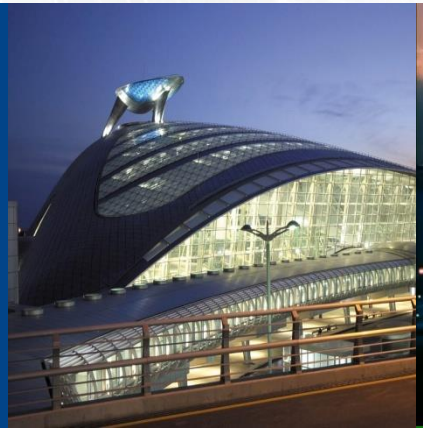
SSP and SMS of ROK Preparation : Focused on SSPIA



5 NOVEMBER 2020 | Korea

국토교통부

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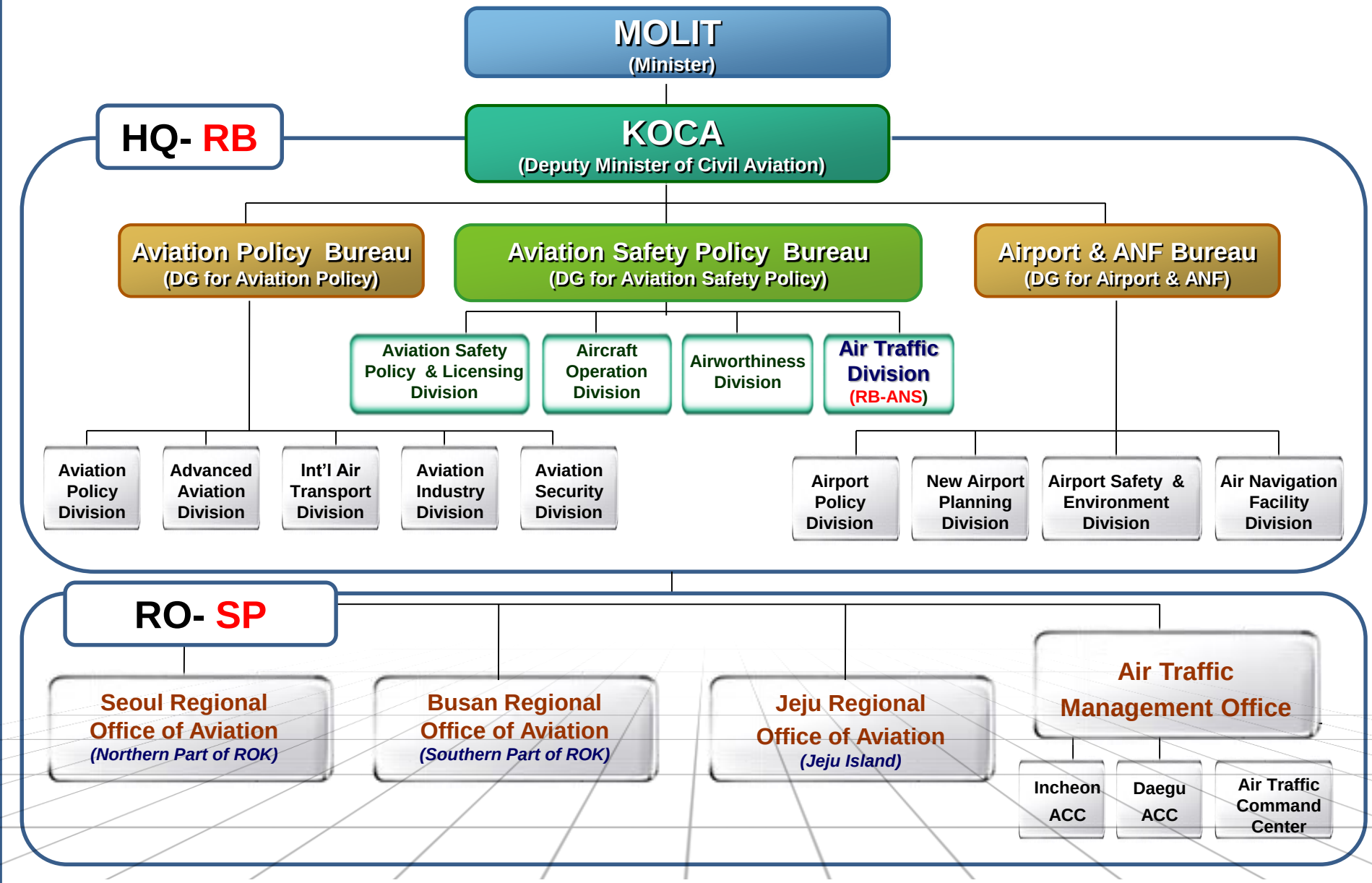
I Civil Aviation Status

