



ICAO WORKSHOP ON THE IMPLEMENTATION OF A NATIONAL AVIATION SAFETY PLAN

Handout 1: Practical Exercise: Developing a National Aviation Safety Plan

Context

You are tasked with developing a national aviation safety plan for the StateX. The results of the State Safety Briefing of StateX are presented in Appendix A. This briefing contains information related to the organizational challenges, operational safety risks, additional categories of operational safety risks, and emerging issues within the State.

Group activity

- Workshop participants will be divided into groups of no more than 10 people.
- A facilitator will be appointed and will coordinate the discussion.
- A scribe will be appointed to take notes and complete the required documentation.
- A member of each group will brief the other groups on the outcomes in the plenary session.
- Time allocated: 3h30

Your task

1. Based on the State Safety Briefing presented in Appendix A of this document, identify organizational challenges, operational safety risks, additional categories of operational safety risks, and emerging issues of StateX;
2. Based on the GASP Goals presented in Appendix B, identify national safety goals, targets and indicators for StateX;
3. Based on the excerpts from the Roadmap presented in Appendix C, identify safety enhancement initiatives (SEIs) and actions by number or name to achieve the goals and targets of StateX; and
4. Complete the template in **Handout 2** as StateX.

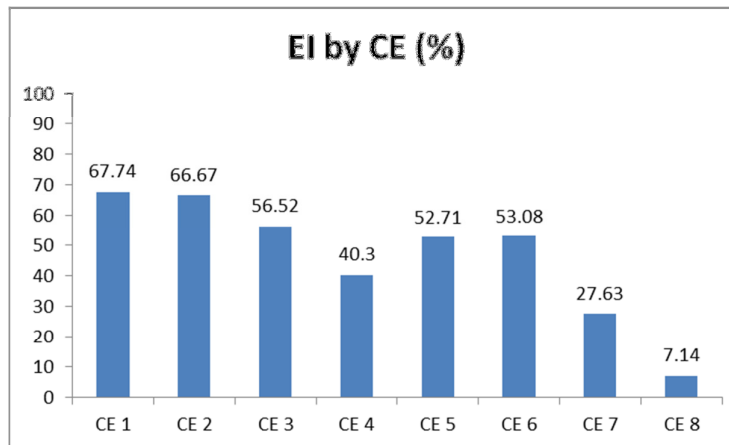
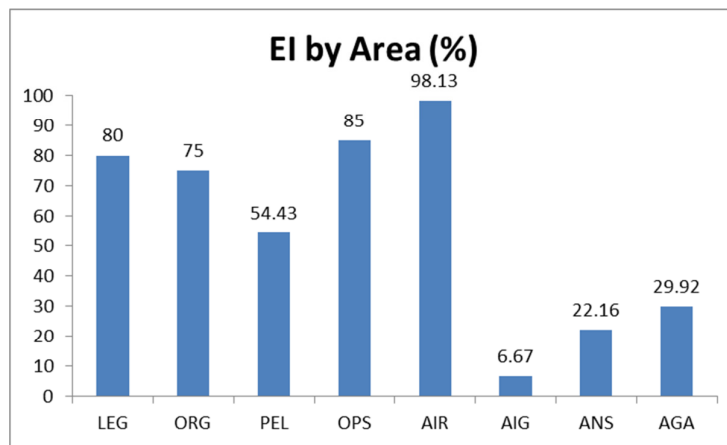


APPENDIX A

State Safety Briefing of StateX

1 Universal Safety Oversight Audit Programme (USOAP) Results

Overall EI Score: 49.16%



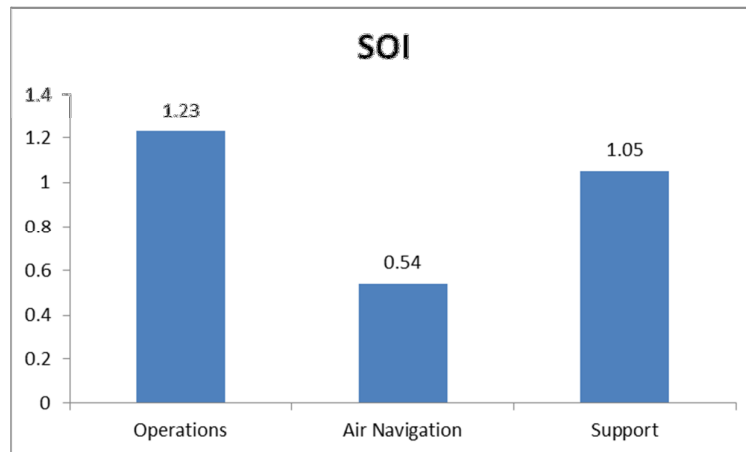
StateX currently has 365 open USOAP protocol findings. The highest number of protocol findings (44) concern Technical Guidance, Tools and the Provision of Safety-Critical Information (CE-5) in the area of Accident Investigation (AIG). StateX has been providing updates to its Corrective Action Plan (CAP) on the CMA online framework (OLF) for uncompleted CAPs.



2 Safety Oversight Index (SOI) Results

Overall SOI: 0.94

StateX has a high Safety Index in only two areas. In the area of air navigation (ANS/AGA), the EI should be increased at least by 21.81%.



3 Significant Safety Concerns (SSCs)

StateX has no SSCs.

4 Certification of International Aerodromes

- StateX has not promulgated regulations detailing the requirements for the certification of aerodromes, and including the criteria to determine if an aerodrome should be certified.
- The State established a process for the certification of aerodromes.



