completed
19.	Tunisia	Audit	7-17 May 2018	Postponed to 2019

Table 4 – USOAP CMA activities in EUR/NAT Regions in 2018

3.1.2. Effective implementation in the EUR/NAT Regions

Results of the USOAP are presented to show the Effective Implementation (EI) by States in reference to the 8 Critical Elements (CEs), which ICAO considers essential for a State to establish, maintain and improve in order to have an effective safety oversight system. The average USOAP score for States in the EUR/NAT Regions is 76.27%, which is above the world average of 67.03%. USOAP results also show that 85.5% of the States in the EUR/NAT Regions have achieved the target of 60% EI as suggested by the Global Aviation Safety Plan (GASP).
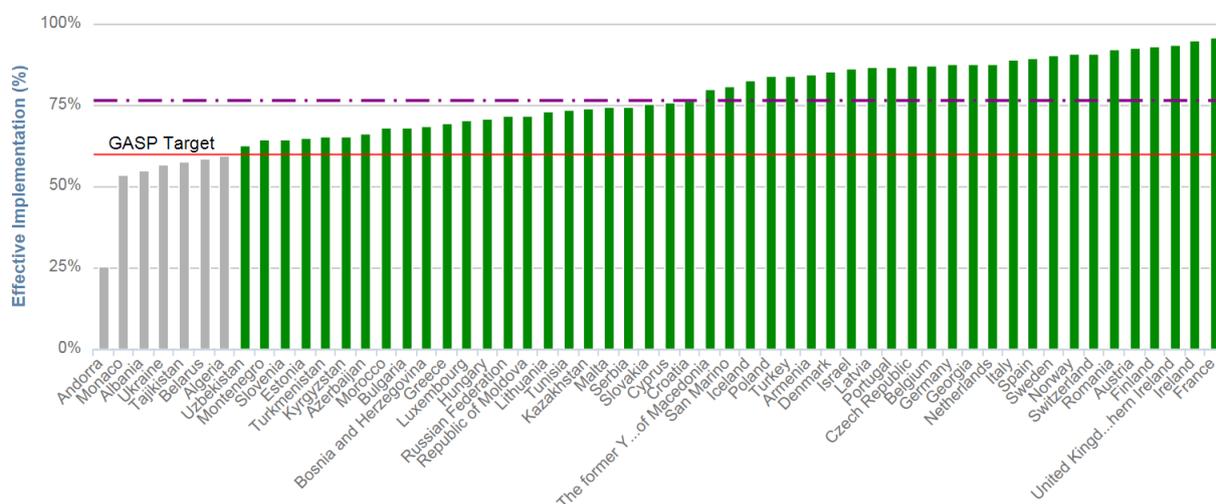
Figure 6 – USOAP Audit Results for States in EUR/NAT Regions as of 31 Dec. 2018 *(Source iSTARS)*

USOAP results also show that AIG (Accident and Incident Investigation) is the area with the lowest EI and that CE4 (Technical staff qualifications and training) is the top issue affecting the effective implementation percentage in the EUR/NAT Regions.

8 areas and 8 critical elements are above the target of 60% EI
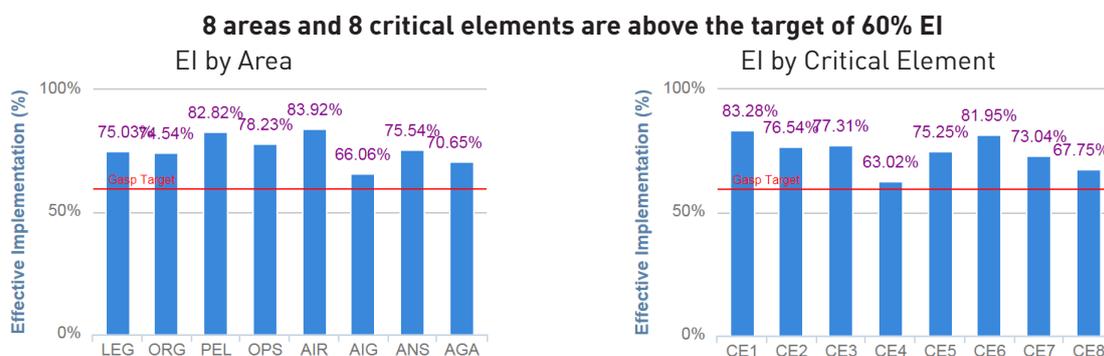
Figure 7 – USOAP Audit Results for States in EUR/NAT Regions by Area and CE as of 31 Dec. 2018 *(Source: iSTARS)*

LEG - Primary aviation legislation and civil aviation regulations	**AIR** - Airworthiness of aircraft
ORG - Civil aviation organization	**AIG** - Aircraft accident and incident investigation
PEL - Personnel licensing and training	**ANS** - Air navigation services
OPS - Aircraft operations	**AGA** - Aerodromes and ground aids

Table 5 – The eight audit areas identified in USOAP CMA

3.1.3. SSP Foundation

A sub-set of 299 Protocol Questions (PQs) out of the 943 ICAO USOAP CMA PQs is used to assist States to build a solid safety oversight foundation for the implementation of SSP. This sub-set of questions is considered as the foundation for a State Safety Programme (SSP) implementation. A SSP Foundation indicator is calculated, as the percentage of PQs which are either validated by the ICAO USOAP team or reported as completed by the State through the corrective action plans (CAP) on the USOAP CMA Online Framework.

The average EI for SSP foundation PQs for States in the EUR/NAT Regions is 79.43 %. The SSP foundation EI for States in the EUR/NAT Regions is shown on the figure below.
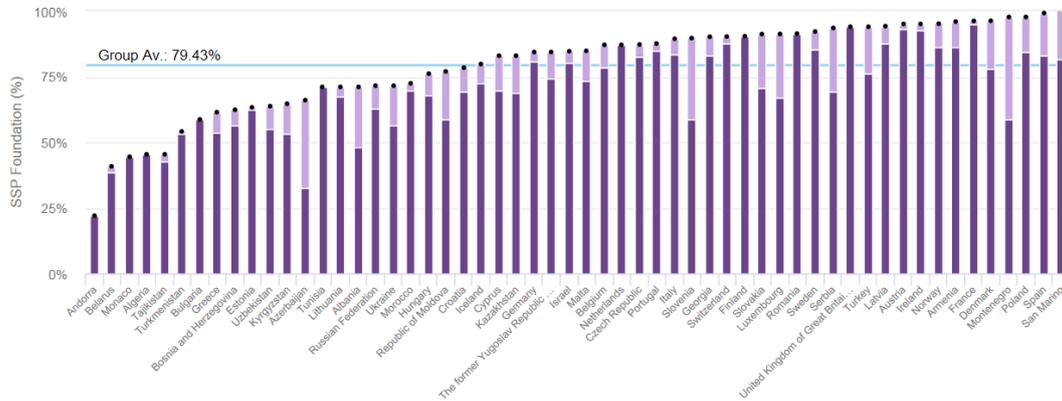
Figure 8 – Overall SSP Foundation for States in EUR/NAT Regions *(source: iSTARS)*

The sub-set of PQs is divided into 17 subjects based on the Annex 19 Amendment 1 and the 4th edition of the Safety Management Manual (Doc 9859). States with EI above 60% may still have PQs to address which are fundamental for their SSP.
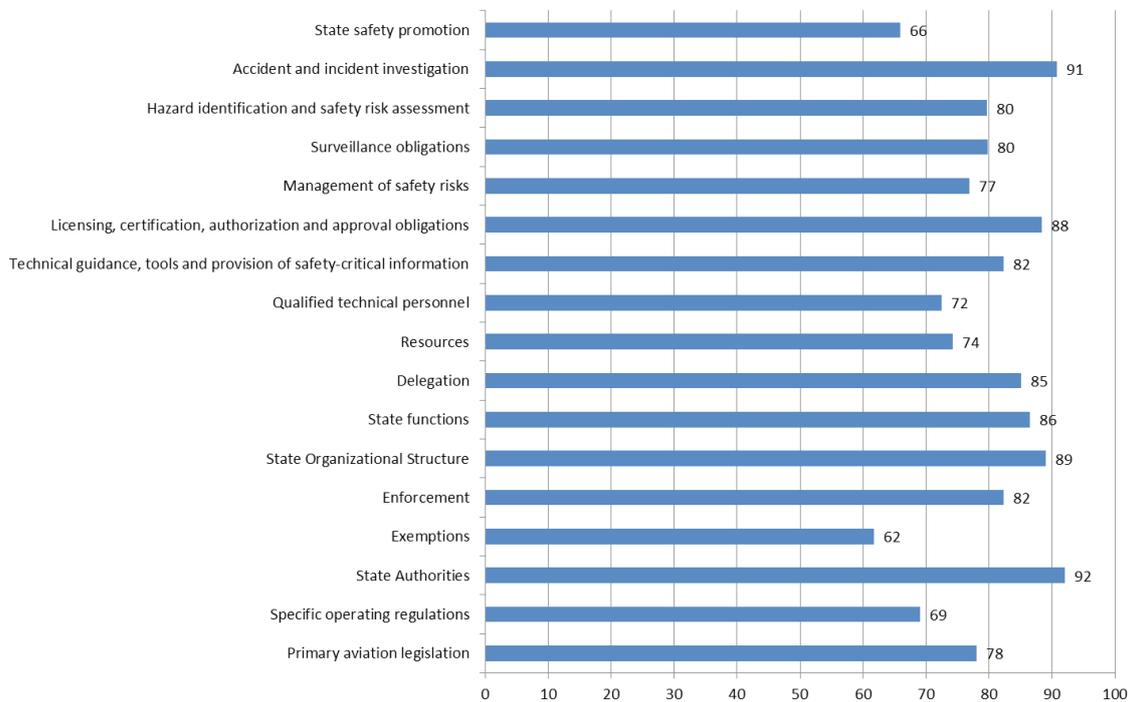
Figure 9 – Average EI by Safety Management subjects for States in EUR/NAT Regions