KOCA Organizations



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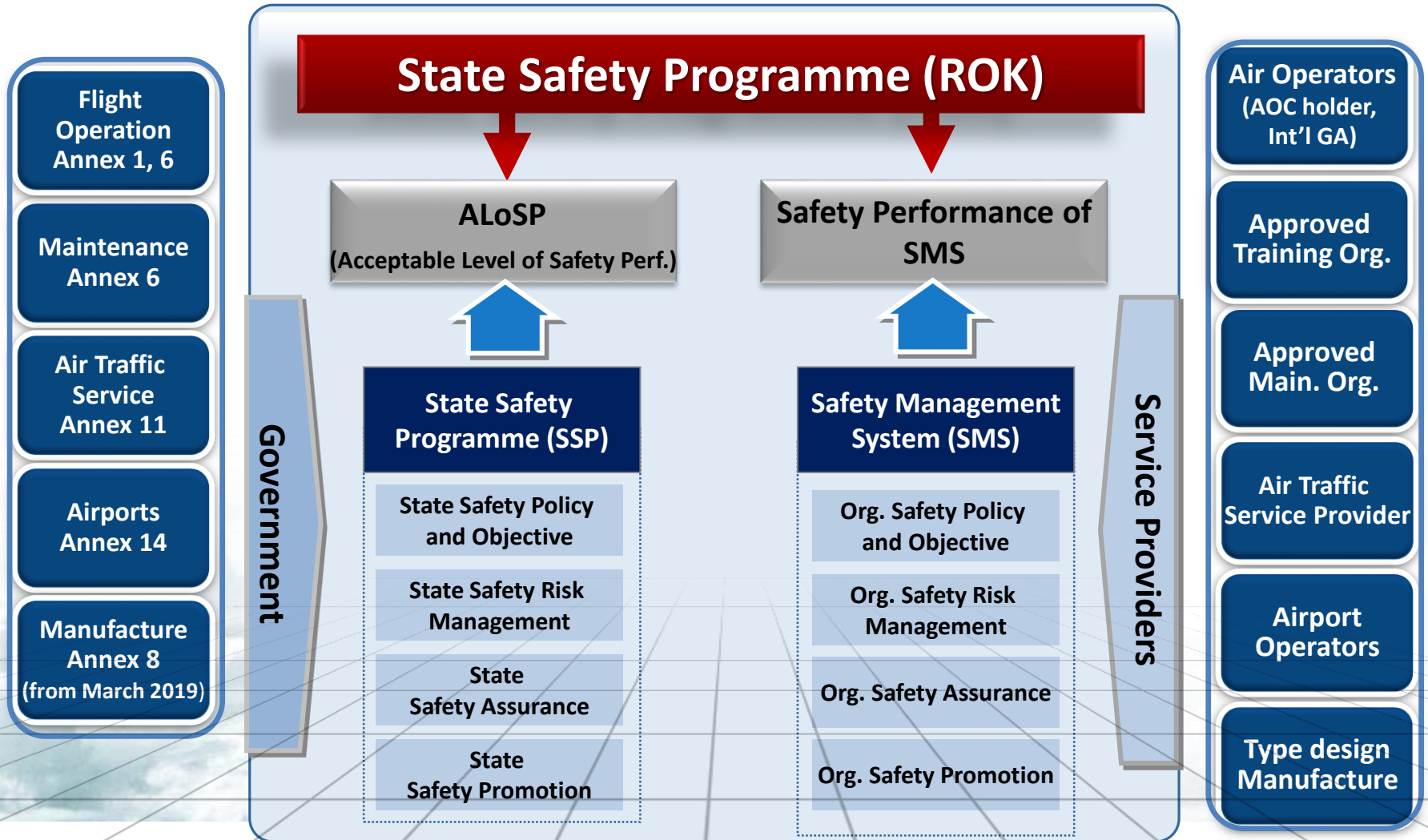
Ⅱ Safety Management System of ROK

Safety Management System

SSP and SMS has implemented since 2008

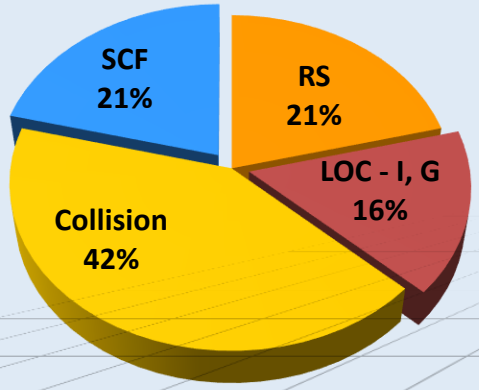


Safety Management System

5 Key Focusing Areas incl. Runway Safety

❖ Based on :

- ICAO 's safety priorities : RWY Safety, Loss of Control, Controlled flight into Terrain
- ROK's safety data driven from recent accidents, serious incidents, some important incidents, etc.



01	Runway Safety	1-1. RWY Excursion, USOS, ARC 1-2. RWY Incursion 1-3. Navigation Error on the Ground 1-4. Rejected Take-off
02	Loss of Control	2-1. Mismanagement of Pressurization Sys. 2-2. Taxiway excursion
03	Controlled Flight into Terrain	3-2. Deviation from SID, STAR, App. Procedure & MSA
04	Mid Air Collision & Ground Collision	4-1. Loss of Separation 4-2. Ground Collision 4-3. Aerodrome (FOD, etc.)
05	System Component Failure	5-1. In-flight Shut Down 5-2. Fire or Smoke caused by SCF 5-3. Diversion caused by SCF

Web based Data Management

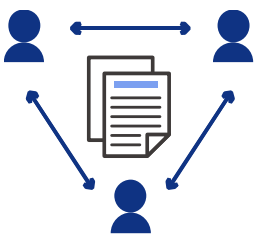
- NARMI
  - Integrated safety database
    - Safety reporting system, etc.
- SMIS
  - Real time monitoring of international & national standards
- FOIS
  - Real time air transport operation info & slot info, aircraft operation statistics
- ADAMS
  - ATC statistics, ATC HR management
- E-AIM
  - Integrated Aeronautical information
    - e-AIP, x-NOTAM, e-TOD, etc.