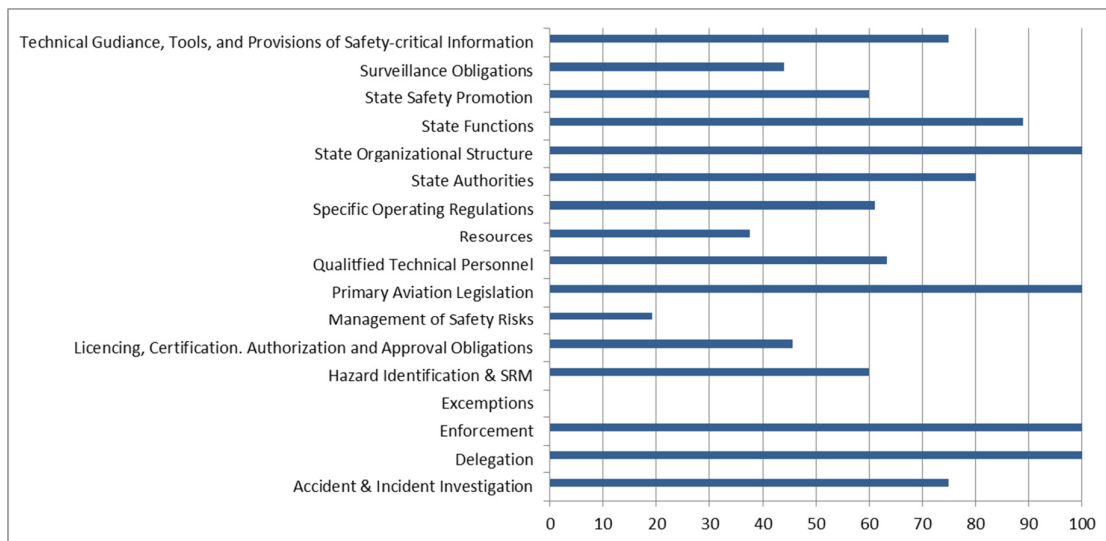
5 Safety Partner Programmes

- StateX has not been assessed by the Federal Aviation Administration FAA through their International Aviation Safety Audit (IASA) programme.
- StateX has operational restrictions with regard to European airspace.
- StateX has one airline certified through the IATA Operational Safety Audit (IOSA) programme, out of all its air operators.

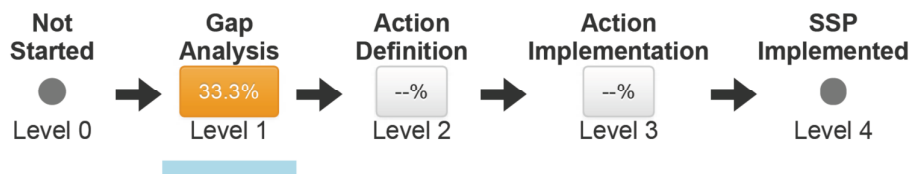
6 State Safety Programme (SSP) Implementation

StateX has an overall SSP foundation of 55.29%.

SSP Foundation by Subject Area (%)



Out of the four levels of SSP Implementation, StateX is rated Level 1 “States having started a GAP analysis”. It has a score of 33.3% in Level 1.





7 Performance-based Navigation (PBN) Implementation

StateX's international airports have 2 instrument runways which have 1 PBN approach. This establishes the PBN implementation at 50% for StateX.

8 Accident Statistics

StateX had no fatal accidents as State of Occurrence on scheduled commercial flights with aircraft of a mass of over 5700 kg in the last 5 years. Operators from StateX had no such fatal accidents outside of the State during that same period.

Non-fatal accidents in the last 5 years:

- 2 runway excursions (one in 2017 and one in 2019)
- 1 undercarriage collapse following bird strike in 2018

Serious incidents in the last 5 years:

- 3 runway incursions between 2016-2017
- 1 near miss between passenger aircraft and glider in 2018

Other occurrences:

- Several cases reported of small drones operating in the vicinity of international airport

9 State Aviation Activity Overview

- In 2018, StateX had approximately 15,302 scheduled commercial departures. During the last 5 years, departures have increased on average by 6.6 % annually.
- 34.8% of departures are international and 19% are regional.
- 46.5% of international departures were performed by operators from StateX. The majority were conducted by STATEX AIRWAYS.
- StateX has one international airport listed in the ICAO Regional Air Navigation Plan with approximately 10,000 departures in 2018.