These PQs can be prioritized and addressed when conducting the SSP Gap Analysis or while defining the SSP implementation/action plan. States can use the ICAO iSTARS online application to perform an SSP Gap Analysis as defined in the 3rd edition of the Safety Management Manual (SMM). This provides an indication of the broad scope of gaps and hence overall workload to be expected. This initial information can be useful to senior management in anticipating the scale of the SSP implementation effort and hence the resources to be provided.

The SSP statistics shown in the figure 10 are high-level information about each Gap analysis project performed by States themselves. SSP implementation progress has been measured for each State using simple milestones as per the entered data. A State having reviewed all Gap Analysis Questions (GAQs) has reached Level 2. A State having reviewed and defined actions for all GAQs has reached Level 3. A State having completed all actions has Level 4.
The completion percentage of GAQs in each level is given in figure 10 for States in the EUR/NAT Regions.
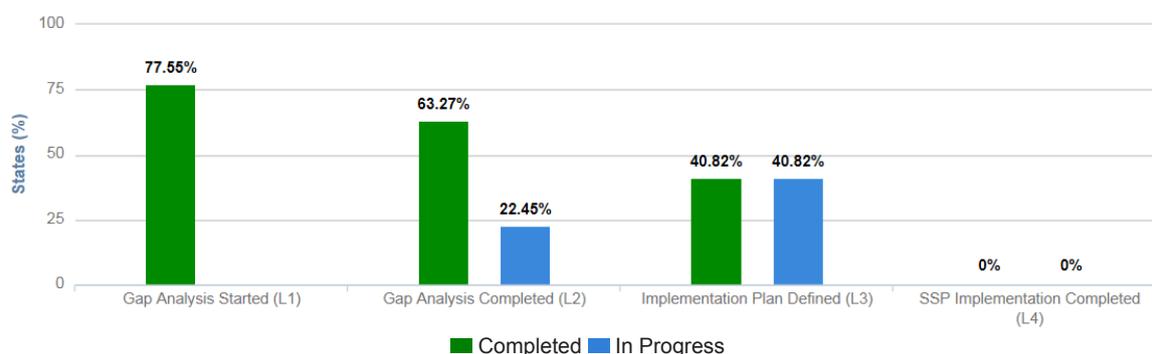
Figure 10 – SSP Implementation Progress for States in EUR/NAT Regions, limited to States with EI >=60%

3.2. EUR List of Air Navigation Deficiencies

A deficiency is a situation where a facility, service or procedure does not comply with a regional air navigation plan approved by the Council, or with related ICAO Standards and Recommended Practices (SARPs), and which has a negative impact on safety, regularity and/or efficiency of international civil aviation.

As of 31 December 2018, one deficiency having a direct impact on safety and requiring immediate corrective actions was identified in the EUR Region (in red on the chart below). This deficiency is related to the provision of air space safety monitoring data, for which the recommended action by ICAO is for States' CAAs to send the required monitoring data to the RMA (Regional Monitoring Agency) on a regular basis. An additional 34 deficiencies classified as having top priority requirements necessary for air navigation safety were identified. The types of deficiencies having a negative impact on safety as of 31 December 2018 are shown in the figure below.
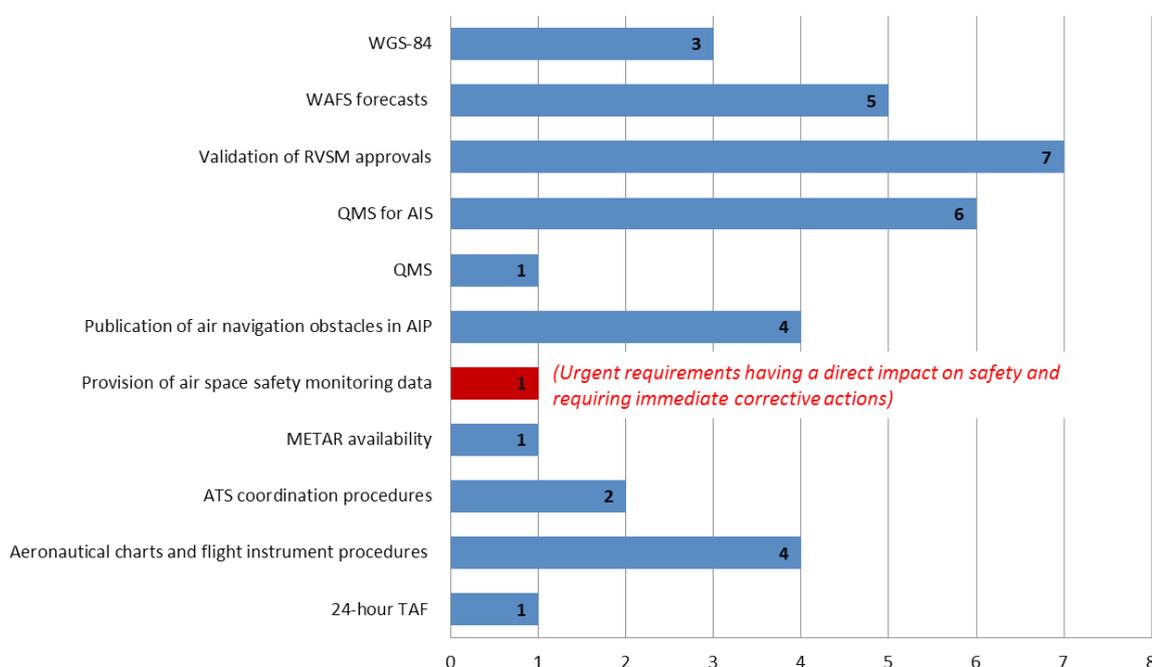
Figure 11 – EUR Air Navigation deficiencies in 2018
Note: deficiencies with intermediate requirements necessary for air navigation regularity and efficiency are not shown here.

The USOAP CMA PQ 7.045 *("Has the State established and implemented a mechanism for the review and elimination of deficiencies identified within the framework of the Planning and Implementation Regional Groups (PIRGs)?")* has an average EI rate of 59.62% for the States in the EUR/NAT Regions.

3.3. IATA Operational Safety Audit (IOSA)

The IATA Operational Safety Audit (IOSA) program is an internationally recognized and accepted evaluation system designed to assess the operational management and control systems of an airline. In 2018 the accident rate for IOSA registered operators in Europe was twice lower than for the non-IOSA operators.

A total of 66 IOSA audits were conducted in 2018 within the EUR/NAT Regions. Most findings were raised regarding the general implementation of SMS and the management and control of documentation, mostly within ground handling, cargo and flight operations. Among the top findings were also those related to a corporate security policy and the availability of processes to monitor and assess the Security Management System (SeMS).

Air Operators seem to experience issues with auditor training and qualification program as well as with recurrent training and qualification program for instructors, evaluators and line check airmen within flight operations scope. Another top finding was concerning processes to execute contracts or agreements with external service providers that conduct outsourced operational functions including measurable specifications. The chart below shows percentage of findings per IOSA discipline/subject:

% Findings Per Subject

- **FLT**: Flight Operations
- **ORG**: Organization and Management System
- **MNT**: Aircraft Engineering and Maintenance
- **SEC**: Security Management
- **GRH**: Ground Handling Operations
- **DSP**: Operational Control and Flight Dispatch
- **CGO**: Cargo Operations
- **CAB**: Cabin Operations