Proactive Safety Management

BIG DATA Driven Proactive Safety Management

KOREA AVIATION BIG DATA CENTER

Integrated all safety data from various sources



GOVERNENCE

Prerequisites for BIG DATA analysis

- ☑ Standardization
- ☑ Data taxonomy
- ☑ Integration of safety data DB
- ☑ Data protection
- ☑ Letter of Agreement for data sharing

2022
2021
2020
2019
2018

Establishment of BIG DATA Platform

- ☑ Feasibility study
- ☑ Demonstration project
- ☑ Development of technology
- ☑ Data platform
- ☑ Cyber security

2017 — **Safety Data Working Group** — **2022**

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Ⅲ ‘20 Safety Management Activities

‘20 Safety Performance Indicatoers

SSP- ANS field Safety Objectives

Process-oriented: **Enhance Safety Management Capability** through ATS SMS upgrade and risk-based safety oversight

Outcome-oriented : **Maintain ATS-caused Accidents and Serious Accidents to “ Zero”**

< 20 SSP-ANS field Safety Performance Indicators (SPIs)>

(13 Lagging SPIs and 7 Leading SPIs)

CAT	Criteria	SPIs
Lagging Indicators	Ground Safety	Runway Incursion per 100 thousand controlled traffic
		Taxiway Excursion
		Collision on the ground (A/C-A/C and A/C-Vehicle/facility)
		Rejected Take-off
	Airspace Safety	Unmet Separation Minimum (Safety Occurrence)
		Unmet Separation Minimum (all cases)
		Operation below MSA
		Penetration to Prohibited/Restricted/Danger Area
		LHD within RVSM Airspace
		Target level of Safety(TLS) in the FIR

CAT	Criteria	SPIs
Lagging	Coord.	Lack of ATS Coordination
	CNS/ Comm.	CNS Malfunction
		AFTN Message Failure/Error
Leading Indicators	ATS Safety Oversight	Effective Implementation (EI)
		CAP Implementation
	Risk Management	Hazard Identification by ANSPs
		Risk Mitigation Implementation
		Factual Investigation on Safety Occurrence by RB
	Reporting	Internal Safety Reporting of ANSPs
	Airspace Safety	Airspace Hotspot identification & Management by ANSPs

‘20 Safety management promotion plan(1)

SSP- ANS field Safety Objectives

Process-oriented: Enhance Safety Management Capability through ATS SMS refinement and risk-based safety oversight

Outcome-oriented : Reduce ATS-caused Accidents and Serious Accidents to “ Zero”

2020 Key Projects

Reinforcement of Operational Risk Management

① Four key safety risks Focus management

② Risk-based state safety oversight system establishment

③ Strengthen data-based safety risk analysis

④ Controller fatigue management system Introduction

⑤ Reinforced runway safety program to prevent human error

⑥ Prepare preventive measures for public collision warning system advice (ACAS RA)

‘20 Safety management promotion plan(2)

2020 Key Projects

Continuous system improvement

① Preparation for perfect response to ICAO SSPIA

② SMS implementation plan approval

③ For SMS implementation support Development of guidelines

④ Safety between Ministry of Land and Defense Establish cooperation system

⑤ Activate the safety reporting system

⑥ Promote safety culture and share safety policies

⑦ Site safety manager and Strengthening the capabilities of navigation safety supervisors

⑧ Improvement of fact-finding system

‘20 Safety management promotion plan(3)

2020 Key Projects

Improvement of air traffic conditions

① Promote normalization of the Jeju Southern Corridor (A593)

② Capacity increase and safety improvement by improving the Incheon Airport entry and departure system

③ Establishment of conditional air routes for flexible airspace use

④ Gimpo Airport apron control station established

⑤ Building a “data center” for smart air traffic management

⑥ Corona 19 emergency management

‘20 Safety management Activities (1)

Building a foundation for risk-based safety oversight

Strategies	Key Focusing Areas
1. Safety information DB	1-1. Risk profiles of 20 control agencies
	1-2. system analysis
	→ Selecting and prioritizing (important) areas for each organization
2. analysis tool	2-1. selecting and scoring a safety index based on safety data
	2-2. Utilization for analysis of vulnerabilities by institution
	2-3. Determining priority institutions and important items for safety supervision
☞ Establishment of safety information DB and quantitative analysis tools for risk-based supervision such as management	

‘20 Safety management Activities (2)