APPENDIX B

GASP Goals, Targets and Indicators

ICAO ASPIRATIONAL SAFETY GOAL		
“ZERO FATALITIES BY 2030 AND BEYOND”		
Goal	Target	Indicators
<p>Goal 1:</p> <p>Achieve a continuous reduction of operational safety risks</p>	<p>1.1¹</p> <p>Maintain a decreasing trend of global accident rate</p>	<ul style="list-style-type: none"> • Number of accidents • Number of accidents per million departures (accident rate) • Number of fatal accidents • Number of fatal accidents per million departures (fatal accident rate) • Number of fatalities • Number of fatalities per passengers carried (fatality rate) • Percentage of occurrences related to high-risk categories (HRCs)
<p>Goal 2:</p> <p>Strengthen States’ safety oversight capabilities</p>	<p>2.1</p> <p>All States to improve their score for the effective implementation (EI) of the critical elements (CEs) of the State’s safety oversight system (with focus on priority PQs) as follows:</p> <p>by 2022 – 75 per cent</p> <p>by 2026 – 85 per cent</p> <p>by 2030 – 95 per cent</p>	<ul style="list-style-type: none"> • Overall global EI score • Overall EI score per State • Overall regional EI score • Number of States that met the EI score as per the timelines • Number of States that have fully implemented the priority PQs related to a safety oversight system • Percentage of priority PQs implemented by a State • Percentage of each priority PQs implemented globally • Number of States timely updating the filing of differences • Percentage of required corrective action plans (CAPs) submitted by States (using OLF) • Percentage of completed CAPs per State (using OLF)
	<p>2.2</p> <p>By 2022, all States to reach a safety oversight index greater than 1, in all categories</p>	<ul style="list-style-type: none"> • Number of States maintaining a safety oversight index greater than 1 in all categories • Percentage of States maintaining a safety oversight index greater than 1 in all categories • Percentage of each category with a safety oversight index greater than 1 globally • Safety oversight index per State, per category

¹ Legend: ORG related targets – Yellow / OPS related targets – Green.



<p>Goal 3:</p> <p>Implement effective State safety programmes (SSPs)</p>	<p>3.1</p>	<p>By 2022, all States to implement the foundation of an SSP</p>	<ul style="list-style-type: none"> • Number of States having implemented the foundation of an SSP • Percentage of each subject area implemented globally • Percentage of satisfactory SSP foundational PQs • Percentage of required CAPs related to the SSP foundational PQs submitted by States (using OLF) • Percentage of required CAPs related to the SSP foundational PQs completed per State (using OLF)
	<p>3.2</p>	<p>By 2025, all States to implement an effective SSP, as appropriate to their aviation system complexity</p>	<ul style="list-style-type: none"> • Number of States having implemented an effective SSP • Level of maturity achieved in Annex 19 PQs, per State • Number of States that require applicable service providers under their authority to implement an SMS • Number of States that have implemented a national aviation safety plan
<p>Goal 4:</p> <p>Increase collaboration at the regional level</p>	<p>4.1</p>	<p>By 2020, States that do not expect to meet GASP Goals 2 and 3, to use a regional safety oversight mechanism, another State or other safety oversight organization's ICAO-recognized functions in seeking assistance to strengthen their safety oversight capabilities</p>	<ul style="list-style-type: none"> • Number of States requiring assistance/support • Number of States actively seeking assistance • Number of States that received assistance • Number of States offering assistance
	<p>4.2</p>	<p>By 2022, all States to contribute information on safety risks, including SSP safety performance indicators (SPIs), to their respective regional aviation safety group (RASGs)</p>	<ul style="list-style-type: none"> • Number of States contributing information on safety risks to RASGs • Number of States that are sharing their SSP SPIs with RASGs • Number of States forwarding information on safety matters to States, RASGs or other stakeholders
	<p>4.3</p>	<p>By 2022, all States with effective safety oversight capabilities and an effective SSP, to actively lead RASGs' safety risk management activities</p>	<ul style="list-style-type: none"> • Number of States with effective safety oversight capabilities and an effective SSP, leading RASGs' safety risk management activities • Number of RASGs that have a regional aviation safety plan



Goal 5: Expand the use of industry programmes	5.1	By 2020, all service providers to use globally harmonized SPIs as part of their safety management system (SMS)	<ul style="list-style-type: none"> • Number of service providers using globally harmonized metrics for their SPIs
	5.2	By 2022, increase the number of service providers participating in the corresponding ICAO-recognized industry assessment programmes	<ul style="list-style-type: none"> • Number of service providers participating in the corresponding ICAO-recognized industry assessment programmes
Goal 6: Ensure the appropriate infrastructure is available to support safe operations	6.1	By 2022, all States to implement the air navigation and airport core infrastructure	<ul style="list-style-type: none"> • Number of States having implemented the air navigation and airport core infrastructure elements



APPENDIX C

Excerpts from the Global Aviation Safety Roadmap

ORGANIZATIONAL CHALLENGES (ORG) ROADMAP

1.1 Component 1 — State safety oversight system

1.1.1 Phase 1 — Establishment of a safety oversight framework (CE-1 to CE-5)

<i>Safety enhancement initiative</i>	SEI-2 — Development of a comprehensive regulatory oversight framework
<i>Stakeholder</i>	States
<i>Actions</i>	<ul style="list-style-type: none"> <input type="checkbox"/> 2A — Establish and maintain an independent regulatory oversight authority, which includes separation of oversight functions from service provision functions where these exist within the authority (CE-3) <input type="checkbox"/> 2B — Develop an effective system to promulgate technical guidance and tools, and provide safety-critical information needed for technical personnel to effectively perform their safety oversight functions (CE-5) <input type="checkbox"/> 2C — Establish an effective system to attract, recruit, train and retain qualified and sufficient technical personnel to support regulatory oversight (see SEI-5) (CE-3 and CE-4)
<i>References</i>	<p>2A</p> <ul style="list-style-type: none"> — Doc 9734, <i>Safety Oversight Manual, Part A — The Establishment and Management of a State Safety Oversight System</i> <p>2B and 2C</p> <ul style="list-style-type: none"> — FAA Inspector Training System — Flight Standards (International) Course — ICAO-Endorsed Government Safety Inspector Training Programme — ICAO Global Aviation Training course catalogue — ICAO TRAINAIR PLUS Programme — iSTARS — Ramp Inspection Programmes (SAFA/SACA)