CAB 6.65%
CGO 8.63%
FLT 19.13%
DSP 11.23%
ORG 15.38%
GRH 12.16%
SEC 13.31%
MNT 13.51%
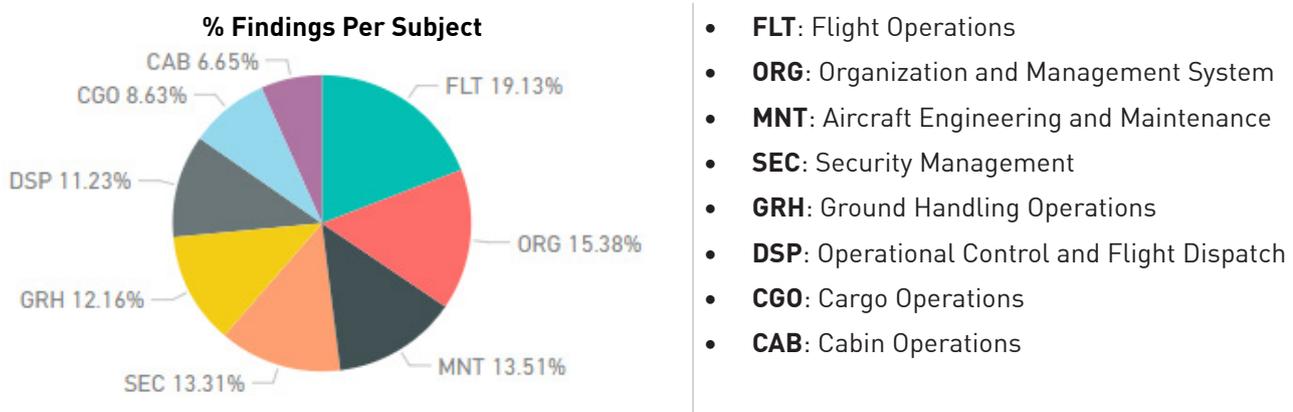
Figure 12 – IOSA findings by discipline in 2018

3.4. EUROCONTROL ATM operational safety risk assessment

EUROCONTROL identifies operational safety hazards at European ATM network level and assesses the associated network safety risk, in accordance with EU implementing regulation 2019/123 from 24 January 2019. The process supports aviation service providers (ANSPs, aircraft operators and airport operators) in their proactive risk management. In 2018, the top 5 collaborative operational safety priorities in the Network are as follows: "ACAS RA not followed", "Risk of operations without transponder or with dysfunctional one", "Controller blind spot", "Sudden high-energy runway conflict" and "Controller detection of occupied runway".

Regarding the collaborative safety priority "Risk of operations without transponder or with dysfunctional one", a study was launched to propose an approach for the safety assessment of the impact on ATC from the loss of the aircraft transponder function, i.e. an Aircraft Surveillance Function (ASF) continuity failure. It addresses the case of an aircraft subject to Area Control Service and Approach Control Service.

Regarding the collaborative safety priority "ACAS RA not followed" a dedicated study was performed, including the online survey that elicited 3,800 responses from flight crew in 90 countries. The results show that while 37 percent of respondents experienced a Resolution Advisory (RA) in the last 5 years, 15 percent of them did not follow the RA. For TCAS II system to work as designed and to resolve a risk of mid-air collision, immediate and correct flight crew response to ACAS RA is essential. In order to mitigate the mid-air risk associated with incorrect flight crew response to RA, IATA and EUROCONTROL developed specialized guidance material, including recommendations to aircraft operators and flight crew.

Working in cooperation with the operational stakeholders, the Network Manager (NM) is continuously advancing the assessment of the associated safety risk of the already identified Top 5 safety priorities. Two further operational reports on existing Top 5 issues have been developed i.e.:

- Safety considerations and a requirement for system notification at ATCO working position of an Aircraft Surveillance Function continuity failure.
- IATA and NM developed Guidance material for performance assessment of pilot compliance to TCAS using Flight Data Monitoring.

3.5. EUROCONTROL Voluntary ATM Incident Reporting (EVAIR)

EVAIR was established in 2006 as the reaction on the Linate runway incursion accident and Uberlingen air collision. One of the requirements identified after these two accidents, which had direct ATM contributions, was the improvement of the reporting. The aim of the improved reporting was pro-active approach to the safety by having low-level severity incidents, which were not covered by mandatory reporting.

Main EVAIR incident data providers are Aircraft Operators (AOs) and Air Navigation Service Providers (ANSPs). Both stakeholders provide their occurrences either on a daily or monthly basis depending on the agreement with EVAIR and occurrence providers' preferences.

For the period 2014-2018 EVAIR received reports or SMS investigation results from all European ANSPs and more than 350 Aircraft Operators (AO) including business aviation and state aircraft. Only in 2018 EVAIR received reports from about 200 AOs who come from the European Region but also from Middle East, Asia, Amerika and Africa.

This allowed for the identification and monitoring of the following areas: Level Bust, Runway Incursions, Missed Approach/Go-around, ACAS RAs, Call Sign Confusion, Air-Ground Communication, Loss of communication, Wake Turbulence and Laser threats. EVAIR also monitors regularly new emerged safety concerns, like GPS outages and Drones/RPASs.

In 2018 EVAIR enabled contacts between safety mangers of AOs and ANSPs in more than 600 events thanks to the list of SMS safety contacts, which is kept up to date on a daily basis. These contacts enabled the provision of the feedbacks on submitted reports and sharing of SMS investigation results and lessons learned. The feedback process facilitated by EVAIR is the main tool to close the loop of one occurrence, and the main factor, which motivates reporters to report ATM safety events. In the EVAIR database in 2018 about 40% of reports were covered by feedbacks which were the investigation results of the ANSPs or AOs Safety Management System (SMS) investigators. Closed loops of ATM incident reports helped in solving or mitigating some of the safety issues identified through the SMS investigation.

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4. Safety priorities for RASG-EUR

4.1. Risks from reactive and proactive safety information

Taking into consideration the GASP objectives as well as reactive safety information from 2018 and previous years (accident and incident data) and proactive safety information (safety oversight audit, inspections, studies and SMS/SSP assessments) from the EUR/NAT Regions, the safety priorities for RASG-EUR are:

- **Runway safety**:
  Runway safety-related events include the following ICAO accident occurrence categories: abnormal runway contact (ARC), bird strikes (BIRD), ground collision (G-COL), runway excursion (RE), runway incursion (RI), loss of control on the ground (LOC-G), collision with obstacle(s) during take-off and landing (CTOL) and undershoot/overshoot (USOS). Runway safety events remain the highest number of events, even if they do not cause the most fatalities. In 2018, 22 accidents involving aircraft of maximum mass of over 2 250 kg occurred in the EUR/NAT Regions.

- **Loss of control in flight**:
  Loss of control In-flight (LOC-I) events include uncontrolled collisions with terrain as well as extreme manifestations of deviations from intended flightpath or aircraft flight parameters, regardless of whether the flight crew realized the deviation and whether it was possible to recover or not. These types of events account for a small portion of accidents in a given year but are generally fatal and account for a large portion of the total number of fatalities. In 2018, 6 accidents involving aircraft of maximum mass of over 2 250 kg occurred in the EUR/NAT Regions. Three were fatal, causing 75 fatalities.

- **Controlled flight into terrain**:
  Controlled Flight into Terrain (CFIT) events are in-flight collision or near collision with terrain, water, or obstacle without indication of loss of control. These types of events account for a small portion of accidents in a given year but are generally fatal and account for a large portion of the total number of fatalities. No CFIT accident involving an aircraft of 2 250 kg or more has occurred in the EUR/NAT Regions in 2018.

- **Safety oversight capabilities**:
  Universal safety oversight audit programme (USOAP) audits have identified that States' inability to effectively oversee aviation operations remains a global safety concern. AIG (Accident and Incident Investigation) is the area with the lowest EI in the EUR/NAT Regions and CE4 (Qualified technical personnel) is the top issue affecting the effective implementation percentage. The effective implementation in certification, surveillance and resolution of safety concerns has decreased since 2017. All the States in the EUR/NAT Regions with an effective implementation below the 60% target set out in the GASP are in the IE-REST[2] geographical area (the part of the ICAO EUR Region which is not covered by the EU/EASA regulatory framework). One State still had an unresolved Significant Safety Concern[3] in the OPS area, as of 31 December 2018.

- **Air Navigation Deficiencies**:
  A total of 34 deficiencies classified as having top priority requirements necessary for air navigation safety are identified in the EUR/NAT Regions. One unresolved deficiency identified for a State and concerning the provision of safety monitoring data to RMAs have a direct impact on safety and require immediate corrective actions.

- **Safety management**:
  The GASP near-term objective requiring that all States which have an EI of 60% or greater should have a SSP implemented by 2017 is not met, as only 41% of EUR/NAT States have a defined implementation plan and none have fully implemented their SSP. SSP Foundation data from ICAO iSTARS show that safety promotion is one of the weakest SSP subject for States in the EUR/NAT Regions.

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2 ICAO-EUR Regional Expert Safety Team
3 A significant safety concern occurs when the audited State allows the holder of an authorization or approval to exercise the privileges attached to it, although the minimum requirements established by the State and by the Standards set forth in the Annexes to the Chicago Convention are not met, resulting in an immediate safety risk to international civil aviation.

4.2. Emerging risks

GPS outages continuous increase

In 2018, EVAIR collected more than 3000 GPS reports, which is significantly higher than in 2017. Reports were located within 35 FIRs across Europe and Middle East. The most affected traffic flows were:

- Middle east - Europe across the Black Sea
- Middle east – Europa via Mediterranean Sea
- Middle east – Canada and America via Cross polar route

The absolute majority of GPS outages were closely linked with the political disputes in different regions. The most affected geographical area was Eastern Mediterranean with its Syrian crisis.