Improvement of airspace safety diagnosis technique

Strategies	Key Focusing Areas
1. Development of safety diagnosis checklist	1-1. Operate airspace using the latest air traffic data
	1-2. Reflects hotspot characteristics through analysis and presents specific inspection items
	→ Equipment (radar·communication, etc.), Ooperation environment (agreement, airspace·airway environment, business cooperation), Operator (work environment, education and training, etc.), Operation procedure (SOP, abnormal situation, etc.), External environment (weather, safety supervision)
2. Airspace hotspot selection and management	2-1. Investigate overseas (US, Spain, Australia, UK) hotspot operation
	2-2. study cases to derive domestic application plans
	2-3. reflect SMS operating guidelines (commands) such as hotspot definition, selection criteria, management method

☞ **Establishing techniques for discovering and improving potential hazards through monitoring safety of hotspot in Incheon FIR**

‘20 Safety management Activities (3)

Enhancement of safety oversight supervisor

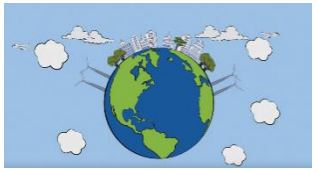
Strategies	Key Focusing Areas
1. Improve understanding of risk-based supervisory techniques	1-1. Participation in specialized training
	1-2. Do case study and review domestic application
	→ <5 principles of risk-based safety supervision in the UK> 1. Establish a supervision plan according to the risk score according to the collection and analysis of safety data 2. Be sure to check how well the safety risks under management by each institution are well controlled. 3. Grouping of safety risk information for selective control of risks urgent management 4. Determine safety issues that need improvement by using a lot of information with different stakeholders 5. Concentrate allocation of resources and budget to areas where improvement effects can be expected among specific high risks

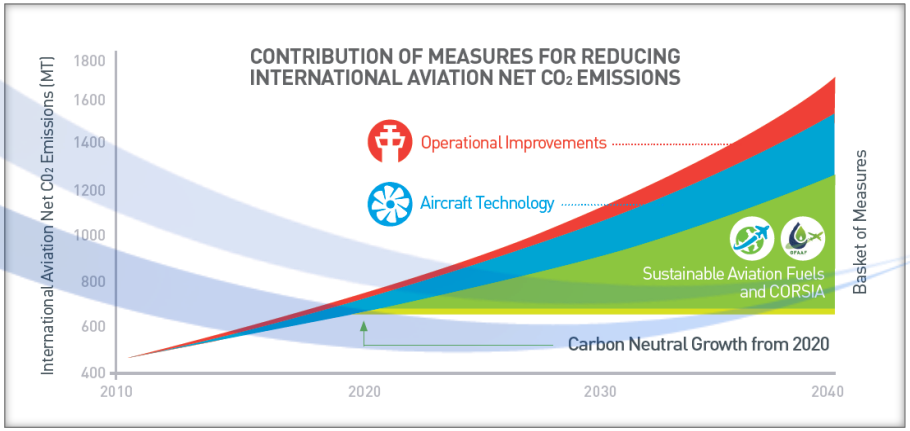
☞ **Promote improvement of domestic safety supervision such as provision and supervision according to risk score**

Environmental Protection

ICAO CORSIA Plan

- ***CORSIA*** *: Carbon Offsetting and Reduction Scheme for International Aviation*





ALL ICAO MEMBER STATES with aeroplane operators conducting international flights are required to monitor, report and verify (MRV) CO_2 emissions from these flights every year from 2019, independent of their participation in CORSIA.

ROK 's CORSIA Implementation Plan

Participate in Pilot Phase from 2021

- CO_2 Emission 11.8M ton (**2.2%** of global Emission) in 2015

* World 7th largest

Establish Legal Framework

- Legislation for Air operator's obligation and CORSIA Implementation

Update National Implementation Plan

- National Emission Monitoring Plan
- Aircraft Technology
- ATM & Operational Improvement, etc.

Internal & external cooperation

- Close cooperation with Aviation Industry and International society

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Ⅳ Preparation for SSPIA of ROK

USOAP Audits

What is ICAO USOAP aduit?

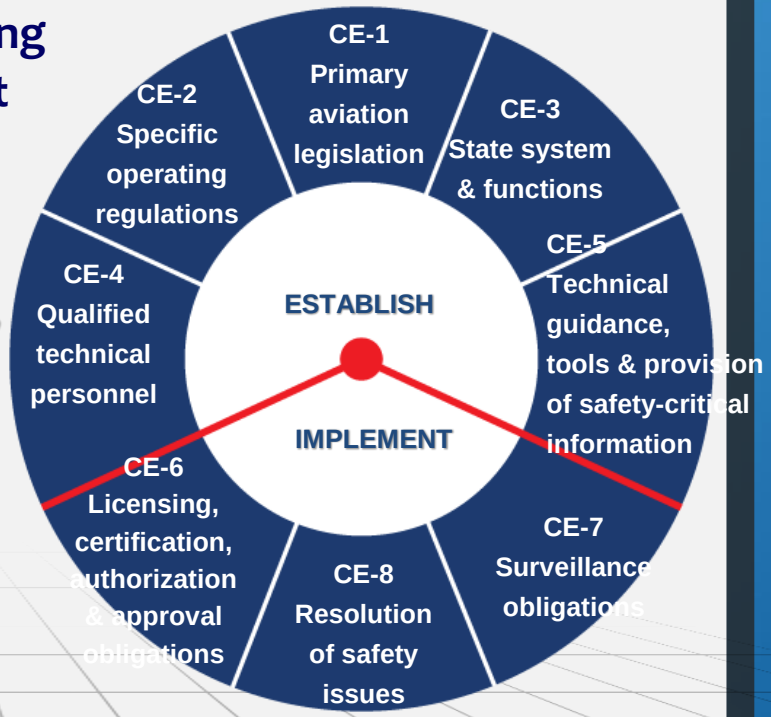
The approach for USOAP audits is based on:

"…the implementation of a structured process and methodology for the planning, preparation, conduct, reporting, follow-up and evaluation of ICAO safety oversight audits, in order to determine States' capability for safety oversight."

