International Civil Aviation Organization

Eleventh Meeting of the Aeronautical Communication Services Implementation Coordination Group (ACSICG/11)

Bangkok, Thailand, 19 - 22 March 2024

Agenda Item 5: AMS and Datalink communication

ATMB CARRIES OUT DATALINK-BASED ALL-PHASE DATALINK ATC SERVICE VALIDATION

(Presented by China)

SUMMARY

Since 2019, the Air Traffic Management Bureau (ATMB) of Civil Aviation Administration of China (CAAC) has carried out flight validation of All-Phase Datalink ATC Service based on the ACARS ATS protocol in Zhengzhou, Guangzhou, Haikou, and Shanghai, exploring the use of avionics equipment capabilities and ground-to-air datalink network capabilities generally available on China civil aviation aircraft to develop on-demand release technology for flight-related flight assistance information, operational risk information, and flight meteorological information, in order to support the China civil aviation in the research and preparation of the Roadmap for the Planning and Implementation of All-Phase Datalink ATC Service (hereinafter referred to as the Roadmap), and explores the development path of hybrid digital and voice applications in China civil aviation.

1. INTRODUCTION

1.1 Since 2019, ATMB has commissioned the Aviation Data Communication Corporation (ADCC) to successfully carry out flight validation of All-Phase Datalink ATC Service based on the ACARS ATS protocol in Zhengzhou, Guangzhou, Haikou, Shanghai and other regions, with the validation covering digitization of similar callsign, hazardous weather warnings for the flight paths, etc., to support the technical feasibility Roadmap's near-term (to 2025) planning objective of fully exploiting the existing system capacity of the China civil aviation to provide digitized emergency contact and information-based services in major airspace.

1.2 In 2024, ATMB will carry out all-phase digital and voice hybrid flight validation in Xinjiang based on the ACARS ATS protocol and FANS 1/A protocol. The design of the flight validation scheme has now been completed, involving 34 categories, >120 commonly used datalink ATC advance commands and flight-related assistance information, covering the tower, approach, and area control

center, to explore the hybrid operation mode of voice and digital control in all-phases of the flight of the China civil aviation, and the synergistic mode of ATC-airline company-airport multiple subjects.

2. DISCUSSION

Avionic Systems

2.1 With regard to the airborne datalink control application protocol, fully explored and utilized the capacity of the existing aircraft airborne system of the China civil aviation, and carry out validation based on the ACARS ATS protocol, which is supported by all the aircrafts of China civil aviation with more than 99 seats and reduces the unnecessary investment in upgrading and reconstruction of the airborne system.

Air-Ground Data-Link Communication Network

2.2 Regarding the ground-air data link network, the above validation is based on the existing VDL Mode 2 and ACARS compatible ground-air data link network of China civil aviation, currently, more than 50% of the aircrafts in China civil aviation over 99 seats support VDL Mode 2, and 100% support ACARS, of which the VDL Mode 2 network covers the airspace of the major airports in China and the major air routes in the Middle East, and it is planned to realize the VDL Mode 2 network coverage of the major transportation airports and air routes of China civil aviation by 2025. ACARS network has already covered major transportation airports and air routes of China civil aviation.

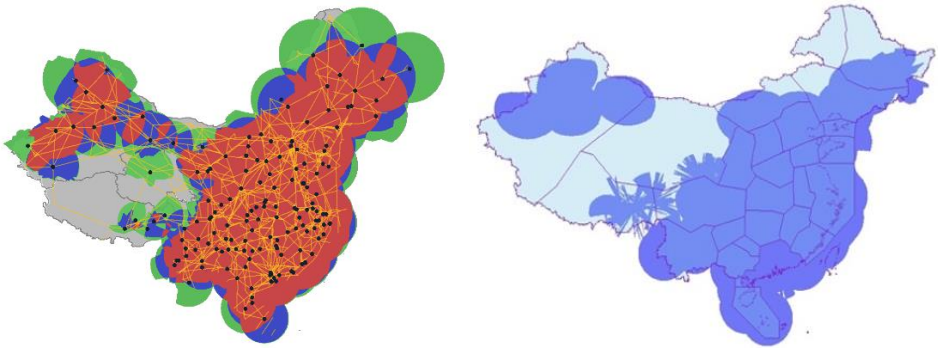

Figure 1 ACARS network and VDL Mode 2 network coverage

ATC Information System

2.3 Regarding to the application validation of datalink similar callsign, the existing control ground automation systems in all regions of China civil aviation have been equipped with similar callsign alert functions. Relying on the results of the previous validation of datalink similar callsign in Zhengzhou and Chengdu, it is proposed to start the promotion of datalink similar callsign alert services based on datalinks this year, upgrading on the basis of the existing automated systems to realize automatic identification of similar callsign within the sectors and automatic release of datalink similar callsign alert information to designated flight crews based on the ACARS ATS protocol.

2.4 With regard to the validation of the application of datalink route hazardous weather warning, based on the actual needs of the control department, upgrading on the basis of the existing control system in Zhengzhou, realizing the release of flight-related turbulence and other flight route hazardous weather warning information publish to the associated crews, and this service has been in

regular operation in the airspace of Zhengzhou since September 1, 2023, with a daily average of 13.13 copies of digitized flight route hazardous weather warning information being published.

Crew Side

2.5 Relying on the ATC ground system, various kinds of datalink control information and emergency communication information are automatically/manually published to the Multi-Function Control Display Unit (MCDU) at the on-board end of the designated flight crew.

Figure 2 Crew-side datalink route hazardous weather warning display

2.6 Area Control Center (ACC) has taken the lead in launching the pilot operation of datalink-based similar callsign alert service since May 1, 2021, and has published 169.70 digitized similar callsign alert messages on average per day. Average delay of 2.32 seconds, with a 97.78% success rate. According to statistics, relying on the digitized similar callsign service, the Zhengzhou area control center can save an average of about 38 minutes of voice calls per day, which effectively reduces the workload of the control and flight crews, and improves the level of safety and security.

2.7 Since August 1, 2022, ACC has started the normalized operation of datalink-based D-FIS (Datalink-Flight Information Service) and emergency communication links in Guangzhou airspace, publishing out 189.11 datalink flight assistance information on a daily average, Average delay of 2.28 seconds, with a 96.84% success rate. which has significantly improved the efficiency of control operation.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper; and

b) discuss any relevant matter as appropriate.

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