ICAO WORKSHOP ON NATIONAL AVIATION SAFETY PLAN DEVELOPMENT

Handout 4: Facilitated Exercise III: Develop List of Prioritized Safety Enhancement Initiatives

Context

Using the results from the Facilitated Exercises I and II, and the documentation provided during this workshop, complete the tasks below.

Time allocated: 3h00

Documentation / References

- Doc 10131, Chapter 2, Sections 2.7 and 2.8
- Doc 10161, Appendices A and B

Your tasks

1. Based on list of prioritized national safety issues (from Exercise I) and the national goals, targets and indicators (from Exercise II), review the excepts from the *Global Aviation Safety Roadmap* (Doc 10161), presented **Appendix A**;
2. Select series of safety enhancement initiatives (SEIs), and their specific actions, that will enable the achievement of the national targets;
3. Review the list of selected SEIs and assign them an order of priority – Select those you will keep for the action plan as a prioritized list of SEIs; and
4. Complete the form in the **Appendix B**.

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APPENDIX A

EXCERPTS FROM THE GLOBAL AVIATION SAFETY ROADMAP

ORGANIZATIONAL CHALLENGES (ORG) ROADMAP

COMPONENT 1 – STATE SAFETY OVERSIGHT SYSTEM – PART 1. STATES

Safety enhancement initiative	SEI-1 — Strategic allocation of resources to enable effective safety oversight
Stakeholder	States
Related GASP target(s)	2.1
Actions	☐ 1A – Establish (or confirm, if existing) executive or legislative mandate for each competent safety oversight authority to receive financial resources from government or other external sources and expend them ☐ 1B – Establish and document a process for the ongoing resource planning and allocation in in support of the organizational structure of a competent authority, which is required to conduct effective safety oversight. Use SEI-2, SEI-3, SEI-4, SEI-7, SEI-8 and SEI-9 to identify resource requirements ☐ 1C – Obtain a sustainable and stable source of financing (e.g., State budget, fees and charges) through commitments from the national executive or legislative body (as applicable) and the organization's leadership and other stakeholders ☐ 1D – For small scope short-term improvements: – Utilize the ICAO Safety Fund, the ICAO Capacity Development and Implementation Bureau, or other means to acquire technical and financial assistance in coordination with the Regional Aviation Safety Group (RASG), Regional Safety Oversight Organization (RSOO) and/or ICAO Regional Office – Seek assistance from more experienced States and other stakeholders in coordination with RASG/RSOO/ICAO Regional Office – Seek assistance from sources of financing (e.g., World Bank, African Development Bank) in coordination with RASG/RSOO/ICAO Regional Office ☐ 1E – Establish and document a process for assessing changing resource requirements (e.g., regulating new entrants, new design organizations, etc.) and sustain necessary coordination with resource stakeholders for safety oversight improvements, in line with the national aviation safety plan (may be included in the process described in Action 1B)
References	— ICAO Safety Fund (SAFE)

Safety enhancement initiative	SEI-2 — Implementation of a mechanism so that each safety oversight authority has sufficient financial resources to meet its national and international obligations
Stakeholder	States
Related GASP target(s)	2.1
Actions	2A — Establish, implement, and regularly review mechanisms to fund the authorities, as per the actions listed in SEI-1, for: – The development of regulations, procedures and other guidance material – Training – Surveillance activities – The resolution of safety deficiencies
References	— Annex 19 – *Safety Management* — Doc 9734, *Safety Oversight Manual*, Part A – *The Establishment and Management of a State Safety Oversight System*

Safety enhancement initiative	SEI-3 — Implementation of a mechanism to ensure that each safety oversight authority has sufficient qualified technical personnel to meet its national and international obligations
Stakeholder	States
Related GASP target(s)	2.1; 2.2
Actions	3A — Define and document a methodology to identify staffing needs for all specialities in safety oversight related activities, including those related to the development of regulations, procedures and other guidance material; training; surveillance activities; and the resolution of safety deficiencies 3B — Establish and document required qualifications for technical personnel, including knowledge and practical experience in civil aviation required (as pilot, engineer, air traffic controller or other areas of expertise), appropriate for the assigned duties and responsibilities 3C — Establish and implement a remuneration scheme for the attraction, recruitment and retention of qualified technical personnel (i.e., the ability to offer competitive terms of employment and compensation packages) 3D — Establish and implement a system, including supporting human resource plans, to attract, recruit, and retain the appropriate number of qualified technical personnel 3E — Establish and implement a documented process to establish and fill the required posts initially and on an on-going basis 3F — Make use of RSOOs or equivalent means, to secure qualified technical personnel to perform those functions which cannot be performed by the State acting on its own 3G — Implement a process to verify that the established minimum qualifications and experience requirements are met by all recruited technical staff and key management personnel 3H — Establish and implement a process for assessing changing needs for qualified technical personnel requirements, and develop and implement procedures to update recruitment and retention of personnel needs 3I — Regularly review the actual number of staff and ensure that sufficient personnel are available to accomplish all required activities including: the development of regulations, procedures and other guidance material; training; and reporting and analyses of safety deficiencies
References	— Annex 19 – *Safety Management* — Doc 9734, *Safety Oversight Manual*, Part A – *The Establishment and Management of a State Safety Oversight System*