<p><i>Safety enhancement initiative</i></p>	<p>SEI-3 — Establishment of an independent accident and incident investigation authority, consistent with Annex 13 — <i>Aircraft Accident and Incident Investigation</i></p>
<p><i>Stakeholder</i></p>	<p>States</p>
<p><i>Actions</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> 3A — Establish an independent accident and incident investigation authority, as per Annex 13 requirements (CE-1 and CE-3) <input type="checkbox"/> 3B — Develop an effective system to promulgate technical guidance and tools, and provide safety-critical information needed for technical personnel to effectively conduct accident and incident investigations (CE-5) <input type="checkbox"/> 3C — Establish an effective system to attract, recruit, train and retain qualified and sufficient technical personnel to support accident and incident investigations (see SEI-5) (CE-3 and CE-4)
<p><i>References</i></p>	<p>3A</p> <ul style="list-style-type: none"> — Annex 13, <i>Aircraft Accident and Incident Investigation</i> — Doc 9734, <i>Safety Oversight Manual, Part A — The Establishment and Management of a State Safety Oversight System</i> — ICAO Model Aircraft Accident and Incident Investigation (AIG) Act — ICAO Model Aircraft Accident and Incident Investigation (AIG) Regulations <p>3B</p> <ul style="list-style-type: none"> — Doc 9734, <i>Safety Oversight Manual</i> — Doc 9756, <i>Manual of Aircraft Accident and Incident Investigation</i> — Doc 9946, <i>Manual on Regional Accident and Incident Investigation Organization</i> — Doc 9962, <i>Manual on Accident and Incident Investigation Policies and Procedures</i> — Doc 9973, <i>Manual on Assistance to Aircraft Accident Victims and their Families</i> — Doc 9998, <i>ICAO Policy on Assistance to Aircraft Accident Victims and their Families</i> — Doc 10053, <i>Manual on Protection of Safety Information, Part I — Protection of Accident and Incident Investigation Records</i> — Doc 10062, <i>Manual on the Investigation of Cabin Safety Aspects in Accidents and Incidents</i> — Cir 315, <i>Hazards at Aircraft Accident Sites</i> <p>3C</p> <ul style="list-style-type: none"> — Cir 298, <i>Training Guidelines for Aircraft Accident Investigators</i>



<p><i>Safety enhancement initiative</i></p>	<p>SEI-5 — Qualified technical personnel to support effective safety oversight</p>
<p><i>Stakeholder</i></p>	<p>States</p>
<p><i>Actions</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> 5A — Establish an effective system to identify and track qualifications and training of existing technical personnel (CE-4) <input type="checkbox"/> 5B — Identify the gaps in qualified technical personnel and training requirements necessary to implement the oversight mandate (CE-4) <input type="checkbox"/> 5C — Establish a compensation scheme for the attraction and retention of qualified technical personnel (CE-4) <input type="checkbox"/> 5D — Make use of RSOOs, RAIOS, or equivalent means, to secure qualified technical personnel to perform those functions which cannot be performed by the State acting on its own (CE-4) <input type="checkbox"/> 5E — Establish human resource plans to support hiring and retention of the appropriate number of qualified technical personnel required (CE-4) <input type="checkbox"/> 5F — Implement training policies and programmes for technical personnel and verify that the type and frequency of training successfully completed (i.e. initial, recurrent, specialized and on-the-job training) are sufficient to acquire/maintain the required qualifications and level of competence corresponding to the assigned duties and responsibilities of technical personnel (CE-4) <input type="checkbox"/> 5G — Develop a process for assessing changing needs for qualified technical personnel requirements and develop procedures to update hiring, retention and training of personnel needs, in coordination with SEI-4B (CE-4)
<p><i>References</i></p>	<ul style="list-style-type: none"> — Doc 8335, <i>Manual of Procedures for Operations Inspection, Certification and Continued Surveillance</i> — Doc 9734, <i>Safety Oversight Manual</i> — Doc 10070, <i>Manual on the Competencies of Civil Aviation Safety Inspectors</i> — ICAO-Endorsed Government Safety Inspector Training Programme — ICAO TRAINAIR PLUS Programme



<p><i>Safety enhancement initiative</i></p>	<p>SEI-6 — Strategic collaboration with key aviation stakeholders to enhance safety in a coordinated manner</p>
<p><i>Stakeholder</i></p>	<p>States</p>
<p><i>Actions</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> 6A — Based on the identified safety deficiencies, establish a mechanism to identify collaborators and develop an action plan for the resolution of those deficiencies (CE-1 to CE-5) <input type="checkbox"/> <input type="checkbox"/> 6B — Use a regional safety oversight mechanism, or the services of another competent State or organization to support a State that does not expect to meet GASP Goals 2 and 3 <input type="checkbox"/> <input type="checkbox"/> 6C — Provide assistance via States, regions and industry to other States for primary aviation legislation development (in coordination with SEI-1B) (CE-1) <input type="checkbox"/> <input type="checkbox"/> 6D — Provide assistance via States, regions and industry to other States for the development of national regulations (CE-2) <input type="checkbox"/> <input type="checkbox"/> 6E — Establish a process via RASG and/or RSOO for a mentoring/collaboration system, including providing State/industry assistance as well as sharing of best practices and internal follow-up actions (CE-1 to CE-5, emphasis on CE-3) <input type="checkbox"/> <input type="checkbox"/> 6F — Collaborate with RASG and/or RSOO, other States, ICAO, industry joint programmes and/or technical school partnerships to attract, recruit and train qualified and sufficient technical personnel and develop a strategy for their retention (CE-4) <input type="checkbox"/> <input type="checkbox"/> 6G — Establish and implement a process for the development and promulgation of technical guidance, tools and the provision of safety-critical information, in collaboration with other States, RSOO, ICAO and/or other stakeholders, with the understanding that these materials need to be tailored to each State's national regulations and operational environments (CE-5) <input type="checkbox"/> <input type="checkbox"/> 6H — While working to improve safety oversight, work with RASG and/or RSOO to address high-risk categories of occurrences (see OPS roadmap)
<p><i>References</i></p>	<p>6A to 6G</p> <ul style="list-style-type: none"> — Doc 9734, <i>Safety Oversight Manual</i> — ICAO Technical Co-operation Bureau — No Country Left Behind initiative — RASGs — RSOOs and COSCAPs — Safety oversight index application (login required) <p>6H</p> <ul style="list-style-type: none"> — Annex 13, <i>Aircraft Accident and Incident Investigation</i>, Attachment C — <i>List of examples of serious incidents</i>