USOAP Audits

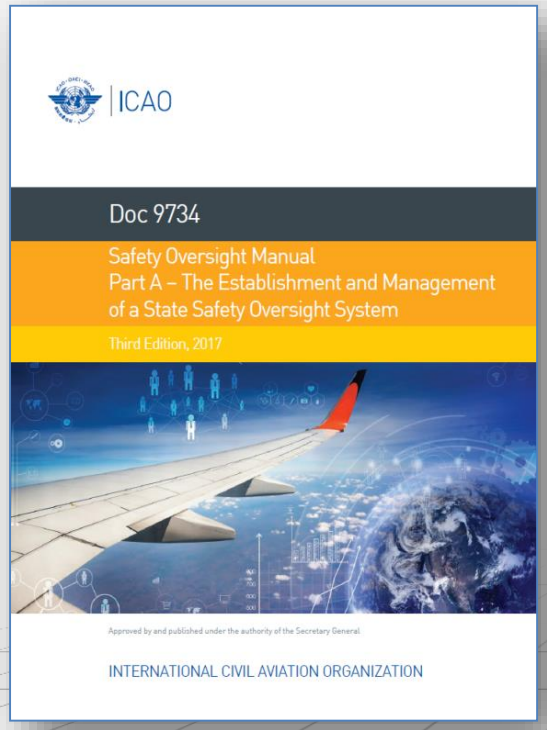
8 Critical Elements (CEs)

- ICAO carries out audits and other monitoring activities to determine the safety oversight capabilities of its Member States by:
- Assessing their effective implementation of the 8 CEs in 8 audit areas (i.e. LEG, ORG, PEL, OPS, AIR, AIG, ANS and AGA) through Protocol Questions (PQs); and
- Verifying the status of the Member States' implementation of:
  - Safety-related ICAO SARPs;
  - Associated procedures; and
  - Guidance material.



USOAP Audits

8 Critical Elements (CEs)



Definitions of CEs: in Annex 19 — *Safety Management*, Appendix 1 (2nd edition, July 2016)

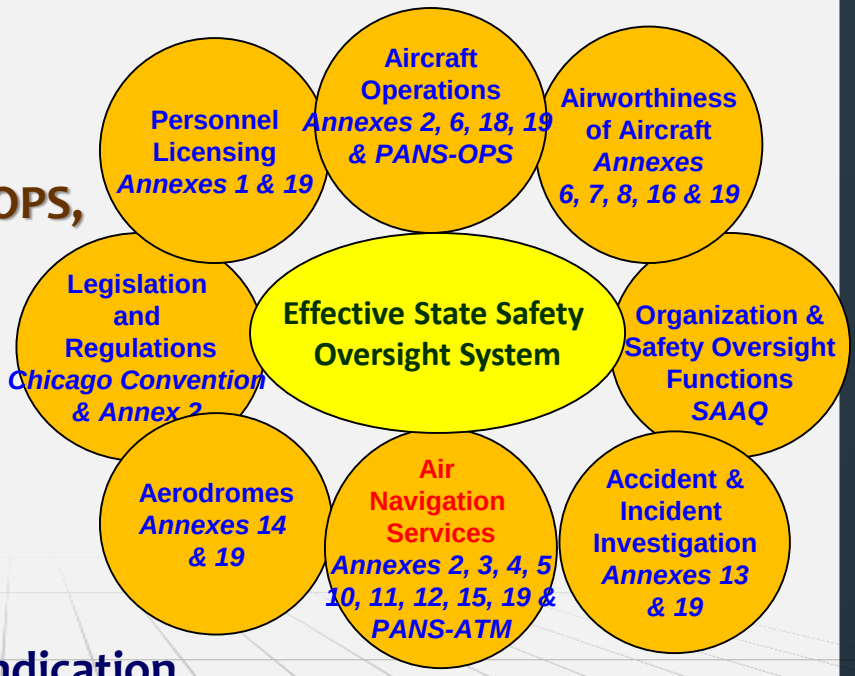
Guidance for CEs:

Doc 9734 — *Safety Oversight Manual*, Part A — *The Establishment and Management of a State Safety Oversight System* (3rd edition, 2017).

USOAP Audits

Audit Scopes and Areas

- Based on ICAO Doc 9735 and MOUs signed between each State and ICAO
- Cover 8 audit areas: [LEG, ORG, PEL, OPS, AIR, AIG, ANS, AGA]
- PQs are main tools used for conduct of audit
- Each PQ is linked to one of the 8 CEs States' safety oversight system
- Effective Implementation (EI) is an indication of States' capability for safety oversight.