Safety enhancement initiative	SEI-4 — Training for technical personnel to support effective safety oversight
Stakeholder	States
Related GASP target(s)	2.1; 2.2
Actions	4A – Establish and implement training policies and programmes for qualified technical personnel (as per SEI-3), ensuring that the type and frequency of training successfully completed (i.e., initial, recurrent, specialized and on-the-job training (OJT)) are sufficient to acquire and maintain the required qualifications and level of competence corresponding to the assigned duties and responsibilities of technical personnel 4B – Identify the training necessary to accomplish all required activities, on an ongoing basis 4C – Establish and implement a process for assessing changing needs for technical training, and develop and implement procedures to regularly update training requirements and plans 4D — Develop written instructions, procedures and/or requirements for the systematic establishment, maintenance, and retention of training records (which comprise certificates of attendance/participation, information on the course content, performance of tasks under supervision, OJT, and the outcomes)
References	— Annex 19 – *Safety Management* — Doc 8335, *Manual of Procedures for Operations Inspection, Certification and Continued Surveillance* — Doc 9734, *Safety Oversight Manual*, Part A – *The Establishment and Management of a State Safety Oversight System* — ICAO-Endorsed Government Safety Inspector Training Programme — ICAO Global Aviation Training – ICAO iPACK – Supporting Civil Aviation Entities in Conducting a Training Needs Analysis (TNA)

Safety enhancement initiative	SEI-5 — Corrective actions to resolve safety issues identified during surveillance activities
Stakeholder	States
Related GASP target(s)	2.3
Actions	5A — Establish and implement procedures to deal with deficiencies found during surveillance activities, including for notifying regulated entities/services providers of identified deficiencies; the categorization of seriousness of the deficiency; and a deadline for corrective action 5B — Establish and implement a process to take actions, including enforcement, if deficiencies found during surveillance activities are not rectified within a reasonable time by the regulated entities/services providers 5C — Establish and implement a process for the resolution of deficiencies or concerns identified during surveillance activities delegated to other entities or individuals
References	— Doc 9734*, Safety Oversight Manual*, Part A – *The Establishment and Management of a State Safety Oversight System*

Safety enhancement initiative	SEI-10 — Development and implementation of training plans and a formal training programme for investigators
Stakeholder	States
Related GASP target(s)	2.2
Actions	10A — Establish and implement training policies and programmes defining the type and frequency of training to be provided to investigators (e.g., initial, recurrent, specialized and OJT)), so they can acquire and maintain the required level of knowledge, skills, competence and qualifications in accordance with their assigned duties and responsibilities 10B — Provide training plans detailing and prioritizing the types of training to be provided to investigators, commensurate with their responsibilities (e.g., investigator, group or team leader, investigator-in-charge, accredited representative, adviser or expert/specialist) 10C — Develop and/or validate (if provided by another entity such as, universities, manufacturers, military establishments or other educational institutions), the content of the training, to ensure that it complies with the authority's accident investigation training programme and contains content related to safety at the accident site (hazards at aircraft accident sites) 10D — Establish and implement a process for assessing changing needs for technical training, and develop and implement procedures to regularly update training requirements and plans 10E — Develop written instructions, procedures and/or requirements for the systematic establishment, maintenance, and retention of training records (which comprise certificates of attendance/participation, information on the course content, performance of tasks under supervision, OJT, and the outcomes)
References	— Doc 9734, *Safety Oversight Manual*, Part A – *The Establishment and Management of a State Safety Oversight System* — Doc 9756, *Manual of Aircraft Accident and Incident Investigation*, Part I – *Organization and Planning* — Doc 9962, *Manual on Accident and Incident Investigation Policies and Procedures* — Doc 10062, *Manual on the Investigation of Cabin Safety Aspects in Accidents and Incidents*

Safety enhancement initiative	SEI-12 — Establishment and use of an accident and incident investigation database
Stakeholder	States
Related GASP target(s)	1.1; 1.2; 1.3
Actions	12A — Establish an accident and incident investigation database, in a standardized format, to facilitate the effective analysis of information on actual or potential safety deficiencies and to determine any preventive actions required 12B — Use a taxonomy, in the accident and incident database, that is compatible with Accident/Incident Data Reporting (ADREP) system/European Co-ordination Centre for Aviation Incident Reporting Systems (ECCAIRS) 12C — Establish and utilize a process to analyse the information contained in the database accident and incident to determine any required preventive action
References	— Annex 13 – Aircraft Accident and Incident Investigation — Doc 9962, Manual on Accident and Incident Investigation Policies and Procedures — ICAO Accident/Incident Data Reporting (ADREP) Taxonomy — European Coordination Centre for Accident and Incident Reporting Systems (ECCAIRS)

