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THIRTEENTH AIR NAVIGATION CONFERENCE

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COMMITTEE B

Agenda Item 7: Operational safety risks

7.1 Facilitation of data-driven decision-making in support of safety intelligence to support safety risk management

THE REFORM AND PRACTICE CHINA CIVIL OPERATIONAL RISKS CONTROL SYSTEM

(Presented by China)

REVISION NO. 1

EXECUTIVE SUMMARY

CAAC has provided airlines with a new kind of theory and methodology related to operational risk control, and guidance on the establishment and implementation of operational risk control system through the issuance of an advisory circular, i.e. the Guidance on the Establishment of Operational Risk Control System by Air Carriers (AC-FS-121-2015-125), which make risk evaluation expand to the flight operation control. The digitalized methodology of operational risk evaluation covering the whole operation process enables airlines to systematically analyze the source of dangers in flight operation on the aspects of human, aircraft and environment, and indicate the risk levels in numerical value. At the same time, as for the key risk elements obtained from the evaluation, mitigation measures will be developed, thus achieving proactive risk control and providing strong support for the operational decision-making by airlines.

Action:

- a) promote the incorporation of this working concept and implementation mode into ICAO Annex 6;
and
- b) recommend that the concept and experience in the establishment of

1. INTRODUCTION

1.1 Annex 19 to the Convention on International Civil Aviation, Safety Management, clearly states that “risk management” is the core of a safety management system. Considering that operation control is at the core of the whole operation of the airlines, operation control department is a command

¹ English and Chinese versions provided by China.

center for organizing and implementing flight, and a decision-making and information-issuing organization that integratedly handles abnormal or emergency events. Establishing an effective operational risk control system is a significant reform in risk management of airlines.

1.2 To provide airlines with guidance on the development and implementation of operational risk control system with risk management as the core, informatization technology as the means, and digitalization as the specific form of expression, 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.

2. DISCUSSION

2.1 Contents of reform

2.1.1 The Guidance focuses on the risk management in Safety Management System, specifies risk evaluation into each and every flight operation, 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 creates, with regard to the pre-flight and in-flight stages, a system of risk evaluation indicators 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.

2.1.2 Establishment and implementation of the system usually involves 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. 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, and develop a mechanism of continuous improvement and a safety culture of an operational risk control system, in order to ensure on an on-going basis of the system management efficiency.

2.1.3 The advisory circular includes management policy, the development of risk evaluation index, risk evaluation methods, risk level classification, the establishment process of risk control system, and samples of system functions, which can be used by airlines as a technical example to develop risk control system based on their own operations.

2.2 Practice

2.2.1 With respect to the implementation of the system, 52 airlines in Chinese mainland, i.e. 100% percent of the airlines, carried out activities related to the establishment of risk control system.

2.2.2 Risk control systems have been developed, which is compatible with its SMS database, 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. 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 system modules, and the alteration and optimization of strategies during the operation.

2.2.3 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.

2.3 **Points to note**

2.3.1 The original intention of the risk management system is to make the first-line operators approach to the level of industry experts. As system function is reminder and assistance, the system can not replace the judgment of license holders, and is the digitalized and visualized representation of risk management.

2.3.2 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. The risk control system firstly needs to eliminate the illegal operation that does not meet the operational standards. Then regarding to those decisions that meet the basic operational standards, the digitalized marks are made for the levels of risk such as high, medium and low, and the risk mitigation measures are given according to causes of the risk.

2.3.3 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. **CONCLUSION**

3.1 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 a route to the establishment of operational risk control system. The digitalized risk evaluation for flight operation is the concrete application and implementation of SMS safety management concept in the area of operation control. It is recommended to revise APPENDIX 7. Chapter 2.2 in Annex 6.

3.2 It is recommended that attention 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. It is strongly recommended that the experience in the establishment of operational risk control system in China be shared with other countries.

3.3 **Specific terms to be modified**

3.3.1 Annex 6 APPENDIX 7. Chapter 2.2 “The operator/approved maintenance organization shall develop and maintain a formal process that ensures analysis, assessment and control of the safety risks in flight/maintenance operations.”

3.3.2 The operator/approved maintenance organization shall develop and maintain an numerical and automatical Operational Risk Control System/ formal process that ensures continuous collection, analysis, assessment and control of the safety risks in flight/maintenance operations.

2. Safety risk management

2.1 Hazard identification

The operator/approved maintenance organization shall develop and maintain a formal process that ensures that hazards in operations are identified. Hazard identification shall be based on a combination of reactive, proactive and predictive methods of safety data collection.

2.2 Safety risk assessment and mitigation

The operator/approved maintenance organization shall develop and maintain a formal process that ensures analysis, assessment and control of the safety risks in flight/maintenance operations.

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APP 7-2

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