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**.

— — — — — — — —

APPENDIX A

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)

Safety enhancement initiative	*SEI-2 — Development of a comprehensive regulatory oversight framework*
Stakeholder	*States*
Actions	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) 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) 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)
References	2A — Doc 9734, Safety Oversight Manual, Part A — The Establishment and Management of a State Safety Oversight System 2B and 2C — FAA Inspector Training System — Flight Standards (International) Course — ICAO-Endorsed Government Safety Inspector Training Programme — ICAO Global Aviation Training course catalogue — ICAO Global Aviation Training — iSTARS — Ramp Inspection Programmes (SAFA/SACA)

Safety enhancement initiative	*SEI-3 — Establishment of an independent accident and incident investigation authority, consistent with Annex 13 — Aircraft Accident and Incident Investigation*
Stakeholder	*States*
Actions	3A — Establish an independent accident and incident investigation authority, as per Annex 13 requirements (CE-1 and CE-3) 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) 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)
References	3A — Annex 13, Aircraft Accident and Incident Investigation — Doc 9734, Safety Oversight Manual, Part A — The Establishment and Management of a State Safety Oversight System 3B — Doc 9734, Safety Oversight Manual — Doc 9756, Manual of Aircraft Accident and Incident Investigation — Doc 9946, Manual on Regional Accident and Incident Investigation Organization — Doc 9962, Manual on Accident and Incident Investigation Policies and Procedures — Doc 9973, Manual on Assistance to Aircraft Accident Victims and their Families — Doc 9998, ICAO Policy on Assistance to Aircraft Accident Victims and their Families — Doc 10053, Manual on Protection of Safety Information, Part I — Protection of Accident and Incident Investigation Records — Doc 10062, Manual on the Investigation of Cabin Safety Aspects in Accidents and Incidents — Cir 315, Hazards at Aircraft Accident Sites 3C — Cir 298, Training Guidelines for Aircraft Accident Investigators

Safety enhancement initiative	*SEI-5 — Qualified technical personnel to support effective safety oversight*
Stakeholder	*States*
Actions	□ 5A — Establish an effective system to identify and track qualifications and training of existing technical personnel (CE-4) □ 5B — Identify the gaps in qualified technical personnel and training requirements necessary to implement the oversight mandate (CE-4) □ 5C — Establish a compensation scheme for the attraction and retention of qualified technical personnel (CE-4) □ 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) □ 5E — Establish human resource plans to support hiring and retention of the appropriate number of qualified technical personnel required (CE-4) □ 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) □ 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)
References	— Doc 8335, Manual of Procedures for Operations Inspection, Certification and Continued Surveillance — Doc 9734, Safety Oversight Manual — 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-6 — Strategic collaboration with key aviation stakeholders to enhance safety in a coordinated manner*
Stakeholder	*States*
Actions	6A — Based on the identified hazards and safety deficiencies, establish a mechanism to identify key aviation stakeholders and develop an action plan for the resolution of those safety issues (CE-1 to CE-5) 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 6C — Provide assistance via States, regions and industry to other States for primary aviation legislation development (in coordination with SEI-1B) (CE-1) 6D — Provide assistance via States, regions and industry to other States for the development of national regulations (CE-2) 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) 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) 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) 6H — While working to improve safety oversight, work with RASG and/or RSOO to address national high-risk categories of occurrences
References	6A to 6G — Doc 9734, Safety Oversight Manual — ICAO Technical Cooperation Bureau — RASGs 6H — Appendix B – OPS Roadmap — GASP Library – Regional Aviation Safety Plans

Safety enhancement initiative	*SEI-8 — Consistent implementation of ICAO SARPs at the national level*
Stakeholder	*States*
Actions	□ 8A — Work at the national level to address significant safety concerns as a priority □ 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)
References	— Doc 9735, Universal Safety Oversight Audit Programme Continuous Monitoring Manual — iSTARS safety audit information (ICAO secure portal login required)