Safety enhancement initiative	SEI-16 — Training for aerodrome regulatory and inspectorate staff to support effective safety oversight
Stakeholder	States
Related GASP target(s)	2.2
Actions	16A — Use SEI-4 to ensure training for technical personnel with safety oversight responsibilities for AGA, including: — All the AGA specialist areas — Training content specifically for personnel responsible for the acceptance and continuous surveillance of aerodrome operators' SMS, in accordance with Annex 19 – *Safety Management* — Specialized training: aerodrome operations; rescue and firefighting; wildlife management; assessment of physical characteristics and electrical systems; obstacle control; assessment and reporting of runway surface conditions; aeronautical studies and risk assessments; enforcement; and signs, markings and lighting
References	— Annex 19 – *Safety Management* — Doc 9734, *Safety Oversight Manual*, Part A – *The Establishment and Management of a State Safety Oversight System* — Doc 9774, *Manual on Certification of Aerodromes* — Doc 9859, *Safety Management Manual*

Safety enhancement initiative	SEI-18 — Corrective actions to resolve safety deficiencies or concerns identified during surveillance activities related to aerodrome operations
Stakeholder	States
Related GASP target(s)	2.3
Actions	18A — Use SEI-5 to ensure resolution of safety deficiencies or concerns identified during surveillance activities related to aerodrome operations, including: — Establish and implement a graduated enforcement system to ensure that the renewal or continuing validity of aerodrome certificates is dependent on the satisfactory outcome of regulatory surveillance activities
References	— Doc 9981, *Procedures for Air Navigation Services — Aerodromes* — Doc 9734, *Safety Oversight Manual*, Part A – *The Establishment and Management of a State Safety Oversight System* — Doc 9774, *Manual on Certification of Aerodromes*

Safety enhancement initiative	SEI-28 – Improvement of industry compliance with applicable regulations
Stakeholder	Industry
Related GASP target(s)	6.1
Actions	28A – Work across industry to maintain compliance with applicable regulations 28B – Participate in the corresponding, ICAO-recognized industry evaluation programmes (for service providers) 28C – Participate in industry safety data sharing programmes (for service providers) – with examples listed in the references for this action
References	28B — ACI Airport Excellence (APEX) in Safety — CANSO and EUROCONTROL Standard of Excellence in Safety Management Systems measurement — FSF Basic Aviation Risk Standard (BARS) — IATA Operational Safety Audit (IOSA) — IATA Safety Audit for Ground Operations (ISAGO) — International Business Aviation Council (IBAC) International Standard for Business Aircraft Operations (IS-BAO). — IBAC International Standard for Business Aircraft Handling (IS-BAH) 28C — Cirium Airline Analytics — IATA Flight Data eXchange (FDX) — IATA Incident Data eXchange (IDX) — US Aviation Safety Information Analysis and Sharing (ASIAS) — Data4Safety (D4S) Programme — FSF Aviation Safety Network

COMPONENT 2 – STATE SAFETY PROGRAMME – PART 1. STATES

Safety enhancement initiative	SEI-30 – Start the establishment of SSP at the national level
Stakeholder	States
Related GASP target(s)	3.1; 3.2
Actions	☐ 30A – Secure State-level commitment to improve safety ☐ 30B – Complete the SSP PQ self-assessment, using the ICAO USOAP CMA Online Framework (OLF) ☐ 30C – Designate the authority in charge of coordinating the establishment and maintenance of the SSP; and define and document its responsibilities and roles ☐ 30D – Identify and define the roles and responsibilities of each State authority (e.g., civil aviation authority, accident investigation authority, military aviation authority and other authorities as applicable) involved in the SSP establishment and maintenance (including a mechanism for the coordination of SSP-related aspects at the State level) ☐ 30E – Establish an SSP implementation team and plan ☐ 30F – Identify safety management best practices to aid in the establishment of SSP
References	— Annex 19 – *Safety Management* — Doc 9859, *Safety Management Manual* — Safety Management Implementation Website — ICAO USOAP CMA Online Framework

Safety enhancement initiative	SEI-31 – Strategic allocation of resources to start the establishment of SSP
Stakeholder	States
Related GASP target(s)	2.1; 3.2
Actions	31A – Establish a plan for the allocation of resources to enable the establishment of SSP 31B – Identify and obtain resources from national and appropriate authorities' leadership and stakeholders within the State to support the establishment of SSP (this may be done through the NASP) 31C – Work with the ICAO Regional Office and/or any other regional organization(s) to make use of available means (e.g., Capacity Development and Implementation Bureau) to acquire assistance needed for the establishment of SSP 31D – Train qualified technical personnel to fulfil their duties and responsibilities regarding the establishment and maintenance of the SSP (potentially working with other entities such as RSOO, other States and other organizations, as appropriate)
References	31A and 31B — Annex 19 – *Safety Management* — Doc 9859, *Safety Management Manual* — ICAO iPACK – Supporting Civil Aviation Entities in Conducting a Training Needs Analysis (TNA) 31C — ICAO Capacity Development and Implementation Bureau 31D — Safety Management International Collaboration Group (SM ICG), *10 Things You Should Know About SMS* — SM ICG, *SMS Inspector Competency Guidance* — SM ICG, *SMS Evaluation Tool*

