ICAO **ELEVENTH MEETING OF THE REGIONAL AVIATION SAFETY GROUP - ASIA AND PACIFIC REGIONS (RASG-APAC/11)**

(Video Teleconference, 25-26 November 2021 at 10:00-13:00 hrs. Bangkok Time, UTC+7)

Agenda Item 4: **ICAO / Member State / Industry Presentations**

ESTABLISHMENT OF SAFETY RISK MANAGEMENT SYSTEM (SRMS) AND IMPLEMENTATION OF DATA-BASED SMS

(Presented by the Republic of Korea)

EXECUTIVE SUMMARY

This paper aims to share the Republic of Korea (ROK)'s the successful operation and experience in developing safety risk management system with other states, and to emphasizes the importance of safety data, in support of Member States facing challenges in collecting, analyzing, and utilizing risk factors.

Furthermore, in the future, it is proposed to reflect additional details in the ICAO Safety Management Manual (SMM, Doc 9859) safety data collection and processing system.

Action: The Conference is invited to:

a) take note of the information provided herein concerning the development and implementation of data-based safety management system operation for air navigation service providers; and
b) encourage ICAO to provide more detailed and practical guidance in SMM on the methodology for safety data collection, analysis and utilization to ensure the successful safety risk management

1. INTRODUCTION

1.1 ICAO issued the fourth edition of the Safety Management Manual (SMM, DOC 9859) in 2018 to support States in implementing effective State safety programmes (SSP) and ensuring the service providers implement safety manage systems (SMS) in accordance with the provisions of Annex 19. According to SMM, the effective management of safety is highly dependent on the effectiveness of safety data collection, analysis and overall management capabilities. Furthermore, safety data and safety information need to be collected, stored and analyzed at the regional level through the regional aviation safety groups (RASGs) to facilitate the identification of hazards that transcend State borders and to promote collaborative efforts to mitigate safety risks.

1.2 According to SMM(5.2.1.3), States are required to establish SDCPS to capture, store, aggregate and enable the analysis of safety data and safety information to support the identification of hazards which cut across the aviation system. However, ROK government and its ANSPs had considerable difficulties in developing the effective means of safety risk management, in that it would involve bringing safety data from scattered sources that had been accumulated through safety management activities over years into a database, estimate the potential results and make sure there are effective prevention and controls. .

1.3 States must also put in place laws, regulations, processes and procedures to make sure that safety data and safety information identified in Annex 19 are reported and collected from service providers and others to feed the SDCPS. To this end, various agreements had to be made to ensure the use of safety information and data for the purpose of maintaining or promoting safety, and it was also difficult to include information on data and information protection to enable service providers to collect, store, and analyze safety data and information.

1.4 As described in ANNEX 19, the air navigation system and safety cannot exist separately, but rather complement each other for the optimized and sustainable development of aviation. Particularly in the event of an important change to the ATS system, the consistent availability of safety data and safety information is required for effective ATM safety risk management. Thus, Korean government has begun consultations on how to include safety risk management in the ATM change management process to ensure safety and provide systematic support for managing associated safety data.

1.5 In order to identify safety trends and support safety performance management on ATS-related safety events occurred under ROK's jurisdiction, quantitative data management was required for data collection, integrated management, identification of key risks, and potential risk factors, and management's decisions to address safety issues as necessary.

1.6 To this end, the Korean aviation authorities and ANSPs have formed a Safety Management Task force, composed of experts in the air navigation field and begun developing a safety data management system (SRMS[1]) suitable for KOK's operating conditions. Based on about 2,000 safety data produced since the introduction of the SMS in the field of air traffic control in 2008, ROK has succeeded in developing a SRMS over a period of 4 years (2018-2021) to document and systematically manage of all safety data.

1.7 This paper aims to share ROK's experience and know-how in developing SRMS with Member States and suggest that ICAO include detailed guidance in SMM on effective safety risk management through safety data supporting tool and detailed methodology to support Member States and service providers having difficulties in utilizing safety data/information.