The most frequent GPS outages problems reported by aircraft operators were:

- Failure of one or both GPS boxes
- Disagreement between GPS positions and NAV FMSs;
- Terrain warnings, sometimes with pull up requests. In the majority of cases pull up warnings were disregarded by pilots or function switched off
- Unable to fly RNP and request for radar vectoring
- In a few cases lack of situational awareness and requests for the assistance of radar vectoring to reach the destination
- Wind and ground speed wrong presentations
- Lost ADS-B, wind shear, terrain and surface functionalities
- Aircraft clocks began to count backwards (latest finding)

EVAIR continues with the monitoring of GPS outages. EUROCONTROL multidisciplinary team composed of safety, navigation and communication experts closely cooperates with IATA, EASA, FAA and manufacturers.

Drones/RPAS

In 2018 EVAIR recorded almost the same level of RPAS reports as in 2017. In 2018 EVAIR recorded RPAS occurrences on 59 different locations across Europe. The main affected phase of flight was approach below 500ft. The most affected areas were around big European hubs. Pilots categorized around 10% of RPAS reports as serious incidents. In the narrative part of certain number of reports pilots' stated that the vertical or horizontal separation was a few meters and that in a few cases they had to take avoiding actions, which says about high safety risk generated by 'small' drones.

More about drones' activities within EUROCONTROL - http://www.eurocontrol.int/news/air-traffic-management-fit-drones

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5. Safety enhancement activities in 2018

The following initiatives conducted by ICAO and various stakeholders for States in the EUR/NAT Regions were either on-going or under development in 2018.

5.1. Initiatives addressing Runway Safety risks

- In 2018, a **Runway Safety Go-Team mission was conducted to Malta**, consisting of ICAO and experts from partner organizations. The objectives of this mission were to establish a Local Runway Safety Team (LRST) and support its development, through action plans and continuous guidance. This mission was implemented by ICAO EUR/NAT Technical Team with in-kind donations from ACI (Brussels Airport Company), Eurocontrol, IFALPA and IATA.

- **SKYclips website**, initiated by EUROCONTROL, makes available a collection of short animations of approximately two minutes duration, which focus on a single safety topic in aviation. Additions made in 2018 address runway incursion risks and include videos on aim point selection: https://www.skybrary.aero/index.php/Aimpoint_Selection_(SKYclip)

- **The IE-REST/12** meeting was briefed on the follow-up activities related to the enhancement of air operators' Standard Operating Procedures (SOPs) for approach and landing, and on the establishment and operation of Local Runway Safety Teams (LRSTs). A new SEI shall be developed related to the establishment of a Runway Safety Forum.

5.2. Initiatives addressing Loss of Control In-flight (LOC-I) risk

- The following activities were carried out or completed in 2018 through SEI of IE-REST:
  *   International CBT/EBT implementation workshop held in Moscow in April 2018 with the purpose to facilitate required practical steps for regulators and air operators of the region.
  *   Scientific and practical conference on upset prevention and recovery training (UPRT) held in Gromov Flight Research Institute (GFRI) and Central AeroGydrodynamic Institute (CAGI) at Zhukovsky, near Moscow (Russian Federation).

- The need to develop and implement additional SEI focused on pilot training instructors' standardization and improvement of the approval process for pilot training organizations was discussed and the IE-REST Task 12/01 is planned for 2019 focused on the development of new safety enhancement initiatives related to pilot instructors' standardization.

- Additions made in 2018 to the SKYclips website address startle effect that can contribute to loss of control of an aircraft: https://www.skybrary.aero/index.php/Startle_Effect_(SKYclip)

5.3. Initiatives addressing Controlled Flight into Terrain (CFIT) risk

- IE-REST/12 meeting was presented with the outcomes of IATA Controlled Flight into Terrain (CFIT) Accident Analysis Report 2008 - 2017. (See https://www.iata.org/whatwedo/safety/Documents/cfit-report.pdf)

  IE-REST members agreed that they would perform a review of recommendations proposed in the IATA CFIT Accident Analysis Report and identify those recommendations that are not yet implemented and select those recommendations that would be advisable to be implemented in EUR/NAT Regions. Relevant draft RASG-EUR safety advisory shall be developed in 2019.

5.4. Initiatives addressing Safety Oversight capabilities

- An **ICAO Workshop on USOAP CMA for EUR/NAT Regions** was held at the ICAO EUR/NAT Office in Paris, France, from 11 to 13 September 2018. The objectives of this workshop were to provide States with updated information on the USOAP CMA, and hands-on training on the latest CMA online framework tools. This

workshop was attended by 48 participants from Albania, Austria, Azerbaijan, Belgium, Czechia, Denmark, Estonia, France, Germany, Iceland, Israel, Italy, Kyrgyzstan, Latvia, Lithuania, Malta, Montenegro, Netherlands, Norway, Portugal, Republic of Moldova, Serbia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom and EASA. The participants were personnel involved in the USOAP CMA activities including State National Continuous Monitoring Coordinators (NCMC). The workshop also allowed States to better prepare for USOAP CMA audits, ICAO Coordinated Validation Missions (ICVMs) and other activities by understanding steps for Corrective Action Plan (CAP) development and update, Protocol Questions Self-assessment process, instruction on notifying differences electronically and other CMA processes and online framework modules.

For workshop materials please visit the ICAO EUR/NAT official webpage https://www.icao.int/EURNAT/Pages/Other-Meetings.aspx , page SAFETY - USOAP CMA Regional events, USOAP CMA workshop 2018.

- A draft **standardized training programme for the safety oversight personnel in the areas of PANS-OPS** and Aeronautical Charts was developed and is expected to be finalized and made available in 2019.

- **Technical Assistance project EUR NAT KGZ 16004 (phases 1, 2 and 3)** assisted the Civil Aviation Authority (CAA) of Kyrgyzstan to enhance its safety oversight system capacity by providing On-the-Job Training (OJT) and transfer of knowhow to available and qualified OPS, AIR and PEL inspectors. EUR NAT KGZ 16004 phase 2 was supported by Subject Matter Experts (SME) released from the State Aviation Administration of Ukraine, as in kind donations to the EUR/NAT TAP.

- **An aerodrome certification workshop for Maghreb States**, conducted under the Technical Assistance Programme (EUR/NAT TAP) ICAO EUR NAT AGA 18001 project was conducted in Paris, France, on 18-20 December 2018. Ten participants from Algeria, Andorra, Tunisia and ACAO attended the workshop.

- **A technical assistance mission was conducted to Azerbaijan (7-9 March 2018)** within the framework of the signed ICAO EUR/NAT tailored plan of actions and Technical Assistance project EUR/NAT AZE 16001. ICAO experts were supported in the mission by an expert kindly released by Civil Aviation Authority of Israel.

- In the framework of the **EUR/NAT AZE 16001 Technical Assistance project,** the ICAO EUR/NAT Office carried out a mission to Baku, held at the State Civil Aviation Administration (SCAA), from 2 to 5 May 2018. During the mission, inspectors of SCAA of Azerbaijan received training aimed to help them to better prepare for the ICAO Coordinated Validation Mission (ICVM) . Operation of Aircraft (OPS) and Aircraft Accident and Incident Investigation (AIG) experts from ICAO EUR/NAT Regional Office and Ukraine shared experience and best practices on OPS safety oversight and accident investigation activities.

- **A Technical Assistance Workshop**, organized within the framework of the ICAO EUR/NAT No Country Left Behing Technical Assistance Programme (EUR/NAT TAP) was held in Tirana, Albania from 19 to 21 September 2018, kindly hosted by the Republic of Albania Civil Aviation Authority. The workshop provided a familiarization course about the ICAO Universal Safety Oversight Audit Programme (USOAP) and included specific guidance on some protocol questions related to Air Navigation Services (ANS), Aerodrome and Ground Aids (AGA) as well as Aircraft Accident and Incident Investigation (AIG). The workshop, delivered by two Regional Officers from the ICAO EUR/NAT Office and one from the ICAO MID Office, was attended by 11 participants: 7 from the CAA of Albania, one from the Accident Investigation Authority of Albania (OKIAA) and 3 from the CAA of Montenegro.

- **A Technical Assistance mission** was held in Kiev, Ukraine on 5-10 November 2018 with the purpose to share experience related to the update of CAPs. ICAO EUR/NAT Team met Ukraine SCAA Management and staff in the areas of LEG, ORG, PEL, OPS, AIR, ANS and AGA. A review of the draft Tailored plan of action has been done, further actions agreed, leading to its signature in December 2018.

5.5. Initiatives addressing EUR Air Navigation deficiencies and contingency plans

- IE-REST/12 was presented with an analysis of situation regarding Global Navigation Satellite System (GNSS) signal monitoring. It was acknowledged that the monitoring system is advanced in the United States and is less developed in the EUR Region. The IE-REST/12 noted that in the Russian Federation such monitoring was being performed based on Ground Based Augmentation System (GBAS).