1.1.2 Phase 2 — Implementation of a safety oversight system (CE-6 to CE-8)

<i>Safety enhancement initiative</i>	SEI-8 — Consistent implementation of ICAO SARPs at the national level
<i>Stakeholder</i>	States
<i>Actions</i>	<input type="checkbox"/> 8A — Work at the national level to address significant safety concerns as a priority <input type="checkbox"/> 8B — Increase the level of compliance with ICAO SARPs and the EI of CEs at the national level (all CEs, emphasis on CE-6 to CE-8)
<i>References</i>	<ul style="list-style-type: none"> — Doc 9735, <i>Universal Safety Oversight Audit Programme Continuous Monitoring Manual</i> — iSTARS safety audit information (login required)

<i>Safety enhancement initiative</i>	SEI-9 — Continued implementation of and compliance with ICAO SARPs at the national level
<i>Stakeholder</i>	States
<i>Actions</i>	<input type="checkbox"/> 9A — Implement licensing, certification, authorization and approval processes (CE-6) <input type="checkbox"/> 9B — Implement regulatory oversight and enforcement processes (CE-7 and CE-8) <input type="checkbox"/> 9C — Establish a system to resolve safety concerns identified via accident and incident investigations, surveillance activities, safety reports and other means (CE-8)
<i>References</i>	<p>9A</p> <ul style="list-style-type: none"> — Doc 8335, <i>Manual of Procedures for Operations Inspection, Certification and Continued Surveillance</i> <p>9B</p> <ul style="list-style-type: none"> — Doc 9756, <i>Manual of Aircraft Accident and Incident Investigation</i> <p>9C</p> <ul style="list-style-type: none"> — Annex 13, <i>Aircraft Accident and Incident Investigation</i>, Attachment C — <i>List of examples of serious incidents</i>



<i>Safety enhancement initiative</i>	SEI-11 — Strategic collaboration with key aviation stakeholders to enhance safety in a coordinated manner
<i>Stakeholder</i>	States
<i>Actions</i>	<ul style="list-style-type: none"> <input type="checkbox"/> 11A — Based on the identified safety deficiencies, establish a mechanism to identify collaborators and develop an action plan for the resolution of those deficiencies (CE-6 to CE-8) <input type="checkbox"/> 11B — Use an RSOO or other competent State or organization to support a State that does not expect to meet GASP Goals 2 and 3 <input type="checkbox"/> 11C — Provide assistance via RASG and/or RSOO to other States for the conduct of surveillance activities (CE-7) <input type="checkbox"/> 11D — Use technical guidance, tools and safety-critical information, developed in collaboration with other States, RSOO, ICAO and/or other stakeholders, to enable technical personnel to perform their safety oversight functions effectively (CE-6 to CE-8) <input type="checkbox"/> 11E — While working to improve safety oversight, continue to work with RASG and/or RSOO to address high-risk categories of occurrences (see OPS roadmap)
<i>References</i>	<p>11A to 11D</p> <ul style="list-style-type: none"> — RASGs — RSOOs and COSCAPs — GASOS — Safety oversight index application (login required) <p>11E</p> <ul style="list-style-type: none"> — Annex 13, <i>Aircraft Accident and Incident Investigation</i>, Attachment C — <i>List of examples of serious incidents</i>



1.2 Component 2 — State safety programme

<i>Safety enhancement initiative</i>	SEI-13 — Start of SSP implementation at the national level
<i>Stakeholder</i>	States
<i>Actions</i>	<ul style="list-style-type: none"> <input type="checkbox"/> 13A — Secure State-level commitment to improve safety <input type="checkbox"/> 13B — Conduct initial SSP gap analysis (checklist) then the detailed SSP self-assessment <input type="checkbox"/> 13C — Establish an SSP implementation team <input type="checkbox"/> 13D — Develop an implementation plan for the SSP <input type="checkbox"/> 13E — Issue SMS regulations for service providers and verify SMS implementation <input type="checkbox"/> 13F — Identify and share safety management best practices
<i>References</i>	<p>13A, B and D</p> <ul style="list-style-type: none"> — Annex 19, <i>Safety Management</i>, Chapter 3 — Doc 9859, <i>Safety Management Manual</i> — ICAO USOAP CMA Online Framework (login required) — iSTARS SSP gap analysis (login required) — Safety Management International Collaboration Group (SM ICG), 10 Things You Should Know About SMS <p>13A, C and E</p> <ul style="list-style-type: none"> — SM ICG, The Frontline Manager's Role in SMS — SM ICG, The Senior Manager's Role in SMS <p>13E</p> <ul style="list-style-type: none"> — SM ICG, SMS Evaluation Tool — CANSO Standard of Excellence in Safety Management Systems <p>13F</p> <ul style="list-style-type: none"> — SM ICG, How to Support a Successful SSP and SMS Implementation — Recommendations for Regulators