Safety enhancement initiative	*SEI-9 — Continued implementation of and compliance with ICAO SARPs at the national level*
Stakeholder	*States*
Actions	□ 9A — Implement licensing, certification, authorization and approval processes (CE-6) □ 9B — Implement regulatory oversight and enforcement processes (CE-7 and CE-8) □ 9C — Establish a system to resolve safety issues identified via accident and incident investigations, surveillance activities, safety reports and other means (CE-8)
References	9A — Doc 8335, Manual of Procedures for Operations Inspection, Certification and Continued Surveillance 9B — Doc 9756, Manual of Aircraft Accident and Incident Investigation 9C — Annex 13, Aircraft Accident and Incident Investigation, Attachment C — List of examples of serious incidents

Safety enhancement initiative	*SEI-11 — Strategic collaboration with key aviation stakeholders to enhance safety in a coordinated manner*
Stakeholder	*States*
Actions	11A — Based on the identified hazards and safety deficiencies, establish a mechanism to identify key aviation stakeholders and develop an action plan for the resolution of those safety issues (CE-6 to CE-8) 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 11C — Provide assistance via RASG and/or RSOO to other States for the conduct of surveillance activities (CE-7) 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) 11E — While working to improve safety oversight, continue to work with RASG and/or RSOO to address national high-risk categories of occurrences
References	11A to 11D — RASGs — RSOOs and COSCAPs 11E — Appendix B – OPS Roadmap — GASP Library – Regional Aviation Safety Plans

1.2 Component 2 — State safety programme

Safety enhancement initiative	*SEI-13 — Start of SSP implementation at the national level*
Stakeholder	*States*
Actions	□ 13A — Secure State-level commitment to improve safety □ 13B — Conduct initial SSP gap analysis (checklist) then the detailed SSP self-assessment □ 13C — Establish an SSP implementation team □ 13D — Develop an implementation plan for the SSP □ 13E — Issue SMS regulations for service providers and verify SMS implementation □ 13F — Identify and share safety management best practices
References	13A, 13B and 13D — Annex 19, Safety Management, Chapter 3 — Doc 9859, Safety Management Manual — Safety Management Implementation Website — ICAO USOAP CMA Online Framework — iSTARS SSP gap analysis (ICAO secure portal login required) — Safety Management International Collaboration Group (SM ICG), 10 Things You Should Know About SMS 13A, 13C and 13E — SM ICG, The Frontline Manager's Role in SMS — SM ICG, The Senior Manager's Role in SMS 13E — SM ICG, SMS Evaluation Tool — CANSO Standard of Excellence in Safety Management Systems 13F — SM ICG, How to Support a Successful SSP and SMS Implementation — Recommendations for Regulators

Safety enhancement initiative	*SEI-14 — Strategic allocation of resources to start SSP implementation*
Stakeholder	*States*
Actions	14A — Establish a process for planning and allocation of resources to enable SSP implementation and identify areas where resources are needed 14B — Obtain resources from national and appropriate authorities' leadership and stakeholders within the State to support SSP implementation 14C — Work with the ICAO Regional Office to make use of available means (e.g. Technical Cooperation Bureau) to acquire assistance needed for SSP implementation 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
References	14A and 14B — Annex 19, Safety Management, Chapter 3 — Doc 9859, Safety Management Manual — ICAO iPACK – Supporting Civil Aviation Entities in Conducting a Training Needs Analysis (TNA) 14C — ICAO Technical Cooperation Bureau regional coordinator 14D — SM ICG, SMS Inspector Competency Guidance

Safety enhancement initiative	*SEI-17 — Availability of safety data and safety information to support safety management activities at the national level (step 1)*
Stakeholder	*States*
Actions	17A — Establish national laws, regulations and policies protecting safety data, safety information and related sources, in accordance with Appendix 3 of Annex 19 17B — Establish a State mandatory occurrence reporting system 17C — 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 17D — Establish and maintain a process to identify hazards from collected safety data 17E — Establish and utilize a process to ensure the assessment of safety risks associated with identified hazards 17F — Establish a State confidential voluntary safety reporting system providing data to the safety database
References	17A to 17F — Annex 19, Safety Management — Doc 9859, Safety Management Manual — Safety Management Implementation Website 17B to 17D — 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 17E — SM ICG, Risk Based Decision Making Principles

