International Civil Aviation Organization

Twenty Fifth Meeting of the Communications/ Navigation and Surveillance Sub-group (CNS SG/25) of APANPIRG

Video Tele-Conference, 18 – 22 October 2021

Agenda Item 7: Automation

7.1 Review Report of the Second Meeting of ATM Automation Systems Task Force (ATMAS TF/2);

REVIEW REPORT OF THE SECOND MEETING OF ATM AUTOMATION SYSTEMS TASK FORCE (ATMAS TF/2)

(Presented by the Secretariat)

SUMMARY

This paper presents the report of the Second Meeting of ATM Automation Systems Task Force (ATMAS TF/2), which was held using Video Tele- Conference (VTC) from 14 to 16 September 2021, for review and action.

1. INTRODUCTION

1.1 The Second Meeting of the Asia/Pacific Air Traffic Management Automation System Task Force (ATMAS TF/2) was held from 14-16 September 2021 via Video Tele-Conference (VTC) using Microsoft Teams.

1.2 The meeting was attended by **143** participants from **17** States/Administrations, **3** International Organizations, namely Bangladesh, China, Hong Kong China, Fiji, India, Indonesia, Japan, Malaysia, Nepal, Pakistan, Philippines, Republic of Korea, Singapore, Sri Lanka, Thailand, USA, Viet Nam, CANSO, IATA, IFALPA and **1** System Provider from the industry, the Second Research Institute of CAAC (CASRI).

1.3 The ATMAS TF/2 meeting considered **Twelve** (12) Working Papers, **Eleven** (11) Information Papers and **One** (1) Presentation under its **Eight** (8) Agenda Items. The meeting report, working papers, information papers and other resources can be accessed at https://www.icao.int/APAC/Meetings/Pages/2021-ATMAS-TF-2.aspx

2. DISCUSSION

Outcomes of SURICG/6 (WP/06)

2.1. The meeting reviewed the main points of the report of the Sixth Meeting of the Surveillance Implementation Coordination Group (SURICG/6), and discussed and agreed that the implementation of conspicuity code (Mode A code 1000) in ATM Automation Systems is necessary to

support Mode S operations in the Region. China informed that the ATM Automation System Implementation and Operations Guidance Document (ATMAS IGD) had already provided the recommendation for the ATM Automation Systems on implementation of conspicuity code.

Outcomes of APAC Webinars (IP/02)

2.2. The meeting reviewed the relevant information and updates with the key outcomes of 4 webinars related to CNS, i.e. ICAO APAC Cybersecurity Webinar, Webinar on Implementation of CRV in APAC region, SWIM workshop, and Webinar on Implementation of ADS-B. The ICAO Secretariat agreed that it would be possible to hold a webinar about ATM Automation Systems in 2022.

Repository of the ATMAS in APAC (WP/05)

2.3. To follow up ACTION ITEM 1-1 of ATMAS TF/1: Develop a table to list the current ATMAS status for all states for this task force to establish a repository of the ATM automation systems implemented by States, Indonesia proposed a draft Table of Current ATMAS Status for all States and invited States/Administrations to review and provide inputs to this regional repository. The meeting suggested that the table should make reference to the revised version of the ATMAS IGD and agreed to create an ad-hoc group led by Indonesia, including China, Hong Kong China, Republic of Korea, and Singapore with support of the ICAO Secretariat to consider the suggestions provided by the meeting and work out a revised version of the table before conduct a survey.

Air Traffic Management Automation System Problem Reporting Database (WP/07)

2.4. Hong Kong, China has taken up the action item from ATMAS TF/1 on studying the feasibility of expanding the ADS-B Avionics Problem Reporting Database (APRD) to cover the report and sharing of ATMAS-related problems by States/Administrations in APAC region. Hong Kong China provided a detail proposal to expand the existing APRD with pages, and concluded that it is technically feasible and cost-effective to implement ATMAS PRD by leveraging the framework and hardware resources of APRD with no additional hardware resource requirement. The meeting agreed that China, Hong Kong China, and Indonesia create an ad-hoc group with support of the ICAO Secretariat to further progress the development of ATMAS PRD and consider including AIDC implementation issue as well.

Current Status and Promotion Plan of the DMAN/AMAN in Incheon International Airport for Enhancement of ATM Automation System (IP/11)

2.5. ROK presented the enhancement plan in Incheon International Airport to set up more efficient information gathering environment with Enhancing Arrival Manager (AMAN) and Departure Manager (DMAN) system which are integral components of ATM automation system. The current status, direction of enhancement, and the expected effects of the Incheon Airport DMAN/AMAN system were further explained.