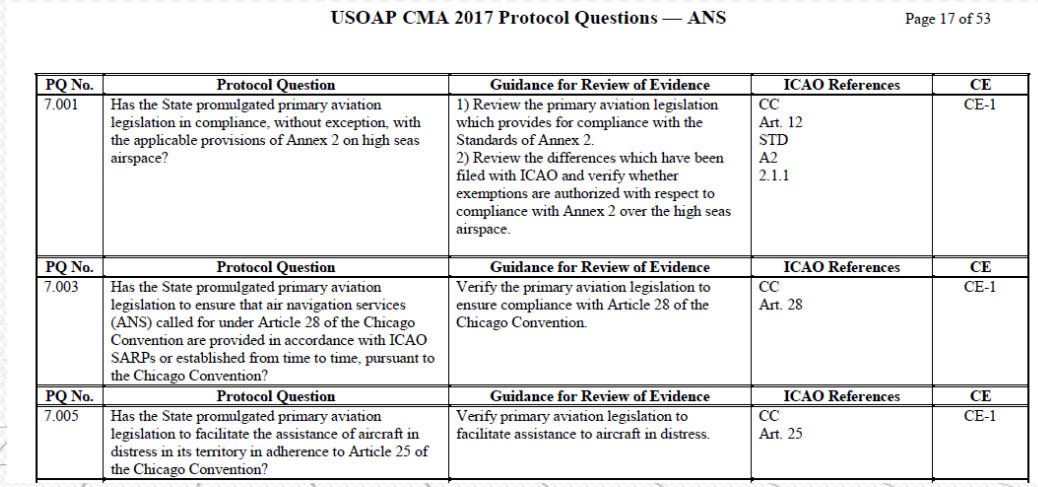
USOAP Audits

2017 edition of the PQs

- With the roll-out of Amendment 1 to Annex 19, a 2017 edition of the PQs was developed on the basis of the 2016 edition and excludes aspects related specifically to the State Safety Programme (SSP)

- For the 2017 edition of the PQs, the total number of PQs is 943 and a breakdown for each area is shown below:

	Area	# of 2017 PQs
1	LEG	23
2	ORG	14
3	PEL	99
4	OPS	146
5	AIR	210
6	AIG	104
7	ANS	179
8	AGA	168
TOTAL NUMBER		943



USOAP CMA 2017 Protocol Questions — ANS

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PQ No.	Protocol Question	Guidance for Review of Evidence	ICAO References	CE
7.001	Has the State promulgated primary aviation legislation in compliance, without exception, with the applicable provisions of Annex 2 on high seas airspace?	1) Review the primary aviation legislation which provides for compliance with the Standards of Annex 2. 2) Review the differences which have been filed with ICAO and verify whether exemptions are authorized with respect to compliance with Annex 2 over the high seas airspace.	CC Art. 12 STD A2 2.1.1	CE-1
PQ No.	**Protocol Question**	**Guidance for Review of Evidence**	**ICAO References**	**CE**
7.003	Has the State promulgated primary aviation legislation to ensure that air navigation services (ANS) called for under Article 28 of the Chicago Convention are provided in accordance with ICAO SARPs or established from time to time, pursuant to the Chicago Convention?	Verify the primary aviation legislation to ensure compliance with Article 28 of the Chicago Convention.	CC Art. 28	CE-1
PQ No.	**Protocol Question**	**Guidance for Review of Evidence**	**ICAO References**	**CE**
7.005	Has the State promulgated primary aviation legislation to facilitate the assistance of aircraft in distress in its territory in adherence to Article 25 of the Chicago Convention?	Verify primary aviation legislation to facilitate assistance to aircraft in distress.	CC Art. 25	CE-1