Safety enhancement initiative	SEI-34 – Availability of safety data and safety information to support safety management activities at the national level (step 1)
Stakeholder	States
Related GASP target(s)	3.2
Actions	☐ 34A – Establish national laws, regulations and policies protecting safety data, safety information and related sources, in accordance with Annex 19 – *Safety Management*: – Ensure that the protection of safety data, safety information and related sources does not interfere with the proper administration of justice or with maintaining or improving safety – Ensure that safety data, safety information and related sources are protected – Specify the conditions under which safety data, safety information and related sources qualify for protection, including principles of exception and authoritative safeguards, such as de-identification of data – Ensure that safety data and safety information remain available for the purpose of maintaining or improving aviation safety ☐ 34B – Establish safety data collection and processing systems (SDCPS) to capture, store, aggregate and enable the analysis of safety data and safety information to support their safety performance management activities ☐ 34C – Establish and maintain a process to identify hazards and safety risks from safety data, which includes the use of a risk assessment
References	— Annex 19 – *Safety Management* — Doc 9859, *Safety Management Manual* — Doc 10159, *Safety Intelligence Manual* — Safety Management Implementation Website — Commercial Aviation Safety Team (CAST)/ICAO Common Taxonomy Team — ICAO Accident/Incident Data Reporting (ADREP) Taxonomy — SM ICG, *Development of a Common Hazard Taxonomy* — SM ICG, *Hazard Taxonomy Examples* — SM ICG, *Risk-based decision-making principles*

Safety enhancement initiative	SEI-35 – Availability of safety data and safety information to support safety management activities at the national level (step 2)
Stakeholder	States
Related GASP target(s)	3.2; 4.3
Actions	35A – Establish the safety objectives to be achieved through the SSP 35B – Develop safety performance measurement methodologies, aligned with the regional safety metrics (see SEI-33E) 35C – Develop State-specific safety performance indicators and safety performance targets 35D – Promote the use of safety reporting systems by service providers 35E – Promote safety awareness and the two-way communication, sharing and exchange of safety-relevant information within the aviation organizations of the State and encourage sharing of safety information with industry within the State 35F – Contribute information on operational safety risks and emerging issues to the RASG
References	35A to 35E — Doc 9859, *Safety Management Manual* — Safety Management Implementation Website 35A to 35D — SM ICG, *A Systems Approach to Measuring Safety Performance – The Regulator Perspective* — SM ICG, *Measuring Safety Performance Guidelines for Service Providers* 35E — RASG regional safety reports 35F — Secure Portal on Operational Safety Risks and Emerging Issues

Safety enhancement initiative	SEI-38 – Advancement of safety risk management at the national level
Stakeholder	States
Related GASP target(s)	3.2; 4.3
Actions	38A – Integrate the aviation safety databases of the State, including the mandatory occurrences reporting system, voluntary safety reporting systems, safety audit reports and aviation system statistics (traffic volume, weather information, etc.) 38B – Develop capabilities to support the monitoring of safety issues as well as accident and incident prevention 38C – Encourage information-sharing with industry
References	38A to 38C — Doc 10159, *Safety Intelligence Manual* — EUROCONTROL Voluntary ATM Incident Reporting — European Operators Flight Data Monitoring forum (EOFDM) — FAA Aviation Safety Information Analysis and Sharing Program — FAA Aviation Voluntary Reporting Programs — IATA Flight Data eXchange

OPERATIONAL SAFETY RISKS (OPS) ROADMAP

COMPONENT 1 – GLOBAL HIGH-RISK CATEGORIES OF OCCURRENCES – PART 1. STATES
1. CONTROLLED FLIGHT INTO TERRAIN (CFIT)

Safety enhancement initiative	SEI-1 — Mitigate contributing factors to the risk of CFIT at the national level
Stakeholder	States
Related GASP target(s)	1.1; 1.2
Actions	1A – Implement the following CFIT safety actions: a) Ensure aircraft are equipped with ground proximity warning system (GPWS) which has a forward-looking terrain avoidance function, in accordance with Annex 6 – *Operation of Aircraft* b) Promote the wider use of GPWS beyond the requirements of Annex 6 c) Issue guidance to industry to increase adherence to GPWS warning procedures d) Determine and implement methods to 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) Promote the use of global positioning system (GPS)-derived position data to feed GPWS (through global navigation satellite system (GNSS)) h) Ensure the implementation of World Geodetics System (WGS)-84 i) Ensure that the terrain and obstacle data that is published in the AIP is accurate and updated in a timely manner j) Promote the use of threat and error management (TEM) methodology k) Ensure the implementation of effective GNSS radio frequency interference (RFI) mitigation measures that ensure accuracy and reliability of service or effective adapted responses l) Provide guidance to manufacturers and operators regarding operations in a GNSS disrupted environment