<i>Safety enhancement initiative</i>	SEI-14 — Strategic allocation of resources to start SSP implementation
<i>Stakeholder</i>	States
<i>Actions</i>	<ul style="list-style-type: none"> <input type="checkbox"/> 14A — Establish a process for planning and allocation of resources to enable SSP implementation and identify areas where resources are needed <input type="checkbox"/> 14B — Obtain resources from national and appropriate authorities' leadership and stakeholders within the State to support SSP implementation <input type="checkbox"/> 14C — Work with the ICAO Regional Office to make use of available means (e.g. Technical Co-operation Bureau) to acquire assistance needed for SSP implementation <input type="checkbox"/> 14D — Work with RSOO, other States and other organizations, as appropriate to train qualified technical personnel to fulfil their duties and responsibilities regarding SSP implementation
<i>References</i>	<p>14A and B</p> <ul style="list-style-type: none"> — Annex 19, <i>Safety Management</i>, Chapter 3 — Doc 9859, <i>Safety Management Manual</i> <p>14C</p> <ul style="list-style-type: none"> — ICAO Technical Co-operation Bureau regional coordinator <p>14D</p> <ul style="list-style-type: none"> — SM ICG, SMS Inspector Competency Guidance



<p><i>Safety enhancement initiative</i></p>	<p>SEI-17 — Establishment of safety risk management at the national level (step 1)</p>
<p><i>Stakeholder</i></p>	<p>States</p>
<p><i>Actions</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> 17A — Establish a legal framework related to the protection of safety data, safety information and other related sources <input type="checkbox"/> 17B — Establish a State mandatory occurrence reporting system <input type="checkbox"/> 17C — Develop a safety database for monitoring system safety issues and hazards, in line with the principles of Doc 9859 — <i>Safety Management Manual</i> <input type="checkbox"/> 17D — Establish and maintain a process to identify hazards from collected safety data <input type="checkbox"/> 17E — Establish and utilize a process to ensure the assessment of safety risks associated with identified hazards <input type="checkbox"/> 17F — Establish a State confidential voluntary safety reporting system providing data to the safety database (see SEI-17C)
<p><i>References</i></p>	<p>17A to 17F</p> <ul style="list-style-type: none"> — Annex 19, <i>Safety Management</i> — Doc 9859, <i>Safety Management Manual</i> <p>17B to 17D</p> <ul style="list-style-type: none"> — Commercial Aviation Safety Team (CAST)/ICAO Common Taxonomy Team (CICTT) — ICAO Accident/Incident Data Reporting (ADREP) Taxonomy — SM ICG, Development of a Common Hazard Taxonomy — SM ICG, Hazard Taxonomy Examples <p>17E</p> <ul style="list-style-type: none"> — SM ICG, Risk Based Decision Making Principles



<p><i>Safety enhancement initiative</i></p>	<p>SEI-18 — Establishment of safety risk management at the national level (step 2)</p>
<p><i>Stakeholder</i></p>	<p>States</p>
<p><i>Actions</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> 18A — Develop safety performance indicators using the established safety risk management process <input type="checkbox"/> 18B — Develop safety performance measurement methodologies, aligned with the regional safety metrics, using the established safety risk management process (see SEI-17E) <input type="checkbox"/> 18C — Establish the acceptable level of safety performance to be achieved through the SSP <input type="checkbox"/> 18D — Ensure the establishment of mandatory safety reporting systems by service providers <input type="checkbox"/> 18E — Encourage establishment of voluntary safety reporting systems as part of service providers' SMS <input type="checkbox"/> 18F — Promote safety awareness and the two-way communication, sharing and exchange of safety-relevant information within the State's aviation organizations and encourage sharing of safety information with industry within the State <input type="checkbox"/> 18G — Contribute information on safety risks and SSP safety performance indicators to the RASG
<p><i>References</i></p>	<p>18A to 18F</p> <ul style="list-style-type: none"> — Doc 9859, <i>Safety Management Manual</i> <p>18A to 18D</p> <ul style="list-style-type: none"> — SM ICG, A Systems Approach to Measuring Safety Performance — The Regulator Perspective — SM ICG, Measuring Safety Performance Guidelines for Service Providers <p>18E and 18F</p> <ul style="list-style-type: none"> — RASG regional safety reports



<i>Safety enhancement initiative</i>	SEI-21 — Advancement of safety risk management at the national level
<i>Stakeholder</i>	States
<i>Actions</i>	<input type="checkbox"/> 21A — Establish data sharing connectivity and integration among the State's aviation safety databases, including the mandatory occurrences reporting system, voluntary safety reporting systems, safety audit reports and aviation system statistics (traffic counts, weather information, EI scores, etc.) <input type="checkbox"/> 21B — Develop risk modelling capabilities to support monitoring system safety issues and accident/incident prevention <input type="checkbox"/> 21C - Encourage information-sharing with industry
<i>References</i>	21A and 21B <ul style="list-style-type: none"> — EUROCONTROL Voluntary ATM Incident Reporting (EVAIR) — European Authorities Coordination Group on Flight Data Monitoring (EAFDM) — FAA Aviation Safety Information Analysis and Sharing Program — FAA Confidential Information Sharing Program — IATA Flight Data eXchange (FDX) — IATA STEADES Global Aviation Safety Data Sharing Program — IMPLEMENT



