



ICAO

*International Civil Aviation Organization***Sixth Meeting of the Asia/Pacific ATS Inter-facility
Data-link Communication Implementation Task Force
(APA TF/6) of APANPIRG**

Web-Conference, 14 – 16 July 2020.

Agenda Item 3: Status of implementation plan focusing those connections identified with priorities**PROGRESS OF AIDC IMPLEMENTATION IN CHINA**

(Presented by China)

SUMMARY

This paper presents the AIDC implementation progress and future plan in China with adjacent ATSUs as well as the issues encountered during the implementation.

1. INTRODUCTION

1.1 In order to make the transfer of aircrafts more efficient and more accurate, reduce the controllers' workload, and minimize Large Height Deviations (LHD), China continues to facilitate the AIDC implementation between domestic ATSUs and with adjacent ATSUs by using Asia/Pacific Regional ICD. China usually adopts ABBREV AIDC mode, mainly depending on core messages.

1.2 To date, China has implemented AIDC operation with Incheon ACC and Khabarovsk ACC (Russia) respectively, and is conducting AIDC technical tests with 4 adjacent ATSUs, namely Ulaanbaatar ACC, Yangon ACC, Vientiane ACC, and Hanoi ACC.

1.3 This paper will report the AIDC implementation progress, future plan in China with Hong Kong China, Taipei China, and adjacent ATSUs, and the relevant issues illustration during the tests.

2. IMPLEMENTATION PROGRESS**Between Sanya ACC and Hong Kong ACC**

2.1 The AIDC through AFTN link between Sanya ACC and Hong Kong ACC had implemented in Feb 2007. The AIDC messages to be exchanged as follows: EST, ACP, TOC, AOC, LRM, and LAM.

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Between Shanghai ACC and Taipei ACC

2.2 The AIDC through dedicated line between Shanghai ACC and Taipei ACC had implemented in 2013. The AIDC messages to be exchanged as follows: EST, ACP, TOC, AOC, LRM, and LAM.

Between Guangzhou ACC and Taipei ACC

2.3 The AIDC through dedicated line between Guangzhou ACC and Taipei ACC had implemented in 2013. The AIDC messages to be exchanged as follows: EST, ACP, TOC, AOC, LRM, and LAM.

Between Dalian ACC and Incheon ACC

2.4 China and Republic of Korea commenced AIDC test through dedicated line between Dalian ACC and Incheon ACC in 2014 and implemented in October 2016. The AIDC messages to be exchanged as follows: ABI, EST, ACP, TOC, AOC, LRM, and LAM.

Between Guangzhou ACC and Hong Kong ACC

2.5 Initial AIDC tests between Guangzhou ACC and Hong Kong ACC carried out in June 2017 and implemented in May 2018.

Between Shenyang ACC and Khabarovsk ACC

2.6 Shenyang ACC has implemented automatic handover with Khabarovsk ACC based on OLDI in October 2019 through dedicated line.

Between Beijing ACC and Ulaanbaatar ACC

2.7 China and Mongolia AIDC exchange meeting was held at Ulaanbaatar in November 2014. The meeting discussed the implementation procedure and decided ABBREV AIDC mode based on AFTN link.

2.8 The software and hardware upgrade of Beijing ACC ATM system was completed in April 2016 to support AIDC ICD Version 2.0 capability and part of AIDC Version 3.0.

2.9 Beijing ACC and Ulaanbaatar ACC had commenced AIDC tests since June 2016. AFTN connection and EST message exchange tests were conducted successfully. A software defect of Beijing ACC ATM system was encountered, which is Optional Data Field (ODF-3) in AOC message header is missing. This issue has been fixed by installing the patch on the ATM system in 2017.

2.10 In April 2019, the Beijing ACC ATM system (Eurocat-X) upgraded to version 9 for the operation of Daxing airport. Meanwhile, it brought multiple features enhancement, including TOC message processing. China plans to use the new ATM system to continue AIDC test with Ulaanbaatar ACC. The operational trial is expected to be finished in Q4th 2020.

Between Kunming ACC and Yangon ACC

2.11 China and Myanmar AIDC exchange meeting was held at Yangon in February 2017. The meeting discussed the implementation procedure of AIDC between Kunming ACC and Yangon ACC and next step.

2.12 Initial AIDC tests between Kunming ACC (NUMEN-2000) and Yangon ACC have been carried out in March 2017. The issues were found in the tests as below:

- Rejected EST message by Yangon due to Error messages 57 (No ASSOCIATED FPL or FPL NOT PREAC);
- Latency of existing AFTN network; and
- The failure of AIDC process due to insufficient surveillance coverage;

2.13 China plans to conduct another AIDC test with Yangon ACC after improving ATS surveillance coverage at the coordination point done by Myanmar.

Between Kunming ACC and Vientiane ACC

2.14 China and Lao PDR AIDC exchange meeting was held at Vientiane in February 2017. The meeting discussed the implementation procedure of AIDC between Kunming ACC and Vientiane ACC and next step.

