

International Civil Aviation Organization

TWELFTH MEETING OF THE SOUTH EAST ASIA AND BAY OF BENGAL SUB-REGIONAL ADS-B IMPLEMENTAITON WORKING GROUP (SEA/BOB ADS-B WG/12)



Guangzhou, China, 08 - 10 November 2016

Agenda Item 4: Report on ground system and avionics performance monitoring and improvement in compliance

REASONABLE PERIODIC REPORTING MODE

(Presented by China)

SUMMARY

This paper introduces two types of periodic reporting mode applied by ADS-B ground stations in China, compares their advantages and disadvantages, and discusses which one is more reasonable. The reporting mode of ADS-B data station is mentioned.

1. INTRODUCTION

1.1 The 1090 ES ADS-B ground station generates and transmits targets data with a given reporting mode, i.e. data driven mode or periodic mode. When periodic reporting mode is applied, ADS-B ground stations will periodically transmit ASTERIX Category 021 reports with a predefined period of n seconds, e.g. 1 second.

1.2 Periodic reporting mode helps in maintaining an appropriate reporting rate, reducing process workload and bandwidth occupation. Therefore it is helpful for station sites with insufficient transmission resources.

1.3 There are also drawbacks of the periodic mode, e.g. increasing data refreshing interval. Sometimes it may even cause many problems, such as time delay, instant overload, and network congestion.

2. DISCUSSION

At present, ADS-B ground station equipment provided by Chinese manufacturers mainly deal with periodic reporting in two ways.

2.1 The first is as follows. For every target, it considers the time of receiving first squitter data message as the beginning time, processes latest updating messages during each period and generates a report at the end of the period. It will not generate a report if there is no updating position message, as shown in figure 1. In this way, the latest position message is reported and network occupation is reduced. But it also generates the report with an age variation, which is smaller than a period. Update time for each target should be maintained independently and asynchronously, or it may lead to problems as network congestion.



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Data age variation
PRI: Periodic Reporting Interval
Notel: Position Squiter Messages Only
Note2: Ignoring Processing Latency

Fig. 1 time relation of periodic reporting mode 1

2.2 The second way is as follows. For every target, it considers the time of receiving first squitter position message as the beginning time, then it will wait a period, during this period no reports are sent. The first position message after the wait period will trigger the report sending and initiates a new wait period.



PWP: Position Wait Period Notel: Position Squiter Messages Only Note2: Ignoring Processing Latency



2.3 The purpose of periodical reporting mode is to save the transmission resources. The second periodic reporting mode could reduce position data age variation, which may cause problems for some ATC systems and ADS-B data processing centers, so the second way is more reasonable.

2.4 A data station usually adopts a periodic reporting mode to output fusion data as the input data from multiple ground stations could be very huge. The periodic reporting mode in data station (data processing center) is similar to that in a ground station, just taking the input of data station, i.e. ground station reports, as ES squitter messages, and the output of fusion data as reports of a ground station. In fact, the data station in Sanya adopts the second way to implement periodic reporting mode.

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 matters as appropriate.