OPERATIONAL SAFETY RISKS (OPS) ROADMAP

1. CONTROLLED FLIGHT INTO TERRAIN (CFIT)

<i>Safety enhancement initiative</i>	Mitigate contributing factors to the risk of CFIT
<i>Stakeholder</i>	States
<i>Actions</i>	<ol style="list-style-type: none"> 1. Implement the following CFIT safety actions: <ol style="list-style-type: none"> a. Ensure aircraft are equipped with terrain awareness and warning system (TAWS) in accordance with Annex 6 b. Promote the wider use of TAWS beyond the requirements of Annex 6 c. Issue a Safety Advisory to increase adherence to TAWS warning procedures d. Promote greater awareness of approach risks e. Consider the implementation of continuous descent final approaches (CDFA) f. Consider the implementation of minimum safe altitude warning (MSAW) systems g. Ensure the timeliness of updates and accuracy of Electronic Terrain and Obstacle Data (eTOD) h. Promote the use of GPS-derived position data to feed TAWS 2. Validate the effectiveness of the safety enhancement initiatives (SEIs) presented in this roadmap through the analysis of mandatory occurrence reporting (MORs) and voluntary occurrence reporting systems (VORs) and accident/incident investigations (apply safety management methodologies) 3. Identify additional contributing factors, for example: <ol style="list-style-type: none"> a. Flight in adverse environmental conditions b. Approach design and documentation (e.g. approaches with vertical guidance (APV) or localizer performance with vertical guidance (LPV) approaches) c. Phraseology used (standard vs. non-standard) d. Pilot fatigue and disorientation 4. Develop and implement further SEIs to mitigate the risk of the identified contributing factors, if any, for CFIT 5. Conduct continuous evaluations of the performance of the SEIs
<i>References</i>	<ul style="list-style-type: none"> — Annex 6, <i>Operation of Aircraft</i> — ICAO Safety Report — RASGs — Commercial Aviation Safety Team Safety enhancements for CFIT — IATA CFIT — IATA Safety Report — Flight Safety Foundation (FSF) ALAR Toolkit — Skybrary



2. LOSS OF CONTROL IN-FLIGHT (LOC-I)

<i>Safety enhancement initiative</i>	Mitigate contributing factors to LOC-I accidents and incidents
<i>Stakeholder</i>	States
<i>Actions</i>	<ol style="list-style-type: none"> 1. Implement the following LOC-I safety actions: <ol style="list-style-type: none"> a. Require upset prevention and recovery training in all full flight simulator type conversion and recurrent training programmes b. Require more time devoted to training for the pilot monitoring role 2. Validate the effectiveness of the SEIs in the industry through MORs and VORs systems and accident/incident investigations (apply safety management methodologies) 3. Identify additional contributing factors, for example: <ol style="list-style-type: none"> a. Distraction b. Adverse weather c. Complacency d. Inadequate standard operating procedures (SOPs) for effective flight management e. Insufficient height above terrain for recovery f. Lack of awareness of or competence in procedures for recovery from unusual aircraft attitudes g. Inappropriate flight control inputs in response to a sudden awareness of an abnormal bank angle 4. Develop and implement further SEIs to mitigate the risk of the identified contributing factors, if any, for LOC-I, for example: <ol style="list-style-type: none"> a. Increase the effectiveness of regulatory oversight b. Improve regulations 5. Conduct continuous evaluations of the performance of the SEIs
<i>References</i>	<ul style="list-style-type: none"> — Annex 1, <i>Personnel Licensing</i> — Doc 10011, <i>Manual on Aeroplane Upset Prevention and Recovery Training</i> — ICAO Safety Report — ICAO LOC-I — RASGs — Commercial Aviation Safety Team Safety enhancements for LOC-I — IATA LOC-I — IATA Safety Report — Flight Safety Foundation — Skybrary — EUROCONTROL



3. MID-AIR COLLISION (MAC)

<i>Safety enhancement initiative</i>	Mitigate contributing factors to MAC accidents and incidents
<i>Stakeholder</i>	States
<i>Actions</i>	<ol style="list-style-type: none"> 1. Implement the following MAC safety actions: <ol style="list-style-type: none"> a. Establish guidance and regulations to ensure aircraft are equipped with airborne collision avoidance system (ACAS), in accordance with Annex 6 b. Ensure adherence to ACAS warning procedures c. Promote the improvement of air traffic control (ATC) systems, procedures and tools to enhance conflict management d. Promote the improvement of communications systems and procedures, such as controller-pilot datalink 2. Validate the effectiveness of the SEIs through the analysis of MORs and VORs and accident/incident investigations (apply safety management methodologies) 3. Identify additional contributing factors, for example: <ol style="list-style-type: none"> a. Traffic conditions - traffic density, complexity, mixture of aircraft types and capabilities, etc. b. ATC performance related to workload, competence, teamwork, procedures, commitment, etc., as well as the influence of air navigation services providers' (ANSP) safety management c. Flight crew training and corporate culture with workload, competence, teamwork, procedures, commitment etc., and the influence of aircraft operator's safety management d. ATC systems - flight data processing, communication, short term conflict alert (STCA), etc., as well as the interaction with the human operators and the aircraft systems, and the procurement policy of the ANSP e. Aircraft equipment - autopilots, transponders and ACAS, but also aircraft performance (e.g. rate-of-climb) and their physical size f. Navigation infrastructure - both coverage and quality g. Surveillance - both coverage and quality 4. Develop and implement further SEIs to mitigate the risk of the identified contributing factors, if any, for MAC 5. Conduct continuous evaluations of the performance of the SEIs
<i>References</i>	<ul style="list-style-type: none"> — Annex 6, <i>Operation of Aircraft</i> — Annex 8, <i>Airworthiness of Aircraft</i> — Annex 19, <i>Safety Management</i> — Doc 8168, <i>Procedures for Air Navigation Services — Aircraft Operations</i> (PANS-OPS) — Doc 9868, <i>Procedures for Air Navigation Services — Training</i> (PANS-TRG) — Doc 9859, <i>Safety Management Manual</i> — ISTARS