	1B – Validate the effectiveness of the safety enhancement initiatives (SEIs) in the State through the analysis of mandatory occurrence reporting (MOR) and voluntary occurrence reporting systems (VOR) and accident/incident investigations (apply safety management methodologies) 1C – Identify additional contributing factors, for example: a) Flight in adverse environmental conditions b) Inaccurate approach design and inadequate documentation (for approaches with vertical guidance (APV) or localizer performance with vertical guidance (LPV) approaches) c) Phraseology used (standard vs. non-standard) d) Pilot fatigue, sensory illusion, and loss of situational awareness e) GNSS radio frequency interference (RFI) 1D – Develop and implement further SEIs to mitigate the risk of the identified contributing factors, if any, for CFIT 1E – Continuously evaluate the effectiveness of the SEIs
References	– Annex 6 – *Operation of Aircraft* – Doc 9849 - Global Navigation Satellite System (GNSS) Manual – ICAO Safety Report – Commercial Aviation Safety Team – Safety enhancements for CFIT – FSF ALAR Toolkit – IATA CFIT – IATA Safety Report

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

Safety enhancement initiative	SEI-2 — Mitigate contributing factors to LOC-I accidents and incidents at the national level
Stakeholder	States
Related GASP target(s)	1.1; 1.2
Actions	□ 2A – Implement the following LOC-I safety actions: a) Develop regulations and guidance material on upset prevention and recovery training (UPRT), and require UPRT in all full flight simulator type conversion and recurrent training programmes, and verify implementation b) Require more time devoted to training multi-crew pilots on the pilot monitoring role (to ensure effective crew coordination) c) Implement measures to reduce potential laser interference with aircraft, which can distract or temporarily blind pilots d) Implement provisions in Annex 19 – *Safety Management*, focusing on measures to identify and mitigate risks associated with LOC-I and to promote a proactive safety culture e) Require air operators to conduct extensive pilot training that incorporates human factors, such as distraction, complacency, situational awareness (and verify that crew members have the required training and qualifications before performing flight duties) f) Develop guidance on flight data analysis programmes (FDAP) to encourage operators to consider LOC-I precursors as part of FDAP g) Promote the use of TEM methodology h) Ensure the implementation of effective GNSS RFI mitigation measures that ensure accuracy and reliability of service or effective adapted responses □ 2B – Validate the effectiveness of the SEIs in the State through MOR and VOR systems and accident/incident investigations (apply safety management methodologies) □ 2C – Identify additional contributing factors, for example: 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) Automation dependency leading to degraded pilot proficiency in manual flying, lack of awareness or competence in procedures for recovery from unusual aircraft attitudes g) Startle effect, inappropriate flight control inputs in response to sudden awareness of an abnormal aircraft state (e.g. bank angle, angle of attack or stall) h) GNSS RFI □ 2D – Develop and implement further SEIs to mitigate the risk of the identified contributing factors, if any, for LOC-I, for example: a) Increase the effectiveness of regulatory oversight b) Assess the effectiveness and applicability of regulations □ 2E – Continuously evaluate the effectiveness of the SEIs
References	– Annex 1 – *Personnel Licensing* – Doc 10000, *Manual on Flight Data Analysis Programmes (FDAP)* – Doc 10011, *Manual on Aeroplane Upset Prevention and Recovery Training* – ICAO Safety Report – ICAO LOC-I – Commercial Aviation Safety Team – Safety enhancements for LOC-I – EASA Upset Prevention and Recovery Training – FAA AC 120-111 Upset Prevention and Recovery Training – FSF Toolkits & Resources – IATA Environmental Factors Affecting Loss of Control In-Flight: Best Practice for Threat Recognition & Management (1st Edition) – IATA Guidance Material and Best Practices for the Implementation of Upset Prevention and Recovery Training (2nd Edition) – IATA, IFALPA, IFATCA, CANSO, Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices (3rd Edition)

3. MID-AIR COLLISION (MAC)

Safety enhancement initiative	SEI-3 — Mitigate contributing factors to MAC accidents and incidents at the national level
Stakeholder	States
Related GASP target(s)	1.1; 1.2
Actions	3A – Implement the following MAC safety actions: a) Establish regulations and guidance to ensure aircraft are equipped with airborne collision avoidance system (ACAS), in accordance with Annex 6 – *Operation of Aircraft* b) Verify adherence to ACAS warning procedures c) Promote the improvement of ATC systems, procedures and tools to enhance conflict management d) Promote the improvement of communications systems and procedures, such as controller-pilot datalink e) Promote the use of TEM methodology f) Ensure the implementation of effective GNSS RFI mitigation measures that ensure accuracy and reliability of service or effective adapted responses 3B – Validate the effectiveness of the SEIs in the State through the analysis of MOR and VOR and accident/incident investigations (apply safety management methodologies) 3C – Identify additional contributing factors, for example: a) Traffic conditions: considerations include traffic density, complexity, and the mixture of aircraft types and capabilities b) Air traffic control (ATC) performance: factors such as workload, competence, teamwork, and adherence to procedures. Additionally, the influence of the air navigation services provider's (ANSP) safety management system (SMS). c) Flight crew training and organizational (corporate) culture: aspects such as workload management, competence, teamwork, adherence to procedures, and the impact of the operator's SMS d) ATC systems: elements such as, flight data processing, communication systems, short-term conflict alert (STCA) systems, as well as the interaction between the human operators and the aircraft systems, and the procurement policies of ANSPs