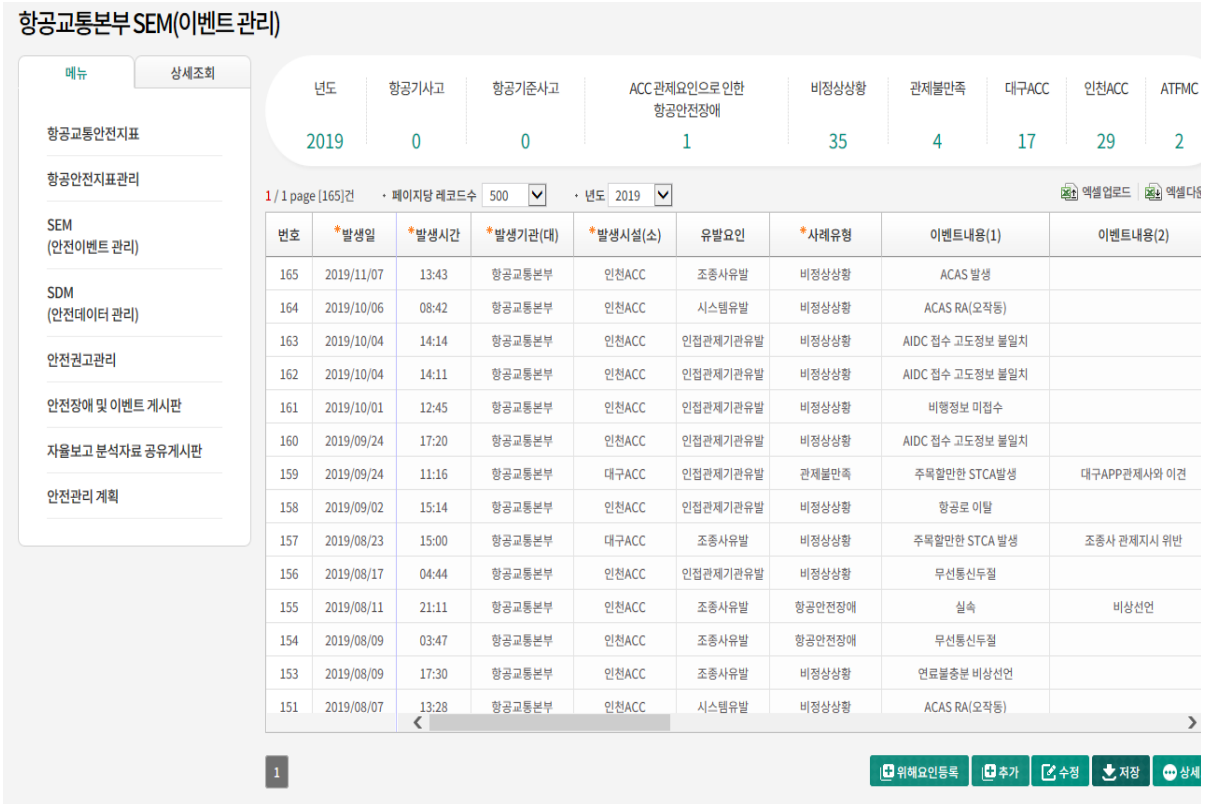
2. FUNCTIONS AND UTILIZATION OF THE SAFETY RISK MANAGEMENT SYSTEM

2.1 The functions of the system are as follows.

2.1.1 **Safety event management.** This function provides, safety managers with support in entering and managing safety events experienced by ANSPs such as aircraft accidents, serious incidents, incidents and abnormal situations.

[1] Safety Risk Management System: A risk management platform for data-based risk management.

[Table-1. Management of aviation event]

