*International Civil Aviation Organization*

**Fifth Meeting of the Surveillance Implementation Coordination Group (SURICG/5)**

Web-conference, 22 – 24 September 2020

**Agenda Item 4: Review the Action Items from SURICG/4 Meeting**

# THE ICAO AIRCRAFT ADDRESS MONITORING IN JAPAN

(Presented by Japan Air Navigation Service (JANS), JCAB)

**SUMMARY**

This paper presents the activity of ICAO Aircraft Address monitoring in Japan including monitoring, tool function, outcomes and reporting paths.

## 1. INTRODUCTION

The accuracy and safety of aircraft surveillance (Air to Ground and Air to Air) is deeply relying on the correct setting of the ICAO Aircraft Address (Mode-S address) on board. Therefore, to detect and suggest the correcting action, Japan has been conducted the address monitoring since 2007.

This paper presents the activity of ICAO Aircraft Address monitoring in Japan including monitoring activity, tool function, monitoring results and reporting paths.

## 2. DISCUSSION

2.1 Monitoring Activity and Tool Function

2.1.1 Japan Civil Aviation Bureau (JCAB) installed Aircraft Address Monitoring (AAM) equipment. AAM receives the radar data from 11 sites out of the 21 En-route SSRs for detecting abnormal/duplicated Mode-S addresses as the following cases. The AAM configuration image is shown in Figure-1.

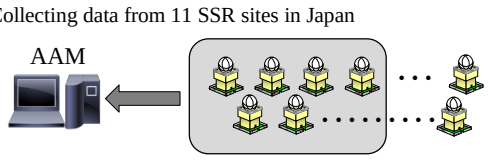


Figure-1: AAM configuration

- Duplicate Mode-S address detected within single sensor in the same time-frame
- Duplicate Mode-S address detected within multi-sensors in the same time-frame
- Aircrafts whose state identification number is not match with the state information registered in its flight plan.
- Aircrafts whose state identification number is not defined in SARPs (Annex 10)
- Aircrafts whose Mode-S address change during the flight
- Mode-S address containing all “0” or “F”
- Mode-S address containing “0” or “F” except *National number*
- Mode-S transponder of which P4 pulse was not detected
- Mode-A/C transponder replied to Mode-S all call

2.1.2 JCAB had also monitored Mode-S address validity on the former RDP (Radar Data Processing system, which is now upgraded to TEPS: Trajectorized En-route Traffic Data Processing System) at 4 ACC. Each RDP monitored the duplicated Mode-S address aircrafts as the back-up for AAM. The RDP monitoring configuration image is shown in Figure-2.

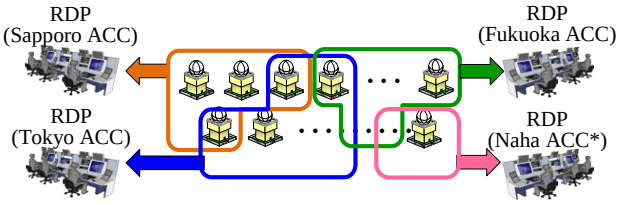


Figure-2: Former RDP monitoring configuration

*Naha ACC was closed and its ACC function migrated to Kobe ACC in 2018.

2.1.3 JCAB has developed the target fusion system, HARP (Hybrid Air-Route surveillance sensor Processing equipment) which took over the monitoring function from AAM and started operation in March 2019. HARP can accept all of 21 SSR radar data around Japan, which makes it possible more accurate Mode-S address monitoring.

*Note:*
*HARP is capable of handling different types of sensors (SSR and WAM) and mix them into the single high-accurate track called "Fusion track". HARP has already started the operation providing the SSR fusion target since March 2019. It is planned to provide the fusion track including WAM target in this year.*

2.2 Monitoring results

Table-1 presents the detected duplicated Mode-S address in Fukuoka FIR.

Table-1: Duplicated Mode-S address

| | Japanese Aircraft | | Foreign Aircraft | Total |
|---|---|---|---|---|
| | Civil | SDF | | |
| 2016 | 1 | 3 | 2 | 6 |
| 2017 | 2 | 0 | 1 | 3 |
| 2018 | 0 | 0 | 2 | 2 |
| 2019 | 0 | 0 | 0 | 0 |
| Total | 3 | 3 | 5 | 11 |

- Japanese civil aircraft : 3 cases
  2 cases were the duplication between Japanese civil aircraft, and one case was the duplication with foreign civil aircraft.
- JSDF (Japan Self Defense Force) aircraft : 3 cases
  All cases were the duplication between JSDF aircraft.
- Foreign aircraft : 5 cases
  All cases were the duplication between foreign aircraft.

2.3 Reporting Paths

When a duplication of Mode-S address was detected, JCAB asked the operators of the aircraft flying frequently in the Fukuoka FIR to correct the address.

JCAB ATC department requested Japanese civil aircraft and JSDF aircraft operators to correct the address via JCAB Mode-S address registering department. Afterwards, JCAB confirmed that the said operators set the appropriate address.

2.4 Conclusion

To maintain the accuracy and safety of aircraft surveillance, JCAB installed Mode-S address monitoring tools and established the procedure to coordinate with operators when a duplication of Mode-S address is detected.

JCAB took 6 correcting actions for Japanese civil aircrafts and JSDF aircrafts for recent 4 years.

## 3. ACTION REQUIRED BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;

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