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AGENDA ITEM 3: AIVIATION SAFETY AND
 AIR NAVIGATION

**CHINA CIVIL AVIATION’S EXPERIMENTATION AND
REFORM ON THE ESTABLISHMENT OF OPERATIONAL
RISK CONTROL SYSTEM IN TRANSPORT AIRLINES**

(Presented by People’s Republic of China)

INFORMATION PAPER

SUMMARY

This paper presents an advisory circular issued by CAAC, i.e. *the Guidance on the Establishment of Operational Risk Control System by Air Carriers* (AC-FS-121-2015-125), which provided airlines with a new kind of theory and methodology related to operational risk control, and with guidance on the establishment and implementation of operational risk control system, and called for risk evaluation for each and every flight operation. The digitalized operational risk evaluation covering the whole operation process enables airlines to systematically analyze the source of dangers in flight operation by focusing on the human, aircraft and environment aspects, indicate the risk levels in numerical value, and develop mitigation measures targeting the key risk elements known from evaluation, thus achieving proactive risk control and providing strong support for the operational

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1. INTRODUCTION

1.1 To provide airlines with guidance on the development and implementation of digitalized operational risk control system which focuses on IT risk management and relies on technology, Flight Standard Department of CAAC officially issued an advisory circular, i.e. the Guidance on the Establishment of Operational Risk Control System by Air Carriers (hereinafter referred to as “the Guidance”) on 28 September 2015, which was designed to provide airlines with standards and guidance on the development and implementation of an operational risk control system.

1.2 The Guidance focuses on the risk management in Safety Management System, and calls for risk evaluation for each and every flight operation. In addition to management policy, review and approval related requirements and other administrative procedures, the advisory circular detailed, among others, the development of risk evaluation index, risk evaluation methods, risk level classification, the establishment of process of risk control system, and sample system functions, which can be used by airlines to develop risk control system based on their own operations.

1.3 With respect to the application of the risk control system, the Guidance obliges air carriers to develop policies on operational risk control, set up experts group on risk control, create a database on the source of operational risks, create a training mechanism for experts and operational staff, identify required system functions and system implementation procedure, develop a mechanism of continuous improvement and foster a safety culture through the establishment of an operational risk control system, thus ensuring on an on-going basis of the system management efficiency.

1.4 In a departure from the operational risk management in the past, the Guidance classifies, in accordance with the systems engineering theory, the broad clutter of operational risk elements into three major aspects involving “human, aircraft and environment”, and created a system of risk evaluation indicators involving the pre-flight and in-flight stages and covering flight crew, aircraft, meteorology, aerodrome and other operational aspects. Through expert evaluation and value assignment, the variety of risk elements are quantified, which added expert experiences into information system and convert these experiences into knowledge, thus enhancing the level of risk control and assisting the growth of young operation control staff.

1.5 With respect to the implementation of the system, except for the two newly established airlines, 49 airlines out of the 51 airlines in Chinese mainland, i.e. 95% percent of the airlines, carried out activities related to the establishment of risk control system, with 21 airlines having already put into trial operation their risk control system. As a forerunner, Hainan Airlines established HNA Operational Risk Control System (HORCS) in 2012, the first of its kind in China, which, after continuous upgrading, is equipped with wide-ranging capabilities of making pre-evaluation three days prior to the flight, conducting in-flight risk monitoring, and making post-flight data comparison. China Southern developed a risk control system compatible with its SMS database, based on the pre-warning mechanism of its current operation control system. It's expected that by the end of 2017, all of the 49 airlines will have finished the establishment of their own operational risk control system.

2. DISCUSSION

2.1 Currently, airlines are using a variety of evaluation methods, including Fuzzy Membership Function, Risk matrix and Support Vector Machines. Calculations will be made on and values be assigned to risks ranging in severity from insignificant to unbearable, producing not only the evaluation results for each risk element, but also the total risk value and level for a flight. During operation in real environment, airlines develop and put in place the most effective mitigation measures in accordance with the risks identified, to conduct closed loop control involving data collection, evaluation of individual risk element, identification of the risk level for flight operation, as well as development and implementation of risk mitigation measures.

2.2 Risk control system is a non-independent system, which shares data with such sub-systems in the operation system as flight crew, aircraft, weather, aeronautical information, terminal and business travel, and which evaluates each flight utilizing internalized risk evaluation system and algorithmic method, based on the automatic extraction of data from various sub-systems. Establishment and implementation of the system usually involves, among others, data quality evaluation, risk evaluation indicators extraction, algorithm model establishment, system data integration, system development, as well as implementation and continuous improvement of the system.

2.3 Decision-making by the risk operation system can't fully replace human judgment, but only approach, to the greatest extent possible, the decision-making level of industry experts, as the system functions as a reminder and support mechanism, not as a tool in place of risk control. The results from the implementation of the system showed that the long-term statistical data related to actual operation can be used as the basis for making judgment of other operation control of system module, and the alteration and optimization of strategies during the operation.

2.4 The establishment of risk control system is central to the nurturing of corporate safety culture. China civil aviation community is keenly aware that fostering a healthy safety culture is the only way to inject the element of risk control consciousness into each and every operational link, thus effectively enhancing the capability of ensuring safe operation.

3. ACTION BY THE CONFERENCE

3.1 The Conference is invited to:

- a) recommend that the concept and experience in the establishment of operational risk control system in China be shared with other administrations.

It is recommended that attention would be paid to the achievements in the application of the risk control system by the airlines in China, be they the achievements in terms of giving a reminder and providing assistance to the front-line staff, or the achievements in terms of providing data support and decision-making evaluation for other activities, and it is strongly recommended that the experience in the establishment of operational risk control system in China be shared with other administrations.

- b) promote the incorporation this working concept and implementation mode into ICAO Annex 6 and Annex 19.

The Guidance on the Establishment of Operational Risk Control System by Air Carriers (AC-FS-121-2015-125) provides airlines with a new kind of theory and methodology related to operational risk control, and with guidance on the establishment and implementation of operational risk control system, calls for risk evaluation for each and every flight operation, and is the concrete application and implementation of SMS safety management concept in the area of operation control. Establishing operational risk control system can also significantly expand the sources of data used in making analysis and judgment related to operation control, and enable comparison and analysis of historical data and current operation data, and even data mining. It can be predicted that, driven by operational risk control system, flight operation management will move further towards big data-based management.

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