The IE-REST/12 meeting participants acknowledged the issue of GNSS signal reliability over certain territories in EUR and other Regions, which raised serious safety concerns among air operators. Hence, monitoring and timely notification to flight crews of possible areas where GNSS signal could be unreliable

could be seen as a safety mitigation measure. Therefore the IE-REST agreed (IE-REST Task 12/04) to develop and review at the next meeting draft Safety enhancement initiative on improving the system for GNSS signal monitoring in EUR.

- **EVAIR** was authorized by the EUROCONTROL Call Sign Similarity Project to monitor the efficiency of the EUROCONTROL Call Sign Similarity de-confliction tool (CSST) developed through the cooperative and coordination process with the main EUROCONTROL stakeholders, aircraft operators and ANSPs. For the period 2014-2018 eighteen ANSPs provided to EVAIR more than 15000 Call Sign similarity/Confusion (CSS/C) occurrences. Besides the reporting process, EUROCONTROL established the process of the de-confliction of similar call signs. Part of the process is request to the AOs to change their similar call signs. So far, AOs showed high readiness to cooperate. The majority of them managed to change similar call signs during the ongoing seasons. The analysis of the CSST efficiency showed that the AOs who use the tool had significantly less CSS/C. More about the Call Sign Similarity project could be found on http://www.eurocontrol.int/services/call-sign-similarity-css-service

- As a **mandate of the European Air Navigation Planning Group (EANPG) Programme Coordinating Group (COG) and North Atlantic (NAT) Implementation Management Group (IMG)**, Volcanic Ash Exercises Steering Groups for the EUR and NAT Regions (VOLCEX/SG) and for the (far) Eastern part of the EUR Region (EUR (EAST) VOLCEX/SG) were established to initiate and maintain a programme of regular volcanic ash exercises in the EUR/NAT Regions. One of the main goals of these exercises is to provide training on the Volcanic Ash Contingency Plan (VACP) for the EUR and NAT Regions (EUR Doc 019, NAT Doc 006, Part II) which was recently merged (July 2016). Typically, one exercise called VOLCEX is planned and conducted by VOLCEX/SG each year and one exercise called VOLKAM is planned and conducted by EUR (EAST) VOLCEX/SG each year. The objectives of these exercises is to improve the response to volcanic eruptions and volcanic ash contamination by the relevant national supervisory authorities, service providers (Air Traffic Service (ATS), Aeronautical Information Service (AIS), Air Traffic Flow Management (ATFM), Meteorology (MET)) and airspace users as well as improve the common VACP for the EUR and NAT Regions (EUR Doc 019, NAT Doc 006, Part II). The Network Manager of EUROCONTROL plays an active role in VOLCEX in exercising and evaluating the crisis coordination between various stakeholders through the EACCC (European Aviation Crisis Coordination Cell) and the AOCCC (Aircraft Operator Crisis Coordination Cell).
  The Main ATM Centre in Moscow plays an active role in VOLKAM in coordinating with Air Navigation Service Providers and operators on accepting re-routes into Russian Federation airspace based on exercise contingency routes and operators' needs. Realizing that these exercises mainly test the efficiency of the aviation system in a contingency event, the following safety concerns that may occur are considered by operators when volcanic ash is encountered (note that this list is not exhaustive):

  * malfunction, or failure, of one or more engines leading not only to reduction, or complete loss, of thrust but also to failures of electrical, pneumatic and hydraulic systems;blockage of pitot and static sensors resulting in unreliable airspeed indications and erroneous warnings;
  * windscreens rendered partially or completely opaque;
  * smoke, dust and/or toxic chemical contamination of cabin air requiring crew use of oxygen masks, thus impacting communications; electronic systems may also be affected;
  * erosion of external and internal aircraft components;
  * reduced electronic cooling efficiency leading to a wide range of aircraft system failures;
  * aircraft need to be manoeuvred in a manner that conflicts with other aircraft; and
  * deposits of volcanic ash on a runway degrading braking performance, most significantly if the ash is wet; in extreme cases, this can lead to runway closure.

- **VOLCEX18** took place on 28 November 2018 from 0800 to 1600 UTC. VOLCEX18 simulated a volcano eruption of Öræfajökull in Iceland that produced a simulated volcanic ash cloud which impacted most of the ICAO EUR Region as well as the ICAO NAT Region west to the Canadian Flight Information Regions (FIRs).

To prepare for VOLCEX18, the VOLCEX18 Preparatory Workshop was held at the ICAO EUR/NAT Office, Paris, France from 6 to 7 September 2018. The Workshop was attended by a total of 45 participants from 18 States, 6 airlines and 4 International Organizations.

Aviation Color Codes for Icelandic Volcanic Systems
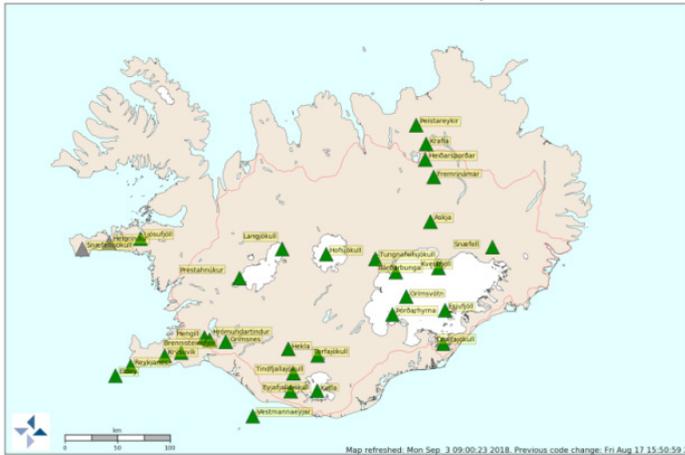
The objectives of the workshop were to review the VACP for the EUR/NAT Regions with an emphasis on the use of Danger Area, NOTAM and SIGMET and to review the draft VOLCEX18 Exercise Directives.

States planned to align their practices on the issuance of Danger Area, NOTAM and SIGMET with the VACP in the EUR/NAT Regions and for those States concerned, consider ceasing the closure of airspace for medium- and/or high-ash concentration.

Volcanic Ash Graphic (VAG)
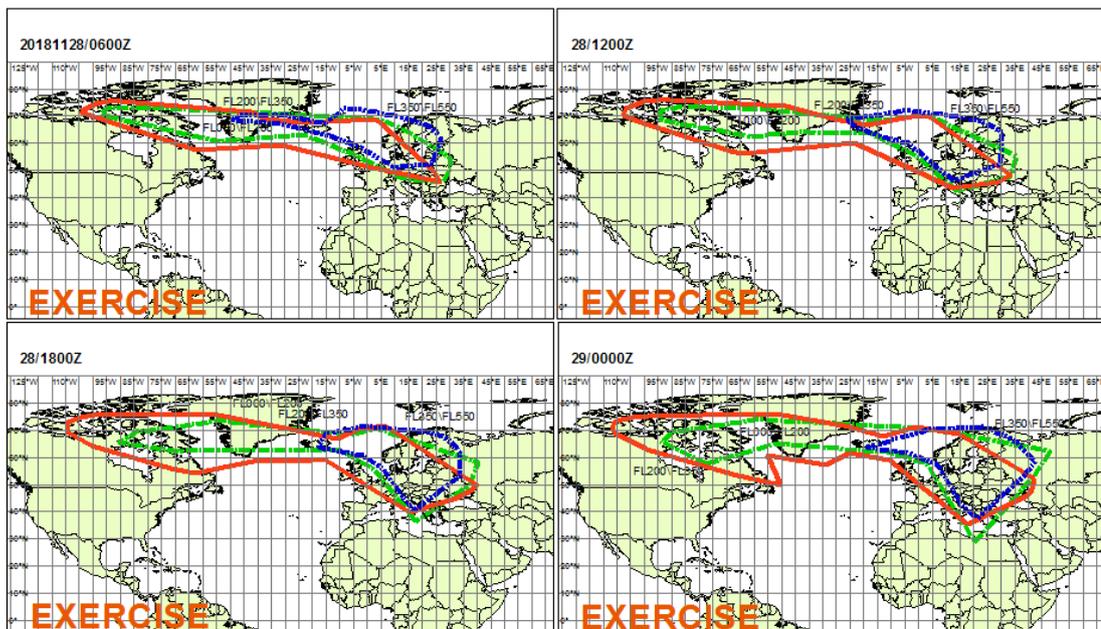
VA ADVISORY
DTG: 20181128/0600
VAAC: LONDON
VOLCANO: ORAEFAJOKULL 374010
VOLCANO_NO: 374010
PSN: N6400 W01639
AREA: ICELAND

SUMMIT_ELEV: 2010M
ADVISORY_NO: 2018/002
INFO_SOURCE: ICELAND MET OFFICE
COLOUR_CODE: RED
ERUPTION_DETAILS: EXERCISE VOLCEX18 -
ERUPTION OF ORAEFAJOKULL CONTINUES EXERCISE

RMK: EXERCISE EXERCISE EXERCISE VOLCEX18 -
SATELLITE PLUME IS CLEARLY EVIDENT ON
SATELLITE IMAGERY - EXERCISE EXERCISE
EXERCISE
NEXT_ADVISORY: NO LATER THAN 20181128/1230Z
WMO_SUFFIX: 01

The main issue identified in VOLCEX18 was that some national procedures were not in accordance to the VACP for the EUR/NAT Regions. However, many States are updating their procedures accordingly which will further harmonize the Safety Risk Assessment approach in the EUR/NAT Regions. Conformance to the Volcanic Ash Contingency Plan in the EUR/NAT Regions will reduce the number of Danger Areas and unnecessary NOTAMs while improving the issuance of SIGMET particularly providing harmonization at the Flight Information Region boundaries and improve reporting and dissemination of special air-reports on volcanic ash. Routinely conducting volcanic ash exercises is essential because stakeholders continue to improve their readiness for a real volcanic ash event.

