



WORKING PAPER

FOURTEENTH AIR NAVIGATION CONFERENCE

Montréal, Canada, 26 August to 6 September 2024

Agenda Item 3: Air Navigation System Performance Improvement

3.1: Proposals to improve the efficiency of air navigation services contributing to LTAG

THE GUIDANCE AND SUPPORT OF NATIONAL POLICIES CONTRIBUTE TO THE RAPID DEVELOPMENT OF AIRPORT COLLABORATIVE DECISION MAKING (A-CDM)

(Presented by China)

EXECUTIVE SUMMARY

This paper presents the process of promoting the development and implementation of airport collaborative decision-making (A-CDM) in China. The government provides policy guidance, formulates technical standards and certification procedures, and with the cooperation and support of stakeholders, the A-CDM of large airports can be quickly constructed and implemented, while maintaining harmonization in the A-CDM systems and operation processes of each airport.

Action: The Conference is invited to:

a) Suggest adding successful implementation illustrations and project examples of A-CDM of China in the *Manual on Collaborative Air Traffic Flow Management* (Doc 9971), Part III — *Airport Collaborative Decision Making*, Chapter 4, A-CDM implementation, 4.3-Illustrations of Successful A-CDM Implementation, and 4.4-Examples of A-CDM Projects.

b) In recent years, the states have been striving to promote the development of A-CDM, accumulating a lot of practical experience and applying some new technologies. It is recommended that ICAO consider revising and updating Doc 9971 at an appropriate time, Part III — *Airport Collaborative Decision Making*, Chapter 2, A-CDM partners and stakeholders, and Chapter 3, A-CDM methods and tools.

1. INTRODUCTION

1.1 The fifth edition of the *Global Air Navigation Plan* (GANP, Doc 9750) is designed to guide the evolution of air transport by leveraging existing technologies and anticipating future development based on State/industry agreed operational objectives. Airport collaborative decision-making (A-CDM) is explained as the airport operations component of Performance Improvement Area 1 in the Aviation System Block Upgrades (ASBUs), consisting of two modules: B0-ACDM and B1-ACDM. Each module

¹ Chinese and English versions provided by China.

determines the goals and timelines for operational improvement related to A-CDM technology and procedures.

1.2 The Civil Aviation Administration of China (CAAC) attaches great importance to the development of A-CDM and has fully communicated with stakeholders. It has decided to adopt a model where the government provides policy guidance and the industry provides investment to promote the building and implementation of A-CDM in China.

2. DISCUSSION

2.1 In the first half of 2017, the CAAC conducted extensive research and gained detailed understanding of the information system building and ground operation processes of large airports, the ideas and opinions from airport management authorities, airlines, and ATM entities on the implementation of A-CDM, and the development of A-CDM products by domestic manufacturers as well as their application. Based on the thorough communication with industrial representatives such as International Air Transport Association (IATA) and the China Civil Airports Association, a plan for A-CDM building and implementation was formulated.

2.2 In August 2017, the CAAC issued the *Notice on Further Promoting the Building of Airport Collaborative Decision Making*, clarifying the roadmap for A-CDM building in China:

2.2.1 Airports with an annual passenger throughput of over 30 million shall finish building A-CDM by the end of 2018.

2.2.2 Airports with an annual passenger throughput of 10 to 30 million shall finish building A-CDM by the end of 2019.

2.2.3 Airports whose annual passenger throughput reaches over 10 million recently are expected to finish building A-CDM by the end of the following year.

2.3 In order to standardize the data, operation and working procedures to facilitate stakeholders to carry out A-CDM building, and ensure the harmonization of A-CDM at various airports, CAAC issued three technical documents from June to September 2018: the Implementation Specification for Airport Collaborative Decision Making, the Evaluation Measures for Building of Airport Collaborative Decision Making, and the Guidelines for the Building of Large Airport Operation Coordination Mechanism (Operation Management Committee). Among them:

2.3.1 Implementation Specification for Airport Collaborative Decision Making, as a technical requirement of the A-CDM system, sets out 81 items of core data, 10 necessary functions and 5 extended functions, 45 ground support milestones, data sharing, calculation methods for target off-block time (TOBT) and collaborative release sequencing mode of the A-CDM system.

2.3.2 Evaluation Measures for Building of Airport Collaborative Decision Making, as a certification method for the A-CDM system, specifies the certification process, organizational form, scoring method, etc.

2.3.3 Guidelines for the Building of Large Airport Operation Coordination Mechanism (Operation Management Committee) serve as an important basis for airport management authorities, airlines, and air traffic management (ATM) entities to establish an agency for discussion and coordination. It clarifies the three-level organizational structure (strategy, management, and execution) of the Airport Operation Management Committee and the responsibilities of each level of organization. The workflow of

the six major collaborative operation mechanisms (air-ground collaborative release, flight classification and disposal, operation in adverse conditions, key resource coordination, ground operation surveillance, and operation evaluation improvement), as well as the operational performance management measures (including rewards and punishments).

2.4 CAAC has carried out airport A-CDM certification in accordance with the Evaluation Measures for Building of Airport Collaborative Decision Making. From October 2018 to May 2024, CAAC completed A-CDM certification for 41 large airports, including Beijing Capital, Shanghai Pudong, and Guangzhou Baiyun. When conducting certification, CAAC sends working groups to the airports for on-site inspection of the core data of the A-CDM systems, ground operation milestones, and the use of functional modules. In the meantime, the working groups have access to the regulations, work manuals, meeting records of the airports' Operation Management Committees. After the on-site inspection, the working groups will write evaluation reports and provide feedback on the certification results, findings, and improvement suggestions to the airport management authorities. Through certification, harmonized A-CDM systems and their operation processes at various airports can be ensured.