	e) Aircraft equipment: considerations include autopilot systems, transponders and airborne collision avoidance system (ACAS), as well as aircraft performance characteristics (such as, rate-of-climb) and their physical dimension f) Surveillance systems: coverage and quality of surveillance technologies used to monitor aircraft positions and movements g) Flight plan processing: the efficiency and reliability of processes related to flight plan submission, approval, and distribution h) Airspace design: the complexity of airspace structure, route layouts, and the extent of controlled or uncontrolled airspace and proximity of military operational or training areas i) Flight in adverse environmental conditions that may influence conflict management and collision avoidance j) GNSS RFI □ 3D – Develop and implement further SEIs to mitigate the risk of the identified contributing factors, if any, for MAC □ 3E – Continuously evaluate the effectiveness of the SEIs
References	– Annex 6 – *Operation of Aircraft* – Annex 8 – *Airworthiness of Aircraft* – Annex 19 – *Safety Management* – Doc 8168, *Procedures for Air Navigation Services – Aircraft Operations* (PANS-OPS) – Doc 9868*, Procedures for Air Navigation Services – Training (PANS-TRG)* – Doc 9859, *Safety Management Manual* – ICAO Safety Report – CAST/ICAO Common Taxonomy Team – Commercial Aviation Safety Team – Safety enhancements for MAC – FSF Toolkits & Resources – IATA Safety Report

4. RUNWAY EXCURSION (RE)

Safety enhancement initiative	SEI-4 — Mitigate contributing factors to RE accidents and incidents at the national level
Stakeholder	States
Related GASP target(s)	1.1; 1.2
Actions	4A – Implement the following RE safety actions: 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 with the ICAO global reporting format in Annex 14 – *Aerodromes*, Volume I – *Aerodrome Design and Operations*, braking action and revised declared distances) e) Certify aerodromes in accordance with Annex 14, Volume I, as well as Doc 9981, *Procedures for Air Navigation Services – Aerodromes* (PANS-Aerodromes) 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 h) Promote the establishment of local runway safety teams i) Audit the effectiveness of the local runway safety teams including the effectiveness of SMS in reducing Runway Safety Precursor events j) Include runway safety precursors in operator's FDAP k) Conduct risk modelling, risk assessment and safety analysis of runway safety based on occurrences reports in the ATM/ANS domain, including low visibility runway operations l) Establish an effective and timely reporting system for meteorological and aerodrome conditions

	m) Certify aerodromes in accordance with Annex 14 – *Aerodromes*, Volume I – *Aerodrome Design and Operations* as well as Doc 9981, *PANS – Aerodromes* n) Ensure that the operator's aerodrome manual contains a requirement for reporting runway surface conditions in the global reporting format by enabling a harmonized assessment and reporting of runway surface conditions and an improved flight crew assessment of take-off and landing performance o) Implement an action plan for assessing and reporting runway surface conditions □ 4B – Validate the effectiveness of the SEIs in the State through the analysis of MOR, VOR and accident/incident investigations (apply safety management methodologies) □ 4C – Identify additional contributing factors, for example: a) Ineffective SOPs b) Lack of adherence to SOPs c) Long/floated/bounced/firm/off-centre/crabbed landing d) Unstabilized approach e) Inadequate reporting of runway surface conditions f) Inadequate approach procedures design g) Inadequate regulatory oversight □ 4D – Develop and implement further SEIs to mitigate the risk of the identified contributing factors, if any, for RE □ 4E – Continuously evaluate the effectiveness of the SEIs
References	– Annex 14 – *Aerodromes*, Volume I – *Aerodrome Design and Operations* – Doc 8168, Procedures for *Procedures for Air Navigation Services – Aircraft Operations* (PANS-OPS) – Doc 9981, *Procedures for Air Navigation Services – Aerodromes* (PANS-Aerodromes) – Doc 9859, *Safety Management Manual*