- **VOLKAM18** took place from 2200 UTC on 19 April 2018 to 0200 UTC on 20 April 2018. VOLKAM18 simulated a volcano eruption of Zheltovsky in Kamchatka, Russian Federation that produced a simulated volcanic ash cloud which impacted trans-east, northern Pacific (NOPAC) and Pacific Organised Track System (PACOTS) routes. VOLKAM18 also simulated a second volcano eruption of Khangar in Kamchatka, Russian Federation that produced a simulated volcanic ash cloud which impacted trans-east routes.

The main issue identified in VOLKAM18 was the complication of managing two eruptions simultaneously as this was a significant workload to all stakeholders. For operators, managing reroute information without automatically sending this information from Area Control Centre (ACC) to ACC would have resulted in diversions and cancelled flights in a real event. The test of providing reroute information from the airline to the ACC via Controller-Pilot Data Link Communications (CPDLC) was successful between United Airlines and Magadan ACC. The next exercise will test providing reroute information to ACC Anchorage who will send to ACC Magadan automatically via ATS Interfacility Data Communications (AIDC) and then from ACC Magadan to ACC Khabarovsk via On-Line Data Interchange (OLDI). This will ease the workload of operators and ACCs as well as reduce the risk of error in passing the reroute information. By 2020, this should be achieved amongst the following ACCs: Edmonton, Anchorage, Magadan, Khabarovsk and Fukuoka.
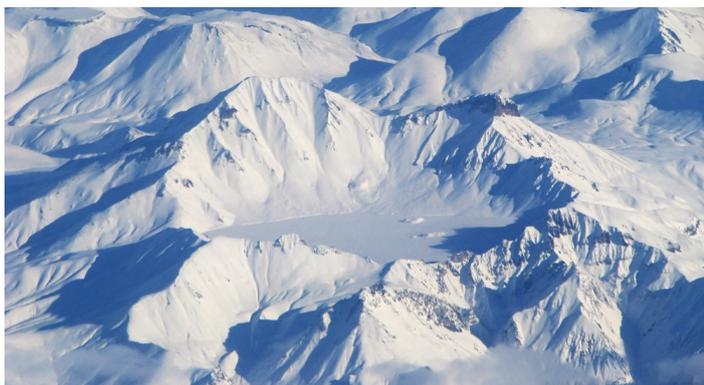
5.6. Initiatives addressing Safety Management capabilities

- **An ICAO workshop on the investigation of cabin safety aspects in accidents and incidents** was held in Istanbul, Turkey, from 4 to 5 October 2018, kindly hosted by the Directorate General of Civil Aviation of Turkey and Turkish Airlines. The purpose of the workshop was to develop competencies for persons involved in investigating cabin safety aspects of occurrences, including survival factors in accident investigations. The workshop was attended by 90 participants from the ICAO EUR/NAT States of accreditation and industry. More information on the ICAO cabin safety (including cabin safety investigations) is available at https://www.icao.int/safety/AirNavigation/OPS/CabinSafety/Pages/default.aspx

- **ICAO SSP implementation workshops** were held in:

  * Podgorica, Montenegro, 18-19 December 2018 - 26 inspectors from the CAA of Montenegro received information on recent changes in SSP implementation provisions of Annex 19 and the Safety Management Manual (ICAO Doc 9859). The workshop resulted in an agreement that the SSP gap analysis and implementation plans would be updated for Montenegro.
  * Chisinau, Republic of Moldova, 25-26 September 2018 - presentations and updates were provided by Civil Aviation Authorities of Finland, France, Georgia, Republic of Moldova and Turkey. This ICAO safety workshop enabled extensive exchange of experience and best practices amongst the stakeholders.

- **An ICAO EUR/NAT Technical Assistance mission** to Morocco was conducted from 13 to 16 February 2018 in the framework of the ICAO EUR/NAT NCLB Technical Assistance Programme (TAP). Two Regional Officers from the ICAO EUR/NAT Regional Office visited the CAA of Morocco to provide assistance on the Safety Management System (SMS) and State Safety Programme (SSP) implementation related to air navigation services. The mission also covered the state safety oversight capabilities in the areas of aircraft operations (OPS) and airworthiness (AIR). In addition, a visit to the air traffic control tower and approach control room of Casablanca airport was performed on 14 February 2018 in order to continue the ANS provider concerning their SMS implementation. The mission resulted in a number of follow up actions agreed between Morocco and ICAO EUR/NAT, including possible technical assistance projects in various civil aviation system domains.

- **The IATA Safety Report** provides the industry with critical information derived from the analysis of aviation accidents to understand safety risks in the industry and propose mitigation strategies. The report combines reactive, proactive and predictive information gathered from industry safety sources and provides valuable information aggregated at global and regional levels. The report can be requested at: http://www.iata.org/publications/Pages/safety-report.aspx

- Regulation (EU) No 996/2010 established the **European Network of Civil Aviation Safety Investigation Authorities (ENCASIA)** and has put strong emphasis on the coordination between Safety Investigation Authorities (SIA) and its reinforcement in the European context, in order to generate real added value in aviation safety. This is to be achieved by building upon the already existing cooperation between such authorities and the investigation resources available in the Member States of the European Union. ENCASIA is one of the Regional Accident Investigation organization in the EUR/NAT Regions.
See https://www.icao.int/safety/Implementation/Lists/COSCAP_RSOO/Admin.aspx.
The 2018 ENCASIA Annual Report related to the implementation of its work programme is available at:
https://ec.europa.eu/transport/modes/air/encasia/activities_en

- **The Interstate Aviation Committee publishes every year a report on flight safety in civil aviation of contracting States** of the Intergovernmental Agreement on Civil Aviation and Air Space Use, signed on 30 December 1991. As of December 2018, the States participating in the Agreement are: Azerbaijan, Armenia, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russian Federation, Tajikistan, Turkmenistan, Uzbekistan and Ukraine. The 2018 edition is available in both Russian and English on the IAC website http://www.mak-iac.org.

Appendix I – List of Accidents

List of accidents involving aircraft of maximum mass of over 2 250 kg that have occurred in 2018 in one of the States of the accredited area of the ICAO EUR/NAT Regional Office

Note: Accidents involving scheduled commercial operations with aircraft of maximum mass of over 5700 kg are shaded in dark grey in the table below.

Date of Occurence	State Of Occurence	Aircraft Type	Max. Mass (kg)	Phase Of Flight	Fatalities	Occurrence Category	Description
2018-01-01	Spain	AIRBUS A319	75500	Approach	0	TURB	During descent at FL210 to Barcelona airport, the aircraft suffered the effects of turbulence, falling one of the cabin crew member to the aisle breaking her right wrist.
2018-01-03	Italy	AIRBUS A319	75500	En Route	0	TURB	During the descent toward Verona, in proximity of SRN, passing FL280 the aircraft encountered a severe turbulence area. The flight crew was informed about injured cabin crews. Medical assistance was requested via ATC.
2018-01-04	Finland	IAI 1125	11838	Standing	1	RAMP	During pre-flight preparations the captain stated the APU so as to heat the cabin and to provide power for aircraft systems. When he went back out he closed the cabin door, pressurizing the cabin. When he opened the door, he was hit with excessive force was was fatally injured.
2018-01-10	Poland	DE HAVILLAND CANADA DHC-8	29260	Landing	0	SCF-NP	Aircraft came to rest with the nose resting on the runway after landing at Warszawa-Frédéric Chopin airport
2018-01-13	Turkey	BOEING 737	78220	Landing	0	RE	Runway excursion after landing on runway 11 at Trabzon Airport, Turkey.
2018-01-25	Germany	AIRBUS A320	77000	Standing	0	RAMP	Damage of the fuselage by a loading vehicle at Berlin-Schönefeld airport.
2018-02-10	Spain	BOEING 737	78220	En Route	0	AMAN	The aircraft, which was in route in the Canaries airspace, requested to descend to flight level 130. The air control service authorized it to descend to the requested flight level, but when the aircraft was at flight level 364, it instructed it to stop at flight level 360. The aicraft descended below flight level 360 with the autopilot on and the pilot manually attempted to recover flight level 360. It was in this maneuver when the passenger fell and broke a leg.