USOAP Audits

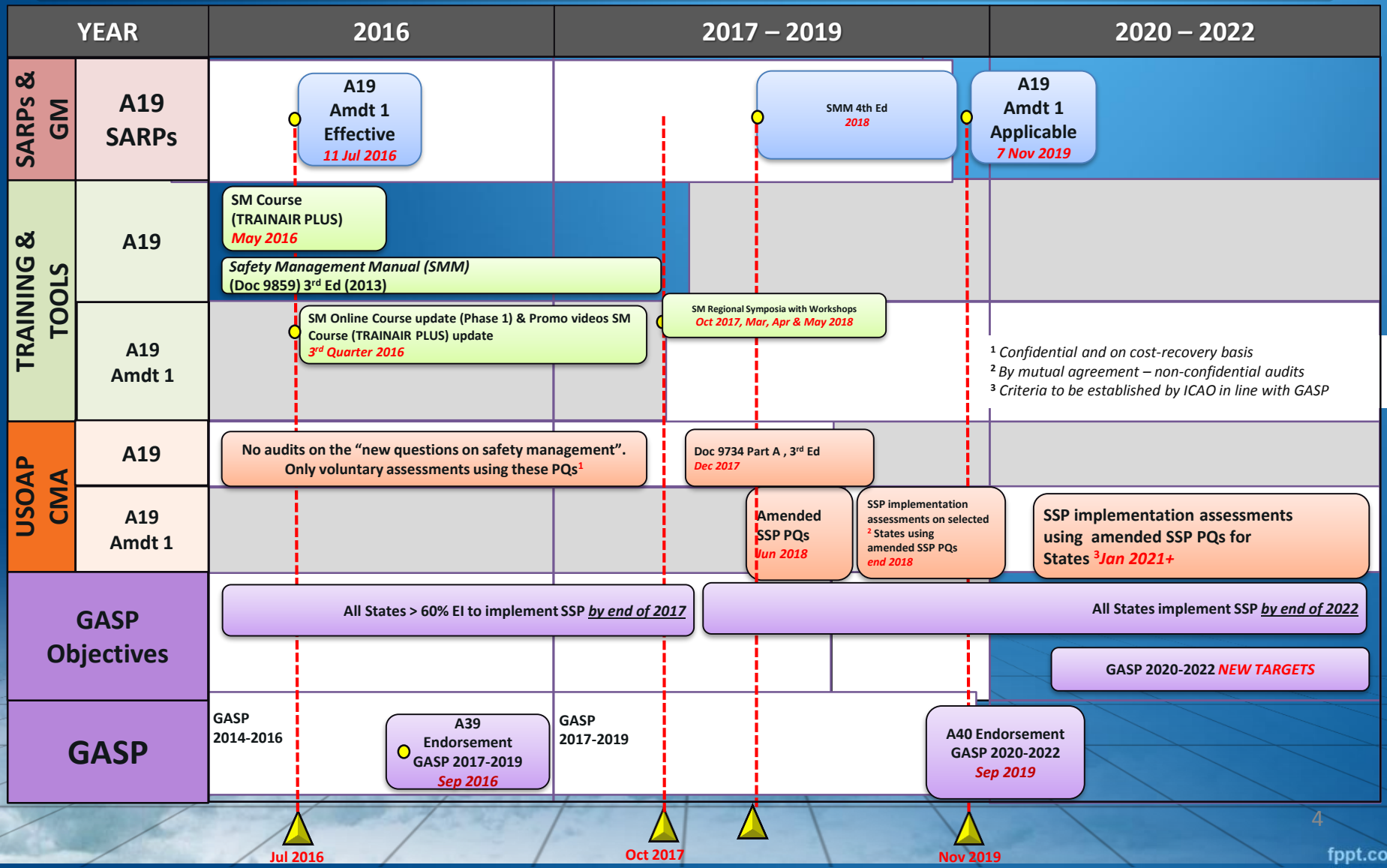
USOAP CMA – ANS Area

- The ANS PQs : Chicago Convention, Annexes 2, 3, 4, 5, 10, 11, 12 and 15 to the Chicago Convention as well as associated ICAO guidance materials
- The USOAP CMA - ANS : legislative and regulatory provisions, including operational and oversight activities, in seven fields, namely:

1) Air Traffic Management (ATM)
2) Procedures for Air Navigation Services — Aircraft Operations (PANS-OPS)
3) Aeronautical Information Services (AIS)
4) Aeronautical Charts (Chart)
5) Communications, Navigation and Surveillance (CNS)
6) Aeronautical Meteorology (MET)
7) Search and Rescue (SAR)

SSP Implementation

Roll-out of SSP Implementation Assessments under USOAP CMA



SSP Implementation Assessment

SSP IA – Amended SSP PQs

- *Reflect* Annex 19 Amdt 1, SMM 4th edition, and lessons learnt from voluntary assessments conducted.
- *Form* a dedicated list of PQs (complementing the PQs on "core" safety oversight and investigation functions).
- *Are not linked* to CEs, but to applicable SSP components (e.g. State Safety Risk Management, State Safety Assurance and State Safety Promotion).
- *Are not assessed* as "satisfactory/non-satisfactory", but in terms of *progress achieved.*
- *Are supported* by references from ICAO manuals.
- *Are classified into 8 areas*:
  GEN (SSP general aspects), SDA (safety data analysis), PEL, OPS, AIR (AMO aspects only), ANS (ATS aspects only), AGA and AIG.

SSP Implementation Assessment

SSP IA : Phase 1 : 2018 - 2020

➢ **SSP implementation assessments will:**

- *Complement*, and *not impact*, the State's Effective Implementation (EI) score.
- Not generate findings.
- Not require the State to submit a "corrective action plan" (CAP).
- Be conducted by a limited pool of assessors, to ensure consistency.
- Use the SSP PQs in selected audit areas (e.g. GEN + SDA + OPS + ANS + AIG).

SSP Implementation Assessment

SSP IA : Phase 2 : Starting 2021

- In due time, a new set of amended SSP PQs may be developed to enable a quantitative measurement of the level of progress achieved by a State for each PQ
- Sufficient guidance is developed to support determination of levels of maturity

❖ Example (still undecided) of maturity levels:

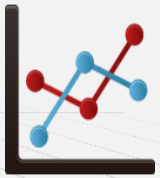
0: not present and not planned

1: not present but being worked on

2: present

3: present and effective

4: present and effective for years and in continuous improvement



Preparation for ROK SSPIA

Background of ROK SSP Implementation Assessment

- In 2016, **ICAO proposed that ROK conduct a voluntary SSPIA** during the SSPIA preparatory phase , if possible, in 2018 or 2019.