2.15 AIDC tests between Kunming ACC (NUMEN-2000) and Vientiane ACC (TopSky-C) commenced in December 2018, adopting ABBREV AIDC mode based on AFTN link. The issues were found in the tests as below:

- Rejected ABI & EST message by Vientiane due to metric altitude values (TopSky-C only support imperial altitude values);
- Rejected ABI message by Vientiane due to missing the Route field (ICAO ATS Field 15), the received LRM invalid text is “FPL NOT PREAC”;
- Rejected AOC message by Vientiane due to missing Optional Data Field 3 (ODF-3) of the AFTN message header; and
- Latency of existing AFTN network, the average latency is 68 seconds, maximum up to 321 seconds;

2.16 The issues related to the data field missing and metric altitude values have been solved through the installation of the patch on the ATM system. The issue of latency has not yet been solved. China continues to work with Lao PDR on a solution to mitigating the latency.

Between Sanya ACC and Hanoi ACC

2.17 China and Vietnam conducted AIDC technical test between Sanya ACC and Hanoi ACC in 2019. An issue was found which due to the ODF-2 missing in LAM message header, the ATM system in Hanoi ACC can't process LAM message.

2.18 In 2020, the new ATM system which supports AIDC ICD Version 3 capabilities in Sanya ACC will put in operation. China expects to conduct another AIDC test with Hanoi ACC in Q4th 2020 until the operation of the new ATM system has completed.

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Between Nanning ACC and Hanoi ACC

2.19 Based on the mutual benefits that AIDC will bring to ATM operations, China plans to promote implementation procedure of AIDC between Nanning ACC and Hanoi ACC. The relevant matters are willing to be discussed in Q4th 2020.

Between Lanzhou ACC and Ulaanbaatar ACC

2.20 ATM coordination meeting between China and Mongolia was held at Xian in September 2019. Lanzhou and Ulaanbaatar both agreed to implement the procedure of AIDC, and preparatory work is expected in Q3rd 2020.

Summary Table

2.21 AIDC implementation with adjacent ATSUs is summarized in the table as below:

Location of AIDC end system	Correspondent location	Technical Test commencement	Implementation date	AIDC messages used	Media used	Remarks
Sanya	Hong Kong	2007	2007	EST, ACP, TOC, AOC, LRM, LAM	AFTN	
Shanghai	Taipei	2013	2013	EST, ACP, TOC, AOC, LRM, LAM	Dedicated Line	
Guangzhou	Taipei	2013	2013	EST, ACP, TOC, AOC, LRM, LAM	Dedicated Line	
Dalian	Incheon	2014	Oct.2016	ABI, EST, ACP, TOC, AOC, LRM, LAM	Dedicated Line	
Guangzhou	Hong Kong	Jun 2017	May.2018	EST, ACP, TOC, AOC, LRM, LAM	AFTN	
Shenyang	Khabarovsk	May 2019	Oct.2019	ABI, ACT, PAC, REV, MAC, LAM, HOP, ACP	Dedicated Line	
Beijing	Ulaanbaatar	Nov.2016	TBD	EST, ACP, TOC, AOC, LRM, LAM	AFTN	Operational trial is expected to be completed in Q4 2020
Kunming	Yangon	Mar.2017	TBD	TBD	AFTN	
Kunming	Vientiane	Dec.2018	TBD	TBD	AFTN	
Sanya	Hanoi	2019	TBD	TBD	AFTN	Technical test expects in Q4 2020
Nanning	Hanoi	TBD	TBD	TBD	TBD	
Lanzhou	Ulaanbaatar	TBD	TBD	TBD	TBD	

3. IMPLEMENTATION ISSUES

3.1 Through the tests with adjacent ATSUs, the latency of the existing AFTN network which can reach 15-20 seconds was observed at times, however, the ATC controller’s demand is less than 5 seconds. With the increasing number of flights, the latency will be much longer. An amount of failures of the AIDC process grow and the benefits of AIDC reduce. In practice, dedicated lines can be used for AIDC, but if we use more dedicated lines, the structure of the network will become more complicated. For example, after the switch of the master & backup system, additional equipment and work procedures need to switch the dedicated lines. On the other hand, by analyzing the latency factor, optimizing the existing AFTN network and upgrading exchanges of AFTN messages on ATN, the latency can be reduced.

3.2 Some issues were reported regarding the Optional Data Field missing in AIDC message headers, especially for ODF 2 and 3. According to the AIDC ICD Ver. 3, ODF 2 and 3 have been defined for computer applications to convey message/data unit identification and message/data unit reference information, respectively, and can greatly improve the accuracy of AIDC message processing. So even each ATM system has a different processing mechanism, these two optional fields should be applied for the best.

3.3 AIDC has been widely used for electronic handover between adjacent FIRs in the Asia-Pacific region, effectively reducing controllers’ workload, and significantly enhancing safety in air traffic management. Generally, in the bilateral letter of agreements (LOA) of AIDC, the Transfer of Control Point (TCP) or the common FIR boundary shall be determined. However, there is no definite LOA in electronic handover between ACC and its regional airports. To realize the application for this situation, China has formulated the standard for FDR data exchange to tackle it, by carrying out tests and verification between Yunnan FIR and Xishuangbanna/Dali Airport. In addition, it provides the allocation function of Calculate Take-Off Time (CTOT) and SSR code. According to the operational statistics, each flight could reduce 1-minute voice communication time per day on average.

4. ACTION BY THE MEETING

- 4.1 The meeting is invited to:
- a) note the information contained in this paper; and
 - b) discuss any relevant matter as appropriate