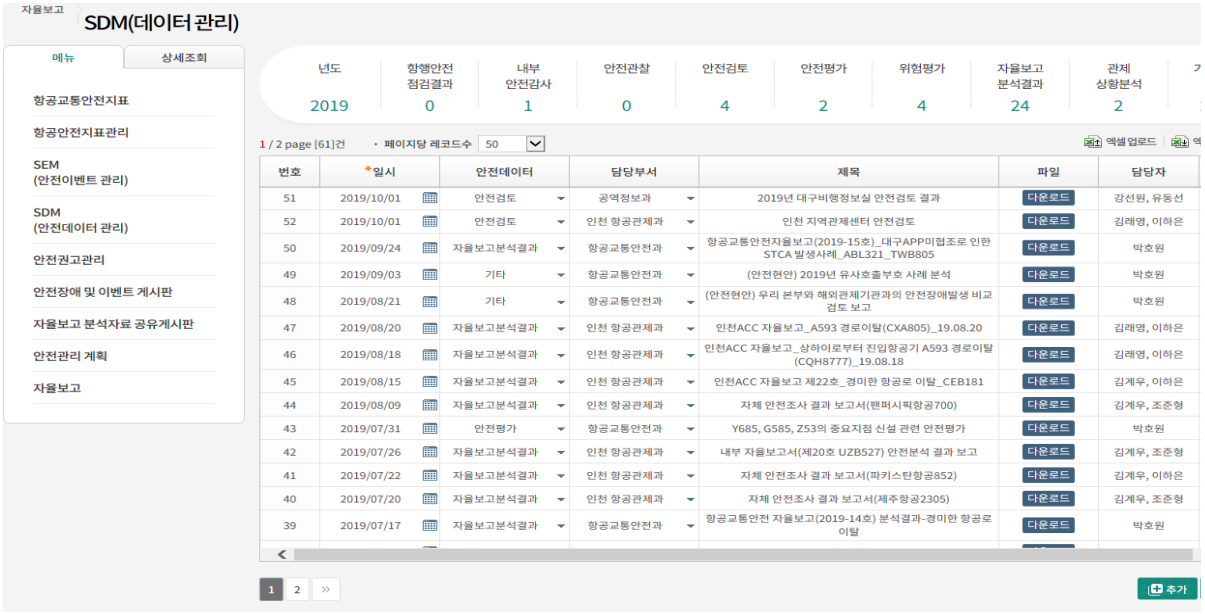


번호	*발생일	*발생시간	*발생기관(대)	*발생시설(소)	유발요인	*사례유형	이벤트내용(1)	이벤트내용(2)
165	2019/11/07	13:43	항공교통본부	인천ACC	조종사유발	비정상상황	ACAS 발생	
164	2019/10/06	08:42	항공교통본부	인천ACC	시스템유발	비정상상황	ACAS RA(오작동)	
163	2019/10/04	14:14	항공교통본부	인천ACC	인접관제기관유발	비정상상황	AIDC 접수 고도정보 불일치	
162	2019/10/04	14:11	항공교통본부	인천ACC	인접관제기관유발	비정상상황	AIDC 접수 고도정보 불일치	
161	2019/10/01	12:45	항공교통본부	인천ACC	인접관제기관유발	비정상상황	비행정보 미접수	
160	2019/09/24	17:20	항공교통본부	인천ACC	인접관제기관유발	비정상상황	AIDC 접수 고도정보 불일치	
159	2019/09/24	11:16	항공교통본부	대구ACC	인접관제기관유발	관제불만족	주목할만한 STCA발생	대구APP관제사와 이견
158	2019/09/02	15:14	항공교통본부	인천ACC	인접관제기관유발	비정상상황	항공로 이탈	
157	2019/08/23	15:00	항공교통본부	대구ACC	조종사유발	비정상상황	주목할만한 STCA 발생	조종사 관제지시 위반
156	2019/08/17	04:44	항공교통본부	인천ACC	인접관제기관유발	비정상상황	무선통신두절	
155	2019/08/11	21:11	항공교통본부	인천ACC	조종사유발	항공안전장애	실속	비상선언
154	2019/08/09	03:47	항공교통본부	인천ACC	조종사유발	항공안전장애	무선통신두절	
153	2019/08/09	17:30	항공교통본부	인천ACC	조종사유발	비정상상황	연료불충분 비상선언	
151	2019/08/07	13:28	항공교통본부	인천ACC	시스템유발	비정상상황	ACAS RA(오작동)	

2.1.2 **Safety Management Dashboard.** This dashboard displays SMS general contents such as automatically aggregated safety indicators and status of indicators and targets achieved, based on databases of aircraft accidents, serious incidents, incidents, and abnormal cases.

2.1.3 **Safety Activity Data Management.** This function supports safety manager to store and utilize safety data generated by safety management activities such as internal safety audit, safety monitoring, safety review, safety evaluation, risk assessment, and voluntary report analysis.

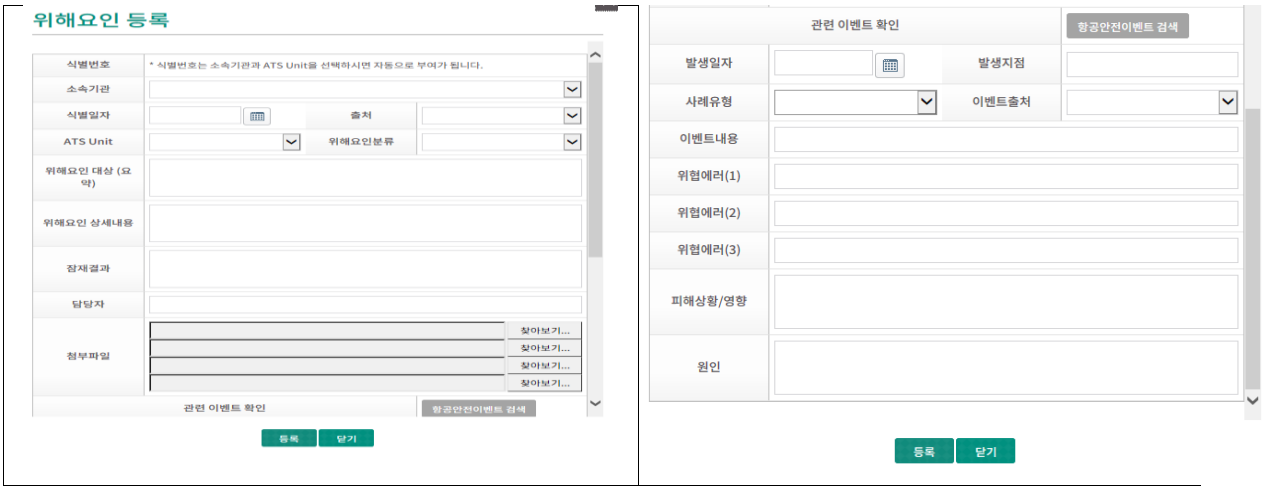
[Table-2. Management of SMS activities]