4. RUNWAY EXCURSION (RE)

<i>Safety enhancement initiative</i>	Mitigate contributing factors to RE accidents and incidents
<i>Stakeholder</i>	State
<i>Actions</i>	<ol style="list-style-type: none"> 1. Implement the following RE safety actions: <ol style="list-style-type: none"> a. Ensure the establishment and implementation of a State runway safety programme and runway safety teams b. Promote the establishment of policy and training on rejected landings, go-arounds, crosswind and tailwind landings (up to the maximum manufacturer-demonstrated winds) c. Promote equipage of runway overrun awareness and alerting systems on aircraft d. Ensure effective and timely reporting of meteorological and aerodrome conditions (e.g. runway surface condition in accordance to the ICAO global reporting format in Annex 14, Volume I, braking action and revised declared distances) e. Certify aerodrome in accordance with ICAO Annex 14, Volume I as well as Doc 9981, <i>PANS-Aerodrome</i> f. Promote the installation of arresting systems if runway end safety area (RESA) requirements cannot be met g. Ensure that procedures to systematically reduce the rate of unstabilized approaches to runways are developed and used 2. Validate the effectiveness of the SEIs through the analysis of MORs, VORs and accident/incident investigations (apply safety management methodologies) 3. Identify additional contributing factors, for example: <ol style="list-style-type: none"> a. Ineffective SOPs b. Failure to adhere to the appropriate SOPs c. Long/floated/bounced/firm/off-centre/crabbed landing d. Inadequate approach procedures design e. Inadequate regulatory oversight 4. Develop and implement further SEIs to mitigate the risk of the identified contributing factors, if any, for RE 5. Conduct continuous evaluations of the performance of the SEIs
<i>References</i>	<ul style="list-style-type: none"> — Annex 14, <i>Aerodromes</i>, Volume I — <i>Aerodrome Design and Operations</i> — Doc 8168, <i>Procedures for Procedures for Air Navigation Services — Aircraft Operations</i> (PANS-OPS) — Doc 9981, <i>Procedures for Air Navigation Services — Aerodromes</i> (PANS-Aerodromes) — Doc 9859, <i>Safety Management Manual</i> — ICAO Global Runway Safety Action Plan — ICAO Runway Safety Team Handbook — ICAO Runway Safety IKit — RASGs



5. RUNWAY INCURSION (RI)

<p><i>Safety Enhancement Initiative</i></p>	<p>Mitigate contributing factors to RI accidents and incidents</p>
<p><i>Stakeholder</i></p>	<p>States</p>
<p><i>Actions</i></p>	<ol style="list-style-type: none"> 1. Implement the following RI safety actions: <ol style="list-style-type: none"> a. Ensure the establishment and implementation of a State runway safety programme and runway safety teams b. Promote the establishment of policy, procedures and training that supports situational awareness for controllers, pilots and airside vehicle drivers c. Ensure effective use of suitable technologies to assist the improvement of situational awareness, such as improved resolution airport moving maps (AMM), electronic flight bags (EFBs), enhanced vision systems (EVS) and head-up displays (HUD), advanced-surface movement guidance and control systems (A-SMGCS), stop bars, and runway incursion warning systems (ARIWS) d. Certify aerodrome in accordance with ICAO Annex 14, Volume I as well as Doc 9981, <i>PANS-Aerodrome</i> e. Ensure the use of standard phraseologies in accordance with applicable State regulations and ICAO provisions (e.g. Doc 9432, <i>Manual of Radiotelephony</i>) 2. Validate the effectiveness of the SEIs through the analysis of MORs, VORs and accident/incident investigations (apply safety management methodologies) 3. Identify additional contributing factors, for example: <ol style="list-style-type: none"> a. Operations in low visibility conditions b. Complex or inadequate aerodrome design c. Complexity of traffic (multiple simultaneous line-ups) 4. Develop and implement further SEIs to mitigate the risk of the identified contributing factors, if any, for RI 5. Conduct continuous evaluations of the performance of the SEIs
<p><i>References</i></p>	<ul style="list-style-type: none"> — Annex 14, <i>Aerodromes</i>, Volume I — <i>Aerodrome Design and Operations</i> — Doc 8168, <i>Procedures for Air Navigation Services — Aircraft Operations</i> (PANS-OPS) — Doc 9981, <i>Procedures for Air Navigation Services — Aerodromes</i> (PANS-Aerodromes) — ICAO Global Runway Safety Action Plan — ICAO Runway Safety Team Handbook — ICAO Runway Safety IKit

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