Safety enhancement initiative	*SEI-18 — Availability of safety data and safety information to support safety management activities at the national level (step 2)*
Stakeholder	*States*
Actions	□ 18A — Establish the safety objectives to be achieved through the SSP □ 18B — Develop safety performance measurement methodologies, aligned with the regional safety metrics, using the established safety risk management process (see SEI-17E) □ 18C —Develop safety performance indicators and safety performance targets using the established safety risk management process □ 18D — Ensure the establishment of mandatory safety reporting systems by service providers □ 18E — Encourage establishment of voluntary safety reporting systems as part of service providers' SMS □ 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 □ 18G — Contribute information on operational safety risks, including SSP safety performance indicators, and emerging issues, to the RASG
References	18A to 18F — Doc 9859, Safety Management Manual 18A to 18D — SM ICG, A Systems Approach to Measuring Safety Performance — The Regulator Perspective — SM ICG, Measuring Safety Performance Guidelines for Service Providers 18E and 18F — RASG regional safety reports 18G — Secure Portal on Operational Safety Risks and Emerging Issues

Safety enhancement initiative	*SEI-21 — Advancement of safety risk management at the national level*
Stakeholder	*States*
Actions	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 volume, weather information, EI scores, etc.) 21B — Develop risk modelling capabilities to support monitoring system safety issues and accident/incident prevention 21C — Encourage information-sharing with industry
References	21A and 21B — EUROCONTROL Voluntary ATM Incident Reporting (EVAIR) — European Authorities Coordination Group on Flight Data Monitoring (EAFDM) — FAA Aviation Safety Information Analysis and Sharing Program — FAA Aviation Voluntary Reporting Programs — 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)

Safety enhancement initiative	Mitigate contributing factors to the risk of CFIT
Stakeholder	States
Actions	1. Implement the following CFIT safety actions: 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: 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
References	— Annex 6, *Operation of Aircraft* — 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)

Safety enhancement initiative	Mitigate contributing factors to LOC-I accidents and incidents
Stakeholder	States
Actions	1. Implement the following LOC-I safety actions: 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: 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: a. Increase the effectiveness of regulatory oversight b. Improve regulations 5. Conduct continuous evaluations of the performance of the SEIs
References	— Annex 1, *Personnel Licensing* — Doc 10011, *Manual on Aeroplane Upset Prevention and Recovery Training* — 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)

Safety enhancement initiative	Mitigate contributing factors to MAC accidents and incidents
Stakeholder	States
Actions	1. Implement the following MAC safety actions: 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: 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
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* — iSTARS

4. RUNWAY EXCURSION (RE)

Safety enhancement initiative	Mitigate contributing factors to RE accidents and incidents
Stakeholder	States
Actions	1. 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 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, *PANS-Aerodrome* 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: 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
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* — ICAO Global Runway Safety Action Plan — ICAO Runway Safety Team Handbook — ICAO Runway Safety IKit — RASGs

5. RUNWAY INCURSION (RI)

Safety Enhancement Initiative	Mitigate contributing factors to RI accidents and incidents
Stakeholder	States
Actions	1. Implement the following RI safety actions: 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, *PANS-Aerodrome* e. Ensure the use of standard phraseologies in accordance with applicable State regulations and ICAO provisions (e.g. Doc 9432, *Manual of Radiotelephony*) 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: 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
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) — ICAO Global Runway Safety Action Plan — ICAO Runway Safety Team Handbook — ICAO Runway Safety IKit

— — — — — — — —

APPENDIX B

SELECTION OF SEIs AND ACTIONS & ASSIGNMENT OF PRIORITY

SEI Number and Name	Actions	Priority (and why?)

— END —