Application of Flight Data Exchange in ATM Automation System (WP/12)

2.6. China introduced the industry standard document MH/T 4029.3 "Civil Aviation Air Traffic Control Automation System - Part 3" to solve the problem of data synchronization and interaction between ATM automation systems. The definition, application, and benefits of MH/T 4029.3 to exchange fight data in ATM Automation Systems were shared. The meeting agreed that information on the MH/T 4029.3 should be translated into English by China for better understanding by other Member States/Administrations before conducting a demand survey on such standard if needed.

Exploration and Realization of Efficient Utilization of SSR Codes (IP/05)

2.7. China introduced a "One Code to the End" path used in China to maximally maintain the

same SSR code for a flight and reduce the conflict of code, and pointed out it will reduce the multiplex rate of the spatial dimensions. In order to solve the problems of code shortages, the spatial dimension distribution strategy suitable for China and the measures used to improve the utilization rate of the SSR code in the spatial dimension including borrow SSR code, orientation distribution of SSR code, and SSR code sharing with experiences in Chengdu were introduced.

Open ATM – A New Approach to Future ATM Systems (WP/10)

2.8. Singapore presented the likely trends in future ATM development - Open ATM. Singapore introduced the concept of Open ATM and explained the benefits of the Open ATM with comparing to the original ATM Automation Systems. Open ATM uses open standards and technologies to partition the ATM system into several discrete functions which is highly maintainable, testable, and potential supplied by different parties. The meeting was informed that Singapore and the industry are working on exploration of Open ATM together.

Exploration on the Application of Mode S DAPs in Safety Net of ATMAS (IP/06)

2.9. China introduced the research and practice of using Mode S downlink aircraft parameters (DAPs) which enhances the safety net of ATMAS based on trajectory prediction, detects air-ground inconsistency, and reduces the instruction deviation events caused by human factors. The existing problems of DAPs, such as BDS SWAP should be considered to avoid nuisance and false alerts were summarized.

Benefits of an Integrated Arrival and Departure Manager (IP/03)

2.10. Singapore presented Singapore's implementation of an Arrival Manager (AMAN) integrating with the Departure Manager (DMAN) and highlighted the benefits of an Integrated AMAN DMAN (IAD) which was successfully implemented in June 2021 in Singapore where both arrival and departure information are shared across the Approach and Tower Controllers through an automated environment, enhancing collaborative decision making. Singapore also shared the plans to further enhance the IAD by integrating it with the Surface Manager (SMAN) which would allow to provide a more precise estimate as it uses ground sensors to determine the taxiing speed and the cleared route.

Solution of Flight Plan Association Consistency between Tower ATM Automation System and ATM Automation System (IP/04)

2.11. China presented the solution of flight plan association consistency between the Tower ATM automation system and the ATM automation system. The differences in life cycle of flight plan and processing logic between the two systems were introduced, and examples of problems caused association inconsistencies were elaborated. Furthermore, China informed that the best solution to synchronize the flight plan within two systems is that the Tower ATM automation system gets flight plans from the ATM automation system. The example of Chengdu terminal, Tianfu Tower, and Shuangliu Tower, and two modes to ensure the robustness of the Tower ATM automation system were shared.

Requirement and Implementation of Data Interaction between the Tower ATM Automation System and the ATM Automation System (IP/08)

2.12. China presented the analysis of operational requirements of the Tower ATM automation system, data interaction method between the ATM automation system and the Tower ATM automation system, and the data interaction method between main and backup Tower ATM automation systems. The technical solutions of data interaction to establish a flight plan synchronization mechanism between the Tower ATM automation system and ATM automation system by using the data structure of the ATM automation system Flight Data Exchange Standard (MH/T 4029.3) were introduced. In addition, Application Case was shared and the benefits of data interaction were analyzed.

The Implement of A-SMGCS IV Operation in Daxing International Airport (IP/09)

2.13. China introduced that the Daxing A-SMGCS system was put into operation in September 2019 which can meet the level 4 operation standard in DOC 9830 and provide surveillance, alert, routing, and guidance functions for ground targets in airport. China shared the system network architecture, system scale, three routing modes, light guidance function as well as surveillance and alert function which can provide the controllers with a reference and basis about target monitoring and conflict resolution.