2018-02-11	Russian Federation	ANTONOV AN-148	43700	Climb	71	LOC-I	AShortly after takeoff, at an altitude of about 1300 meters (4265 feet) and an instrument speed of 465-470 km/h, there were discrepancies between the air speed readings on the captain's side compared to the standby airspeed indicator. The flight crew disconnected the autopilot. The airspeed on the captain's side continued to decrease, while the standby ASI showed 540-560 km/h. The flight passed an altitude of 1700-1900 m (5580-6230 ft) with vertical loads ranging from 1.5 to 0.5 g. Subsequently the aircraft entered a steep descent with the ASI on the captain's side showing 0 km/h, and the standby ASI showing 200 km/h. The pitch angle decreased to -30/-35 degrees with a vertical load factor of 0 g. The aircraft impacted a snowy field and disintegrated.
2018-02-21	United Kingdom	CESSNA 208 CARAVAN	3970	Landing	0	SCF-NP	Nose landing gear drag link spring failed during a normal landing, Netheravon Airfield, Wiltshire
2018-02-28	Estonia	AIRBUS A320	77000	Landing	0	ARC	(Training flight) The engines touched the runway and the main landing gear doors broke. The aircraft then managed to gain altitude and the pilots were able to stabilize the aircraft and turn back. Both engines, however, lost power after the turn back to the airport. An emergency landing was carried out at 17:11, about 150 meters from the runway. The aircraft came to a halt in the snow 15 meters south of the runway.
2018-03-16	France	PILATUS PC-6	2800	Landing	0	SCF-NP	During a technical flight, the pilot observed that the rudder control was less effective. He advised the ATC that there was a yaw control failure and asked to land on unpaved runway 09 at Grenoble airport. While landing, a little before the flare out, the pilot lost control of the aeroplane. The aeroplane touched down heavily, performed a ground loop and came to rest on the paved runway.
2018-03-23	Hungary	BOEING 737	78220	Standing	0	EVAC	During the push back procedure the aircraft was evacuated because of smell of smoke. One passenger was seriously injured.
2018-03-27	Spain	AIRBUS A319	75500	Take-off	0	BIRD	During takeoff run several birds impacted the aircraft engines. As a result of this, both engines stopped. The crew rejected the takeoff and the aircraft stopped on the runway at Murcia/San Javier airport.
2018-03-28	Israel	BOEING 737	78220	Taxi	0	GCOL	Ground collision between a Germania Boeing 737-700 (D-ABLB) and an El Al Boeing 767-300ER (4X-EAK) while on push back for departure from Tel Aviv-Ben Gurion International Airport, Israel.

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2018-04-09	Norway	BEECHCRAFT SUPER KING AIR	5670	Landing	0	ARC	The aircraft came to rest on the belly 278 m after touchdown at Stavanger airport Sola
2018-04-16	France	CESSNA 525 CITATIONJET	5625	Landing	0	RE	The pilot said that during the landing run on runway 31 at Le Touquet airport, there was a braking problem on the left main landing gear. The aeroplane veered off the runway on the left side.
2018-04-17	United Kingdom	DE HAVILLAND CANADA DHC-8	29260	Landing	0	ARC	On the second approach to Runway 12 of Newquay airport, the aircraft developed a high sink rate below 50 ft. The pilot flying reacted to the sink by increasing the pitch attitude, which resulted in the aircraft tail striking the runway before the main landing gear
2018-05-02	Morocco	BOEING 737	78220	Landing	0	ARC	The aircraft struck its tail onto the runway surface on touchdown at Marrakesh airport.
2018-05-13	Turkey	AIRBUS A321	93000	Taxi	0	GCOL	An Asiana Airlines Airbus A330-323 (HL7792) and a THY Turkish Airlines Airbus A321-231 (TC-JMM) suffered substantial damage in a ground contact accident at Istanbul-Atatürk International Airport, Turkey. The Airbus A321 had arrived from Ercan as flight TK969 and turned towards the gate at Terminal A at 14:47 UTC. The aircraft stopped about 30 meters before the intended parking position at the gate. At the same time the Airbus A330 had commenced taxiing along taxiway G to the runway. Flight OZ552 was returning to Seoul, South Korea. While taxiing past the A321, the right hand wing tip impacted the vertical stabilizer of TK969. The A321's vertical stabilizer was knocked over entirely and the A330's wing tip sustained serious damage.
2018-05-13	Ireland	CESSNA 208 CARAVAN	3970	En Route	2	LOC-I	The aircraft impacted bog and woodland terrain subsequent to a successful skydiving jump by 16 of the occupants onboard. The airplane sustained unreported damage and the two remaining occupants onboard received serious injuries. The Cessna 208B Grand Caravan had departed Clonbullogue Aerodrome in Ireland about 14:13 hours local time. The skydivers were dropped at 14:32 an altitude of about 13,000 feet overhead the airfield.

2018-05-25	United Kingdom	NORTH AMERICAN MUSTANG P-51	5490	Take-off	0	RE	As the aircraft moved for takeoff from Woodchurch Airfield, its wheels sank into the ground and it did not reach the desired speed for takeoff. At the end of the runway the pilot turned the aircraft to avoid a ditch. It struck a fence and came to rest approximately 180 m beyond the end of the runway.
2018-06-10	Greece	BOEING 737	78220	Landing	0	ARC	The aircraft bounced upon landing at Heraklion airport and experienced a tail strike causing damage to the aircraft belly.
2018-06-11	United Kingdom	BRITTEN NORMAN BN-2 ISLANDER	3855	Approach	0	LOC-I	The aircraft touched down short of the undershoot area at Beaver Island airfield (Falkland Islands) causing significant damage to the right landing gear, wing and engine mounts. The accident was probably caused by a stall or unexpected descent due to turbulence or windshear under the prevailing conditions.
2018-06-14	Ukraine	MCDONNELL DOUGLAS MD-83	67810	Landing	0	RE	Bravo Airways flight 4406 from Antalya, Turkey, suffered a runway excursion after landing on runway 08 at Kiev's Igor Sikorsky International Airport, Ukraine. At the time of landing a thunderstorm was passing the airport with light rain and wind changing in direction at 19 knots, gusting to 33 knots.
2018-06-22	Norway	BOEING 737	78220	Standing	0	RAMP	Cabin crew injured when drivable stairs were removed at Alta airport (ENAT).
2018-06-26	United Kingdom	CESSNA 414	3062	Approach	0	LOC-I	Collision with farm buildings during forced landing, Enstone Airfield, Oxfordshire
2018-06-27	Russian Federation	ANTONOV AN-2	5500	En Route	0	SCF-PP	An aircraft engaged in a forest fire survey flight nosed over during a forced landing on an island in the Uda River. The aircraft had just departed Nizhneudinsk Airport.
2018-07-06	Morocco	ATR ATR72	22000	Landing	0	ARC	Firm landing, during which the tail bumper contacted the ground and the belly scraped the runway when landing at Fez airport. The investigation was delegated to GPIAA (Portugal).
2018-07-16	United Kingdom	SUPERMARINE SPITFIRE	3976	Landing	0	LOC-G	The aircraft had landed on Runway 14 at Goodwood after completing a passenger flight. As the aircraft was slowing, the pilot became aware that it had started to deviate from the centre line towards the left side of the runway, which he attempted to gently correct by braking. As he did so the aircraft veered to the right, into wind. Despite the application of full left rudder and brake, the aircraft rotated through 90° and the left main landing gear collapsed.
2018-07-26	Kazakhstan	BOEING 757	122470	Landing	0	ARC	The aircraft suffered a tailstrike during go-around at Almaty airport.

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2018-07-27	France	PILATUS PC-6	2800	Maneuvering	1	OTHR	In the fourth rotation, after the ten parachutists including two wearing wingsuits had been dropped, one of the latter collided with the jumper aeroplane which was in descent
2018-07-30	Russian Federation	ANTONOV AN-2	5500	Take-off	0	SCF-PP	The aircraft crashed in the region of in Evenki District of the Krasnoyarsk Krai.
2018-08-04	Switzerland	JUNKERS JU-52	7600	En Route	20	UNK	The aircraft impacted a mountainous area in Switzerland.
2018-08-09	Turkey	BOEING 787	244940	Taxi	0	GCOL	The aircraft struck the tail section of a parked Boeing 777-300 (TC-JJZ) at Istanbul-Atatürk International Airport, Turkey. The right hand wing tip of the aircraft impacted the underside of the tail section of the Boeing 777, ripping away the APU covers.
2018-08-09	Germany	BEECHCRAFT 58 BARON	2300	Approach	2	LOC-I	The pilot carried out an approach to runway 07 at Münster-Osnabrück Airport and performed a go-around. The aircraft crashed during a second approach to runway 07. Preliminary information suggests that the aircraft performed a single engine go around, flipped over to inverted and crashed 10 meter left of the runway.
2018-08-19	Germany	ANTONOV AN-2	5500	Standing	0	F-NI	The right hand wings of the aircraft carrying skydivers caught fire during start-up of the engine at Gera-Leumnitz Airport, Germany. The occupants and pilot were able to evacuate and the fire was put out by fire services.
2018-08-31	Bulgaria	CESSNA 680 CITATION SOVEREIGN	14000	Landing	0	RE	Runway excursion upon landing at Bourgas airport. During the rollout a few seconds after the touchdown, the aircraft veered to the right from the centerline, hit a concrete block with aeronautical equipment and stopped at about 108 meters from the runway.
2018-09-01	Russian Federation	BOEING 737	78220	Landing	0	RE	The aircraft suffered a runway excursion accident after landing at Adler/Sochi Airport, Russia. It went through a fence and came to rest on a dry and rocky surface in a river bed. Subsequent fire broke out, causing substantial damage to the aircarft.
2018-09-08	United Kingdom	BEECHCRAFT 58 BARON	2300	Landing	0	RE	Due to a wet grass runway, the pilot was unable to stop the aircraft after landing at Haydock Park Airfield and deliberately 'ground-looped' the aircraft to prevent overrunning. During this maneuver the aircraft collided with a parked aircraft that got extensively damaged.
2018-09-16	Germany	BOEING 747	447696	Landing	0	SCF-NP	During landing, the A/C lost an inboard fore flap, that damaged the fuselage