5. RUNWAY INCURSION (RI)

Safety Enhancement Initiative	SEI-5 — Mitigate contributing factors to RI accidents and incidents at the national level
Stakeholder	States
Related GASP target(s)	1.1; 1.2
Actions	☐ 5A – Implement the following RI safety actions: a) Ensure the establishment and implementation of a State runway safety programme and runway safety teams b) Develop requirements, policies, procedures and training materials that can support situational awareness of air traffic control officers (ATCOs), 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 (EFB), 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 Annex 14 – *Aerodromes*, Volume I – *Aerodrome Design and Operations*, as well as PANS-Aerodromes (Doc 9981) e) Ensure the use of standard phraseologies in accordance with applicable State regulations and ICAO provisions (e.g. Doc 9432, *Manual of Radiotelephony*) f) Ensure the identification and publication in the aeronautical information publication (AIP) of hot spots at aerodromes g) Ensure that suitable strategies to remove hazards or mitigate risks associated with identified hot spots are developed and executed h) Develop and distribute advisory circular for runway incursion prevention and pilot training i) Ensure aerodromes chart manoeuvring area during construction projects (PANS-Aerodromes (Doc 9981), Chapter 4) ☐ 5B – Validate the effectiveness of the SEIs in the State through the analysis of MOR, VOR and accident/incident investigations (apply safety management methodologies) ☐ 5C – Identify additional contributing factors, for example: a) Operations in low visibility conditions

	b) Complex or inadequate aerodrome design, equipment and signage c) Diversity and complexity of traffic (such as, multiple simultaneous line-ups) d) Conditional clearances e) Simultaneous use of intersecting runways f) Late issue of or late changes to departure clearances g) Unintentional deviations from ATC clearances by flight and ground crew h) Phraseology use (such as, non-standard versus standard; call-sign confusion) i) Concurrent use of more than one language for ATC communications j) English language proficiency k) Inadequate manoeuvring area driver training and assessment programme ☐ 5D – Develop and implement further SEIs to mitigate the risk of the identified contributing factors, if any, for RI ☐ 5E – Continuously evaluate the effectiveness of the SEIs
References	– Annex 14 – *Aerodromes*, Volume I – *Aerodrome Design and Operations* – Doc 8168, *Procedures for Air Navigation Services – Aircraft Operations* (PANS-OPS) – Doc 9981, *Procedures for Air Navigation Services – Aerodromes* (PANS-Aerodromes) – Doc 9137, *Airport Services Manual*, Part 3 — *Wildlife Hazard Management* – Doc 9432, *Manual of Radiotelephony* – Doc 9870, *Manual on the Prevention of Runway Incursions* – ICAO Global Runway Safety Action Plan – ICAO Runway Safety Documents and Toolkits

COMPONENT 2 – OTHER GLOBAL RISK CATEGORIES OF OCCURRENCES

PART 1. STATES

1. ABNORMAL RUNWAY CONTACT (ARC)

Safety enhancement initiative	SEI-16 — Mitigate contributing factors to ARC accidents and incidents at the national level
Stakeholder	States
Related GASP target(s)	1.1; 1.3
Actions	16A – Implement the following ARC safety actions: a) Develop guidance material on unstabilized approaches b) Promote the establishment of policy and training on rejected landings, go-arounds, crosswind and tailwind landings (up to the maximum manufacturer-demonstrated wind) c) Ensure effective and timely reporting of meteorological and aerodrome conditions (e.g. runway surface condition in accordance with the ICAO global reporting format in Annex 14 – *Aerodromes*, Volume I – *Aerodrome Design and Operations,* braking action and revised declared distances) d) Develop guidance material and a training programme for runway pavement, maintenance, and operations from aerodrome operator's perspective e) Use a runway safety maturity checklist 16B – Validate the effectiveness of the SEIs in the State through the analysis of MOR and VOR and accident/incident investigations (apply safety management methodologies) 16C – Identify additional contributing factors, for example: a) Adverse weather conditions (such as, tailwind, crosswind, turbulence or wind shear) b) An unstabilized approach continued to land c) Inappropriate aircraft configuration (weight and balance, trim setting /CG position, and flap setting) d) Mishandling of crosswind e) Mis-trimmed stabilizer, rotation at improper speed, excessive rotation rate

	f) Holding off in the flare g) Over-rotation during go-around h) Improper use of the flight director i) Under-inflated oleo-pneumatic shock absorber j) Slow or late rotation k) Performance calculation errors l) Tail strikes, tip strikes, pod strikes, and nose wheel first touch down m) Illuminated touchdown zones could be a contributing factor of hard landings and tail strikes due to the black hole effect at night n) The absence of centre runway lights could be a contributing factor on off-centre landings o) Non-standard approach profiles, improperly calibrated visual approach aids ☐ 16D – Develop and implement further SEIs to mitigate the risk of the identified contributing factors, if any, for ARC ☐ 16E – Continuously evaluate the effectiveness of the SEIs
References	– Airbus Preventing Tail Strikes at Landing – Airbus Preventing Tail Strike at Take-off – Airbus Prevention of Unstable Approaches – Boeing Tail Strike Prevention – Embraer And Boeing Production Video *No Landing Is Routine – Brake for Safety, Not for Comfort!* – FSF ALAR Toolkit – IATA, IFALPA, IFATCA, CANSO, Unstable Approaches: Risk Mitigation Policies, Procedures and Best Practices (3rd Edition) – Skybrary Landing Flare – Skybrary Rejected-Landings