2.2 Currently, safety managers at ANSPs are implementing safety risk management through data-based decision-making using this system.

2.2.1 **Registration of identified hazards.** Safety managers at ANSPs register hazards identified in safety events and safety evaluations, and share them with safety managers within the institution to move on to the next process.

[Table-3. Registration of identified hazards]



2.2.2 **Data-based Risk Assessment.** Safety managers review the contents and potential consequence of hazards with registered identification numbers in the system and conduct risk assessments. Since the system provides risk assessment matrix and severity and probability classification table corresponding to national regulations, risk assessment can be performed on the system without extra work, and results are also automatically calculated.

2.2.3 **Establishment of Mitigation Measures and Decision-making.** After completing the risk assessment, the safety manager can go to the tracking and action page to fill in the results and mitigation measures according to the automatically calculated output. This can also be shared by all safety managers in the same institution, allowing useful decision-making when discussing safety issues.

2.2.4 **Sharing Monitoring Results of Mitigation Measures.** After a lapse of time following the establishment of the mitigation measures, the safety manager monitors the implementation status of the mitigation measures and registers the results into the system. Since the implementation date of risk assessment/mitigation measures can also be entered, it is easy to trace the beginning point of the monitoring.

2.2.5 **Application to risk management meetings.** Using the risk management status kept in the system, a general safety manager of each institution systematically manages hazards within the organization by discussing mitigation measures and follow-up actions with on-site safety managers through a monthly working-level safety meeting.

2.2.6 **Risk Re-assessment.** Safety managers may re-assess risks through the system if they determine that the mitigation measures established for each hazard alone do not reach the acceptable level of safety performance, or if additional risk assessment is required due to operational changes, all of which can also be shared among safety managers.

[Table-4. Risk assessment, chasing and measurement]

2.2.7 **Hazards Register.** The system includes a list of hazards identified and managed by each ANSPs, risk assessment results, mitigation measures, and monitoring of implementation status in a table format, providing convenience for safety managers in drafting standardized report.

[Table-5. Aviation hazards register]

2.2.8 ROK comprehensively analyzed about 2,000 cases of safety data to establish a SRMS, which led to the selection of Lagging SPIs and Safety Performance Targets (SPTs) to manage key operational risks in the Korean air traffic control sector. The safety performance of ANSPs is being regularly monitored. While ROK's SRMS is designed for air traffic control service providers, it can be used for other service providers in operation and airfields if it is adjusted as appropriate.

2.3 Since ROK implemented data-based proactive and preventive safety management activities using the SRMS that took over four years in development, SPTs for each SPI have been achieved in a stable manner and safety occurrences such as ACAS and runway-related events have also been reduced by more than 40%, a successful performance that exceeds national safety goals.

2.4 The Korean aviation authorities and ANSPs have been periodically identifying hazards and managing the implementation of measures every quarter for systematic safety risk management. The ROK’s SRMS can serve as a useful tool for ensuring the systematic and continuous implementation of key risk management by each service provider.

2.5 In order to use the system more reliably and stably, Korean aviation authorities and its ANSPs are striving to upgrade the system to enhance its completeness and effectiveness by drawing up improvement measures through regular meetings between managers.

3. ACTION BY THE MEETING

3.1 The Meeting is invited to:

a) Take note of the information provided herein concerning the development and implementation of data-based safety management system operation for air navigation service providers; and

b) encourage ICAO to provide more detailed and practical guidance in SMM on the methodology for safety data collection, analysis and utilization to ensure the successful safety risk management

— END —