2018-10-10	Russian Federation	SUKHOI SUPERJET 100	45880	Landing	0	RE	The aircraft overran the runway upon landing at Yakutsk airport and went onto an area that was under reconstruction, stopping after 250 meters. This caused damage to the forward fuselage, separation of both main landing gear bogies and a fuel tank leak.
2018-10-31	France	AIRBUS A330	217000	Taxi	0	GCOL	The left winglet of N817NW damaged the tail cone and THS of the A330 F-GZCI at a standstill on taxiway RT1 behind an A320 at the holding point for runway 08L of at Roissy Charles de Gaulle airport
2018-11-08	Russian Federation	ANTONOV AN-2	5500	En Route	0	ICE	While en route at an altitude of 150 m, on distance of 50 km from the airport of Arkhangelsk, the plane got into icing conditions. The pilots decided to return to the departure aerodrome. The aircraft then lost engine power and a forced landing was made in a forest.
2018-11-11	Portugal	EMBRAER ERJ-190	52290	Climb	0	LOC-I	The aircraft experienced control issues after departure from Lisbon's Alverca Air Base, Portugal. This resulted in unusual attitudes of the aircraft and high structural loads during recovery manoeuvres. Initial findings indicate that the aircraft flight controls showed an incorrect ailerons control cable system installation.
2018-11-20	Russian Federation	BOEING 737	78220	Take-off	1	SEC	The aircraft hit a person during takeoff from runway 24L at Moscow's Sheremetyevo Airport, Russia
2018-12-04	Greece	AIRBUS A320	77000	Standing	0	RAMP	During disembarkation at Athens airport, the aircraft sustained damage in the fuselage after colliding with passenger stairs.
2018-12-18	Norway	BOEING 787	244940	Taxi	0	GCOL	The aircraft right wing hit a light pole during taxi at de-icing stand at Oslo airport Gardermoen (ENGM), Norway.

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Appendix II – Eight Critical Elements of a safety oversight system

ICAO Contracting States, in their effort to establish and implement an effective safety oversight system, need to consider the critical elements for safety oversight (CE). Critical elements are essentially the safety defence tools of a safety oversight system and are required for the effective implementation of safety-related policy and associated procedures. States are expected to implement safety oversight critical elements in a way that assumes the shared responsibility of the State and the aviation community. Critical elements of a safety oversight system encompass the whole spectrum of civil aviation activities, including areas such as aerodromes, air traffic control, communications, personnel licensing, flight operations, airworthiness of aircraft, accident/incident investigation, and transport of dangerous goods by air. The effective implementation of the CE is an indication of a State's capability for safety oversight.

ICAO has identified and defined the following critical elements of a State's safety oversight system:

CE-1. Primary aviation legislation. The provision of a comprehensive and effective aviation law consistent with the environment and complexity of the State's aviation activity and compliant with the requirements contained in the Convention on International Civil Aviation.

CE-2. Specific operating regulations. The provision of adequate regulations to address, at a minimum, national requirements emanating from the primary aviation legislation and providing for standardized operational procedures, equipment and infrastructures (including safety management and training systems), in conformance with the Standards and Recommended Practices (SARPs) contained in the Annexes to the Convention on International Civil Aviation.

CE-3. State civil aviation system and safety oversight functions. The establishment of a Civil Aviation Authority (CAA) and/or other relevant authorities or government agencies, headed by a Chief Executive Officer, supported by the appropriate and adequate technical and non-technical staff and provided with adequate financial resources. The State authority must have stated safety regulatory functions, objectives and safety policies.

CE-4. Technical personnel qualification and training. The establishment of minimum knowledge and experience requirements for the technical personnel performing safety oversight functions and the provision of appropriate training to maintain and enhance their competence at the desired level. The training should include initial and recurrent (periodic) training.

CE-5. Technical guidance, tools and the provision of safety-critical information.The provision of technical guidance (including processes and procedures), tools (including facilities and equipment) and safety-critical information, as applicable, to the technical personnel to enable them to perform their safety oversight functions in accordance with established requirements and in a standardized manner. In addition, this includes the provision of technical guidance by the oversight authority to the aviation industry on the implementation of applicable regulations and instructions.

CE-6. Licensing, certification, authorization and approval obligations. The implementation of processes and procedures to ensure that personnel and organizations performing an aviation activity meet the established requirements before they are allowed to exercise the privileges of a licence, certificate, authorization and/or approval to conduct the relevant aviation activity.

CE-7. Surveillance obligations. The implementation of processes, such as inspections and audits, to proactively ensure that aviation licence, certificate, authorization and/or approval holders continue to meet the established requirements and function at the level of competency and safety required by the State to undertake an aviation-related activity for which they have been licensed, certified, authorized and/or approved to perform. This includes the surveillance of designated personnel who perform safety oversight functions on behalf of the CAA.

CE-8. Resolution of safety concerns. The implementation of processes and procedures to resolve identified deficiencies impacting aviation safety, which may have been residing in the aviation system and have been detected by the regulatory authority or other appropriate bodies.

Appendix III - Glossary

ACI	Airport Council International
ACAS	Airborne Collision Avoidance System
AMAN	Abrupt Maneuver
ANSP	Air Navigation Service Provider
AO	Aircraft Operator
ARC	Abnormal Runway Contact
ATCO	Air Traffic Controller
ATM	Air Traffic Management
BIRD	Occurences involving collisions/near collisions with bird(s)
CANSO	Civil Air Navigation Services Organisation
CE	Critical Element
CFIT	Controlled Flight into Terrain
CSS/C	Cabin Services System Controller
CSST	Call Sign Similarity Tool
CTOL	Collision with Obstacle(s) During Takeoff and Landing
EASA	European Aviation Agency
EGPWS	Enhanced Ground Proximity Warning System
ENCASIA	European Network of Civil Aviation Safety Investigation Authorities
EPAS	European Plan for Aviation Safety
EVAIR	EUROCONTROL's Voluntary ATM Incident Reporting (EVAIR)
FAA	Federal Aviation Administration (USA)
FATA	Federal Air Transport Agency (Russian Federation)
FIR	Flight Information Region
F-NI	Fire/Smoke (Non-Impact)
GAQ	Gap Analysis Question
GASP	Global Aviation Safety Plan
GBAS	Ground Based Augmentation System
GCOL	Ground Collision
IAC	Interstate Aviation Committee
IATA	International Air Transport Association
ICVM	ICAO Coordinated Validation Mission
ICE	Icing
IE-REST	ICAO-EUR Regional Expert Safety Team
IFALPA	International Federation of Air Line Pilots' Associations
IOSA	IATA Operational Safety Audit
ISRALPA	Israel Air Line Pilots Association
iSTARS	integrated Safety Trend Analysis and Reporting System
LOC-G	Loss of Control - Ground
LOC-I	Loss of Control In-Flight
NCLB	No Country Left Behind
NM	Network Manager
OJT	On-the-Job Training
OTH	Other
PQ	Protocol Question

RAMP	Ground Handling
RASG-EUR	Regional Aviation Safety Group Europe
RE	Runway Excursion
RI	Runway Incursion
RMA	Regional Monitoring Agency
RMT	Rule Making Task
RPAS	Remotely Piloted Aircraft Systems
RST	Runway Safety Team
SAS	Scandinavian Airlines System
SCF-NP	System/Component Failure or Malfunction (Non-Powerplant)
SEC	Security Related
SEI	Safety Enhancement Initiatives
SMS	Safety Management System
SSC	Significant Safety Concern
SSP	State Safety Programme
TAWS	Terrain Awareness Warning System
TCAS RA	Traffic Collision Avoidance System Resolution Advisory
TURB	Turbulence Encounter
UAS	Unmanned Aircraft System
UNK	Unknown or Undetermined
UPRT	Upset Prevention and Recovery Training
USOAP CMA	Universal Safety Oversight Audit Programme Continuous Monitoring Approach
USOS	Undershoot/overshoot

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