2. SYSTEM/COMPONENT FAILURE OR MALFUNCTION (NON-POWERPLANT) (SCF–NP)

Safety enhancement initiative	SEI-17 — Mitigate contributing factors to SCF–NP accidents and incidents at the national level
Stakeholder	States
Related GASP target(s)	1.1; 1.3
Actions	17A – Implement the following SCF–NP safety actions: a) Approve operator maintenance programmes taking into consideration changes to the maintenance programme to reflect operator experience, environment of operation and utilization rate b) Approve operator maintenance programmes to include, when applicable, condition monitoring or condition-based maintenance (CBM), based on predictive maintenance (PdM) c) Establish the requirements for, and ensure oversight of defect control and deviations from the approved minimum equipment list (MEL) d) Establish the requirements for training of operator and maintenance personnel on human factors, environmental protections, root cause analysis, software and firmware updates, and supplier quality assurance (training should encompass proper procedures, handling, and troubleshooting techniques) e) Perform thorough root cause analysis/study to understand the underlying reasons and implement corrective actions f) Facilitate the sharing of continuing airworthiness information between State of Design, State of Manufacture, and State of Registry – Complete the necessary information on Cir 95, *The Continuing Airworthiness of Aircraft in Service* g) Conduct oversight of the supplier's quality assurance (QA) programme h) Establish a programme for the traceability of aviation parts and preventing the installation of parts unsuitable for operations 17B – Validate the effectiveness of the SEIs in the State using data provided by States and industry (apply safety management methodologies) 17C – Identify additional contributing factors, for example: a) Inadequate maintenance practices b) Material defects and quality issues

	c) Environmental conditions d) Deterioration due to ageing components e) Design issues f) Manufacturing deficiencies g) Repair issues h) Repair interval extensions i) Mechanical overload and stress j) Human performance including human factors issues k) Improper handling and shipping of parts l) Deficiencies in maintenance programmes m) Inadequate oversight n) Improper implementation of reliability programs and condition monitoring o) Damage (accidental or environment) p) Failure to adhere to the appropriate SOPs q) Suspected unapproved parts (SUPs) ☐ 17D – Develop and implement further SEIs to mitigate the risk of the identified contributing factors, if any, for SCF–NP ☐ 17E – Continuously evaluate the effectiveness of the SEIs
References	– Annex 6 – *Operation of Aircraft* – Annex 8 – *Airworthiness of Aircraft* – Doc 9760, *Airworthiness Manual* – Cir 95, *The Continuing Airworthiness of Aircraft in Service* – EASA Part-ORO.MLR.105(f)

3. TURBULENCE ENCOUNTER (TURB)

Safety enhancement initiative	SEI-18 — Mitigate contributing factors to TURB accidents and incidents at the national level
Stakeholder	States
Related GASP target(s)	1.1; 1.3
Actions	□ 18A – Implement the following TURB safety actions: a) Establish a requirement for the provision of real-time information related to turbulence b) Establish a programme for enhancing the appropriate provision and distribution of SIGMETs c) Establish a programme for enhancing the appropriate provision and distribution of meteorological reports (aerodrome routine meteorological reports (METAR), aerodrome special meteorological reports (SPECI)) and forecasts (aerodrome forecasts (TAF), trend forecasts) at aerodromes d) Establish routine availability of the World Aeronautical Forecast Systems (WAFS) forecasts for inclusion in in-flight briefings and documentation e) Consider the implementation of wake turbulence re-categorization (RECAT), only if it improves the existing safety criteria f) Consider the application of time or distance-based separation minima, as per Doc 4444, *Procedures for Air Navigation Services — Air Traffic Management* g) Promote the sharing of research, experiences, data, and best practices relating to the forecasting and management of turbulence encounters h) Improve the availability of air-reports, including special air-report (ARS), especially those made routinely and containing quantitative turbulence information (i.e., eddy dissipation rate (EDR)) □ 18B – Validate the effectiveness of the SEIs in the State using data provided by States and industry (apply safety management methodologies) □ 18C – Identify additional contributing factors, for example: a) Seasonality, rough terrain and location b) Weather and convective activity c) Jet stream/clear air turbulence d) Wake vortex

	e) availability of timely weather reporting □ 18D – Develop and implement further SEIs to mitigate the risk of the identified contributing factors, if any, for TURB □ 18E – Continuously evaluate the effectiveness of the SEIs
References	– Annex 3 — *Meteorological Service for International Air Navigation* – Doc 4444, *Procedures for Air Navigation Services — Air Traffic Management* – Doc 8643, *Aircraft Type Designators* (lists the wake turbulence category for each fixed wing aircraft type)

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APPENDIX B

SELECTION OF SEIs AND ACTIONS & ASSIGNMENT OF PRIORITY

SEI Number and Name	Actions	Priority (and why?)

— END —