- ROK **accepted ICAO's proposal** for a voluntary SSPIA, **but proposed to adjust the assessment period to 2020**, considering the time needed to prepare for the assessment.

- In May 2019, **ROK and ICAO agreed** that the assessment will be conducted in **August 2020**, on a voluntary but non-confidential basis, covering tentatively **aircraft operation(OPS) and air navigation services (ANS).**

Preparation for ROK SSPIA

Preparation Process for SSP Implementation Assessment

01	02	03	04
Apr. 2018 **SSP Gap Analysis**	Aug. 2018 **SSPIA Prep Plan**	May 2019 **ATS SSP/SMS Improvement Plan**	May 2019~ **CMA–ANS T/F**

- Created a **Special Team for SSP Gap Analysis** composed of SMEs in SSP, OPS, ANS, AIR, AIG and AGA
- Used **104 SSP foundation PQs of CMA, and 55 items in SSP Gap Analysis Checklist**

- **Included CAPs on deficiencies** identified through the SSP Gap Analysis
- Set up **a Comprehensive SSPIA Preparation Plan**, including CAPs, establishment of a **T/F and an Implementation Plan,** in all fields of SSP
- Reflected the **results of** 1) the **ANS self assessment on SSPIA dedicated PQs** (Apr. 2019), and 2) the **SSP Gap Analysis** (Apr. 2018)
- Included **the updated State SPIs & SPTs for ANS,** the **top priority projects** and **sectional tasks**
- Established a **CMA-ANS Preparation T/F** comprising experts of RB, ANSPs, military, S&R, Met, etc.
- **Updating the self assessment** on CMA (ANS) PQs
- **Resolving the deficiencies** and implementing the **Improvement Plan**

USOAP-CMA and SSPIA(2020)

< Febrauary >

1. Public-Private Air Traffic Safety Management Council Meeting in Q1

- Day 1 (Diagnosis of Risk Management Effectiveness)

- Day 2 ("SMS safety review and diagnosis in the field of air traffic in 2019)

- Day 3 ("Review of safety performance indicators (proposal) in the field of air transport in 2020)

2. Answers and evidence preparation by itemized safety assessment

3. Air Navigation Safety Assessment Item (PQ) External Expert Advisory Service

4. Review and Approve Safety Performance Indicators and Goals of Air Traffic Service Institutions for 20

USOAP-CMA and SSPIA(2020)

< June >

1. Policy Consultative Meeting to Discuss Current Issues in Civil and Military Navigation (Aircrew Chief of Staff-Vice Air Force Chief of Staff)
2. Revised the Airfield Use Agreement between the Minister of Defense and the Minister of Land, Infrastructure and Transport
3. Conducted Initial Training for Safety Supervisor
4. Conducted Primary Simulation for ICAO SSPIA
5. Safety Oversight of Air Navigation Field
6. Held Public-Private Air Traffic Safety Management Council Meeting
7. Annex 4, 5, 11, and 15 Review CCs (1,471) and PQs (114) (SMIS Input)

USOAP-CMA and SSPIA(2020)

< July >

1. Completion a system analysis Data of 7 air traffic service providers
2. Implementing training for job training for safety supervisors (7.1~)
3. Completed Air Traffic Safety Management System (SMS) Regular Training
4. Create risk profile of 20 SMS Operating Agency
5. Risk-based safety supervision guidelines development research services
6. SMS Effectiveness Diagnosis Checklist Development Research Service
7. Development of safety assessment guidelines for HOTSPOT (HOTSPOT) Research services
8. Development of Safety Supervision Dashboard (ADAMS Maintenance Project)

USOAP-CMA and SSPIA(2020)

< August >

1. **Open regular education and training for air traffic safety management system**
2. **Conference of Related Institutions to Strengthen Public Safety**
3. **Jeju Southern Air Circulation Simulation Research Service (Ministry of Land, Infrastructure and Transport)**
   - **Development of Airspace Safety Diagnosis Technique and Evaluation Tool**
   - **Quantitative airspace safety assessment**

USOAP-CMA and SSPIA(2020)

< September >

1. Safety supervision in navigation field (subportation office, port office)
2. Simulated diagnosis of SSPIA inspection target institution
3. Consultation on final version of Airspace Safety Evaluation Checklist
4. Attending risk-based safety supervision overseas online training (SMS Responsible 1, Supervisor 3)
5. Simulated diagnosis of SSPIA inspection target institution (Air Traffic Headquarters, Field Inspection)

USOAP-CMA and SSPIA(2020)

< October >

1. Based on the results of the review of Annex 4, 5, and 15 CC, the ministry is pushing for a revision of the standards for aviation information
2. Based on the results of the CC review in Annex 11, the revision of the Air Traffic Standards (Ministry of Land, Infrastructure and Transport Notice) is underway.
3. Sharing the results of self-reporting analysis between the Korea Air Traffic Authority and the Korea Transportation Safety Authority
4. In the process of revising the Guidelines for Operation of the Air Traffic Safety Management System (Ministry of Land, Infrastructure and Transport Directive), reflecting the continuous monitoring process

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Thank you