Protecting Air Traffic Control Systems against Cyber Threats by Deployment of Data Diode Technology in Hong Kong, China (WP/08)

2.14. In pursuit of enhancing the security for multicast data transmission, the Civil Aviation Department of Hong Kong, China (HKCAD) has studied and identified the data diode technology which fulfilled HKCAD's needs to safely disseminate at sufficiently high data transmission rate from internal systems to external users while inhibiting malware and zero-day attacks that are originated from external sources. Hong Kong China shared the background, principle, and technical details of the data diode deployment which comprised of a transmitting host, an optocoupler, and a receiving host to protect critical ATC infrastructure against cyber threats.

Considerations in Design and Implementation of an Approach Spacing Tool (WP/09)

2.15. In connection with the implementation of enhanced Wake Turbulence Separation (eWTS) scheme for arrival traffic of Hong Kong International Airport (HKIA), an Approach Spacing Tool (AST) is being implemented at the HKIA to assist controllers in handling final approach operation under eWTS scheme while improving consistency in delivering the arrival traffic according to the intended runway capacity. Hong Kong China presented the considerations in the design and implementation of an Approach Spacing Tool to fit into an operational environment with track records of busy air traffic, and shared the installation of AST at HKIA has been completed and system acceptance tests are planned to commence in Q4 2021. The meeting was reviewed and confirmed the relevant design considerations of AST has been incorporated into the ATMAS IGD. Singapore shared with the meeting that Singapore is implementing a similar AST system for the existing ATM system and has completed the training for controllers in August 2021 and would achieve operational status by Q1 2022.

The Practice of Runway Incursion Prevention in Tower Automation System (SP/01)

2.16. The Second Research Institute of CAAC (CASRI) introduced runway incursion concept with typical cases and analysis, and shared the most important function of Tower ATM automation system - Runway Incursion Prevention (RIP). CASRI further explained five aspects including integrating A-SMGCS module, EFS module, video processing module, and voice processing module, to enhance the RIP function and effectively reduce the risk of runway intrusion in Tower ATM automation systems.

PBCS Technology Application and ATM Automation System Function Requirements (IP/07)

2.17. China introduced the background of progress in the implementation of Performance-based Communication and Surveillance (PBCS) in China and the function evolution of ATM automation systems to match the research of PBCS. In order to meet the requirements of establishing a long-term monitoring and evaluation mechanism for PBCS, the modifications in ATM automation systems to improve PBCS alert capability of the operational unit, completed the PBCS operation monitoring, evaluation mechanism, and data analysis capability were elaborated.

The Implementation of Virtualization Technology in ATMAS Test and Validate

System (IP/10)

2.18. China informed that China has carried out the verification of virtualization technology in ATMAS Test and Validate System (TVS) which can reduce the hardware cost, improve the server utilization, and complete the test task with full function and performance equivalent to the running platform. The two mainstream technologies for server virtualization, Virtual Machine Technology and Container Technology were introduced, analyzed, and compared in the paper.

Air Traffic Management Automation System Implementation and Operations Guidance Document (WP/11)

2.19. Following the conclusion of ATMAS TF/1, the framework of Recommended Functions and Performances of ATM Automation System (RFAP ATM AS) Edition 0.0, which was led by China, Hong Kong China and Singapore in preparing, had been adopted. The meeting was informed that the completed draft guidance document was sent to Member States/Administrations on 6th August for review, China revised the draft guidance document according to the comments and additional materials received from Hong Kong China, Philippines, and Singapore. In addition, in order to align with the naming convention of other IGDs for APAC, Hong Kong China suggested to adopt "Air Traffic Management Automation System Implementation and Operations Guidance Document (ATMAS IGD)" instead of the original document name Recommended Functions and Performances of ATM Automation System (RFAP ATM AS) as the official name.

2.20. The ATM Automation System Implementation and Operations Guidance Document (ATMAS IGD Advance Edition) reviewed by the meeting is provided in **Appendix A** to this paper. Some suggestions to further improve the ATMAS IGD were discussed. The meeting agreed that the ICAO APAC Regional Office should issue a State Letter to circulate the advance draft of ATMAS IGD to seek further comments and inputs from States, and States/Administrations should provide feedback within one month after receiving the State Letter.