2.5 In 2017, CAAC launched the building of a civil aviation operation data sharing system. In 2019, the Civil Aviation Operation Data Sharing Platform was put into operation, with a total of 48 domestic transportation airlines, 238 airports (including 41 large airports), ATM entities, and research institutes accessing the platform. The data covers the entire process of flight operations and the platform has the ability to provide the industry with data information services where the data in the entire system can be accessed through one access. At present, the sharing scope covers 11 major categories and 380 items of data, including flight flow management, aeronautical meteorology, ground support resources, passengers, cargo and mail, baggage, real-time aircraft location, emergency resources, etc. The platform supports centralized sharing and exchange of civil aviation operational data, including airport A-CDM data, greatly improving information transmission efficiency.

2.6 In 2021, the CAAC conducted the A-CDM economic benefit evaluation, and selected six large airports in Guangzhou Baiyun, Kunming Changshui, Hangzhou Xiaoshan, Zhengzhou Xinzheng, Dalian Zhoushuizi, and Qingdao Liuting as samples, determined the scope of data collection and economic benefit analysis indicator system and improved cost calculation and overall benefit calculation methods, ultimately developing the A-CDM Economic Benefit Evaluation Report Based on Airport Operation Efficiency Analysis.

2.6.1 The overall revenue situation of 6 sample airports. The project team collected 29 operational data and A-CDM building costs from 6 airports, and calculated 11 economic benefit indicators for each airport, including passenger delay losses, ground taxiing expenses, and critical flight benefits. They compared and analyzed the economic benefits before and after the A-CDM was put into operation at 6 airports, and summarized them to form indirect benefits. After excluding the building costs, the 6 airports achieved an overall revenue of 141.1539 million yuan in 2019.

2.6.2 Estimated overall revenue of other 33 large airports. The project team used data from 6 airports and three prediction models, namely target decision method, KNN classification method, and category classification method, to estimate the overall A-CDM revenue of other 33 large airports in 2019. The estimated overall revenue of 687.7685, 718.2757, and 665.3807 million yuan were obtained, respectively. Further comparative analysis was conducted on the correlation coefficients and variances of the three prediction models, and the target decision method is recommended as the overall estimation calculation method.

2.6.3 The Chinese version of the A-CDM Economic Benefit Evaluation Report Based on Airport Operation Efficiency Analysis can be downloaded from the CAAC website².

2.7 The government has provided clear policy guidance and with the support of the stakeholders, A-CDM implementation in China has been rapidly promoted. As of May 2024, a total of 41 airports in China have implemented A-CDM operations, and the relevant certification information is as follows.

2.7.1 10 airports certified in 2018: Beijing Capital, Guangzhou Baiyun, Shanghai Pudong, Kunming Changshui, Xi'an Xianyang, Chongqing Jiangbei, Hangzhou Xiaoshan, Shenzhen Bao'an, Chengdu Shuangliu, and Shanghai Hongqiao.

2.7.2 27 airports certified in 2019: Nanjing Lukou, Xiamen Gaoqi, Zhengzhou Xinzheng, Changsha Huanghua, Qingdao Liuting, Wuhan Tianhe, Haikou Meilan, Urumqi Diwobao, Tianjin Binhai, Sanya Fenghuang, Harbin Taiping, Guiyang Longdongbao, Dalian Zhoushuizi, Shenyang Taoxian, Jinan Yaoqiang, Nanning Wuwei, Lanzhou Zhongchuan, Fuzhou Changle, Taiyuan Wusu, Changchun Longjia, Nanchang Changbei, Hohhot White Pagoda, Shijiazhuang Zhengding, Ningbo Lishe, Wenzhou Longwan, Zhuhai Jinwan, and Hefei Xinqiao.

2.7.3 2 airports certified in 2020: Yinchuan Hedong and Yantai Penglai.

2.7.4 Airport certified in 2021: Beijing Daxing.

2.7.5 Airport certified in 2024: Chengdu Tianfu.

2.8 Based on the development experience of A-CDM in China, the general approach of the national government to promote the development of A-CDM has been summarized:

2.8.1 Develop a roadmap for A-CDM implementation, specifying the airports that require A-CDM implementation and the time used for finishing the building.

2.8.2 Collaborate with the industry to develop A-CDM technology standards, clarify operation processes, working procedures and data specifications.

2.8.3 Develop A-CDM certification methods, clarify certification methods, processes, etc.

2.8.4 Collaborate with the industry to form an A-CDM certification working group to conduct on-site inspections of airport A-CDM, check the compliance of airport A-CDM with technical standards and provide certification results and improvement suggestions, ensuring the harmonization of A-CDM operations at various airports.

2.8.5 Develop A-CDM performance evaluation methods and continuously evaluating A-CDM performance indicators can help identify potential performance improvement opportunities and continuously improve A-CDM.

3. CONCLUSION

The Conference is invited to:

- a) suggest adding successful implementation illustrations and project examples of airport collaborative decision-making (A-CDM) of China in the *Manual on Collaborative Air Traffic Flow Management* (Doc 9971), Part III — *Airport Collaborative Decision*

² http://www.caac.gov.cn/XWZX/MHYW/202206/t20220629_213893.html

Making, Chapter 4, A-CDM implementation; 4.3, Illustrations of Successful A-CDM Implementation; and 4.4, Examples of A-CDM Projects.

- b) in recent years, the States have been striving to promote the development of A-CDM, accumulating a lot of practical experience and applying some new technologies. It is recommended that ICAO consider organizing the revision of Doc 9971 at an appropriate time, Part III — *Airport Collaborative Decision Making*, Chapter 2, A-CDM partners and stakeholders, and Chapter 3, A-CDM methods and tools.

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