Review Report of APA TF/7 Meeting (WP/03)

2.21. The meeting reviewed the report of the Seventh Meeting of the Asia/Pacific ATS Inter-Facility Data-Link Communication Implementation Task Force (APA TF/7) which was held via video tele-conference *from 07 to 09 June 2021*, including updated ATN/AMHS/AIDC Implementation Table, updated Graphical Display on the AIDC implementation and planning status, and Issue report table, etc.

2.22. The APA TF/7 meeting discussed the necessity to maintain the functions of APA/TF persists while major success has been recorded for AIDC implementation in the region, full scale action of the APA/TF is not envisaged. The APA TF/7 meeting agreed to identify ATMAS/TF as the contributory body under CNS SG to take over any outstanding action items of APA/TF. The APA TF/7 meeting requested that the ATMAS/TF shall design future meeting structures to accommodate the AIDC related functions and maintain the effectiveness in promoting AIDC implementation. With aforementioned, it was suggested to consider the Draft Decision APA TF/7/1 - Dissolution of APA/TF on the future of APA/TF.

2.23. The ACSICG/8 meeting also reviewed the APA TF/7 report and noted the Draft Decision APA TF/7/1- Dissolution of APA TF for consideration of ATMAS TF/2. The ACSICG/8 meeting was informed that the AIDC Implementation Table will be maintained by ATMAS/TF and all communications issues related to AIDC discussed in ATMAS/TF will be reported back to ACSICG for necessary action.

2.24. Based on the proposal by APA TF/7 which has been reviewed by ACSICG/8, the ATMAS TF/2 meeting adopted the following Draft Decision for the consideration of CNS SG/25:

Draft Decision CNS SG/25/XX (ATMAS TF/2/1 (APA TF/7/1)) - Dissolution of APA/TF	
What: Noting that most of the tasks outlined in the ToR have been achieved and the completion of residual part of action items will be undertaken by ATMAS/TF. That, the APA/TF be dissolved.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: The APA/TF Terms of Reference have been completed and pending action items will be undertaken by ATMAS/TF.	Follow-up: ☐Required from States
When: 22-October-21	Status: Draft to be adopted by Sub-Group
Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐APANPIRG ☒Other: ATMAS/TF	

Review of the Terms of Reference (ToR) and Update Subject/Tasks List of ATMAS (WP/04)

2.25. According to the Draft Decision ATMAS TF/2/1, after dissolution of the APA/TF, the ongoing APAC regional AIDC work will be conducted by ATMAS/TF. In order to integrate APA/TF ToR into ATMAS/TF ToR, the revised ATMAS/TF ToR was proposed by the meeting as **Appendix B** to this paper.

2.26. The following Draft Conclusion was adopted by ATMAS TF/2 for consideration by CNS SG/25:

Draft Conclusion CNS SG/25/XX (ATMAS TF/2/2) – Revised ATMAS/TF Terms of Reference	
What: That, the revised ATMAS/TF Terms of Reference (ToR) as shown in **Appendix B** of this paper be adopted.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: After dissolution of the APA/TF, the ongoing APAC regional AIDC work will be conducted by ATMAS/TF.	Follow-up: ☐ Required from States
When: 22-Oct-21	Status: Draft to be adopted by Sub-Group
Who: ☒Sub groups ☐APAC States ☐ICAO APAC RO ☐ICAO HQ ☐APANPIRG ☒Other: ATMAS/TF	

2.27. The meeting reviewed and updated the Action Item list for ATMAS/TF, and also reviewed the Action Items arising from APA Task Force and agreed to consolidate APA/TF work in ATMAS TF/3.

Date and Venue for the Next Meeting

2.28. China informed the meeting that China would like to host ATMAS TF/3 in the end of September or second half of 2022 in Chengdu as well. The meeting agreed that the next ATMAS/TF meeting would be considered in physical, hybrid or online mode depends on the pandemic situation and travel restriction. The actual dates and venue will be adjusted to fit the CNS meeting plan for 2022, and coordinated with Co-chairs and States concerned. Member States/Administrations will be informed in

due course.

3. ACTION BY THE MEETING

3.1. The meeting is invited to:

a) note and review on the information and discussion in this paper;

b) review the ATM Automation System Implementation and Operations Guidance Document (ATMAS IGD Advance Edition) in **Appendix A**;

c) consider endorsement of Draft Decision as presented in paragraph 2.24;

d) review the revised ATMAS/TF Terms of Reference in **Appendix B** and consider endorsement of Draft Conclusion formulated by the ATMAS TF/2 meeting as presented in paragraph 2.26; and

e) discuss any matters as appropriate.

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