International Civil Aviation Organization

AUTOMATIC DEPENDENT SURVEILLANCE – BROADCAST SEMINAR AND FOURTEENTH MEETING OF AUTOMATIC DEPENDENT SURVEILLANCE – BROADCAST (ADS-B) STUDY AND IMPLEMENTATION TASK FORCE (ADS-B SITF/14)

Christchurch, New Zealand, 14 – 17 April 2015

Agenda Item 4: Review States' activities and interregional issues on implementation of ADS-B and multilateration

ENHANCING AVIATION SAFETY THROUGH ESTABLISHMENT OF A REGIONAL ADS-B AVIONICS PROBLEM REPORT DATABASE (APRD)

(Presented by Hong Kong China, Australia and Singapore)

SUMMARY

Since December 2013 when ADS-B operation for some major traffic flows over the South China Sea became effective, the task of monitoring and analysis on avionics performance of ADS-B equipped aircraft has become increasingly important for States/Administrations concerned. The APANPIRG/24 has endorsed a Conclusion encouraging States/Administrations to exchange their analysed results on avionics performance and experience gained from the process. In providing full support to this Conclusion, Hong Kong China, in collaboration with Australia and Singapore, has been working with the ICAO to establish a regional database to share the analysed results with a view to enhancing aviation safety for the Region. This paper updates work progress in establishing the database and invites States/Administrations to share their analysed ADS-B data, so as to improve the quality of avionics equipage in ADS-B mandated airspace.

1. INTRODUCTION

1.1 During the past ICAO ADS-B Study and Implementation Task Force (SITF) meetings, Hong Kong China, Australia, and Singapore have presented working papers highlighting their work to monitor and analyse avionics performance of ADS-B equipped aircraft. In the 51st DGCA Conference held in November 2014, Hong Kong China presented a working paper outlining a proposal to establish a centralized database, namely the "ADS-B Avionics Problem Report Database (APRD)", for sharing analysed results with a view to enhancing aviation safety for the Region. The proposal gained endorsement from the Conference, urging States and Administrations to support the development, operation and maintenance of the regional database. Hong Kong China, in collaboration with Australia and Singapore, has been working with the ICAO Regional Sub-Office (RSO) to develop the technical requirements for the database, together with procedures for provision and sharing of data. This paper highlights the latest progress in establishment of the database.

2. DISCUSSION

2.1 Since December 2013 when ADS-B operation along some major traffic flows in the South China Sea became effective, monitoring and analysis on avionics performance of ADS-B equipped aircraft has become an increasingly important task. Problems detected from the monitoring may have safety implications to ATC, which require timely promulgation to States/Administrations and rectification by airline operators. In order to effectively manage, track and promulgate the problems, the APRD will facilitate States/Administrations to file their observations, and to be kept informed of ADS-B avionics safety related information.

2.2 The APRD contains common ADS-B avionics problem categories and a discussion forum, which proactively facilitates the work of the civil aviation authorities (CAAs) and the airlines concerned to improve the quality of avionics equipage in ADS-B mandated airspace.

2.3 Problem Categorization

2.3.1 Despite the problems associated with ADS-B avionics are quite diversified, it is possible to categorize the problems for subsequent investigation and follow-up action. According to the AIGD, currently there are a total of 17 categories of common ADS-B avionics problems so far. It is noted that only a small portion of the aircraft population exhibits performance problems.

2.3.2 The database contains collective information describing different types of known avionics problem. During the ADS-B SITF/13 meeting, there were concerns about whether the database should disclose the identity of airline and airframe concerned. The meeting made reference to other similar databases already established (e.g. the database for FANS 1/A Central Reporting Agency) and endorsed a proposal to establish the APRD to show known generic ADS-B avionics problems to States/Administrations, without disclosing the identity of airlines/airframes.

2.4 Access and Security Procedures

2.4.1 The APRD will be posted on an ICAO secured web-site. States/Administrations wishing to gain access to the APRD are required to nominate points of contact for registration with ICAO. The points of contact will receive notification from the ICAO whenever there are updates to the APRD. Each registered State or Administration will be granted "read" access rights to the APRD with corresponding username and password for login. Administrative rights to the APRD will be confined to the ICAO, and States/Administrations who have the capabilities to monitor/analyze ADS-B avionics performance, and have made prior arrangements with RSO to follow up the investigation of reported problems.

2.5 Submission and Processing of Problem Reports

2.5.1 States/Administrations are encouraged to establish mechanism to monitor/analyse performance of ADS-B equipped aircraft, and based on their analysed results to submit problem reports to the ICAO via the above-mentioned web-site.

2.5.2 When the problem report with initial analysis and recommendation is received from State (i.e. the reporting party), the ICAO will promulgate the problem, with a status of pending verification, through the database as soon as possible, and in parallel forward the problem to those States (i.e. the verifying party) with capabilities in monitoring/analysis of ADS-B avionics performance, for their study and verification. Based on the study results, the verifying party will classify the problem as either “systematic” or “non-systematic”.

2.5.3 For systematic problems, such as software/hardware problems inherent in certain model of avionics equipment, the verifying party will take the lead to identify solutions with the relevant parties e.g. avionics suppliers. For non-systematic problem, such as those exhibited by specific airframes/airlines, the reporting party will take the lead to follow up with the relevant parties e.g. regulatory authority of the airlines/airframes, since the former could provide the detailed observation of the problem directly. All subsequent follow-up actions and results will be recorded in the database. ICAO will serve as a problem moderator and a database platform provider.

2.5.4 A work flow of problem reporting and processing is provided in Appendix 1, and a prototype design of the web-site is demonstrated during the ADS-B SITF/14 Meeting.

2.5.5 Besides, a discussion forum will be created on the web-site to facilitate other States/Administrations to share their views on reported problems. The reported problems and views will be deliberated in the ADS-B Task Force meetings, and the ICAO will work with relevant States/Administrations to update status in the database accordingly. Although the reporting parties are not shown in the database, ICAO should keep records of the reporting parties and regularly request them to update the status so as to ensure the database is correct and up-to-date.

2.6 Information Retrieval and Exporting

2.6.1 The web-site will provide a Human Machine Interface (HMI) to facilitate information retrieval based on pre-defined searching criteria. For example, it can generate a list of known problems with plans for rectification, etc. All the retrieved information can be exported to a tabular format (e.g. CSV) for printing and reporting.

2.7 Exchange of Monitoring Results

2.7.1 The database contains useful information as to the generic ADS-B avionics problem commonly encountered in the Region. States/Administrations are invited to make full use of the database to report and share problems with others, keep abreast of the latest reported problems, and exchange among themselves the lists of airframes exhibiting the problems for CAAs to follow-up with airline operators concerned for remedial action.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the latest progress in the development of the APRD;

b) support the development, operations and maintenance of the APRD in enhancing aviation safety of the Region;

c) encourage States/Administrations to share their analysed ADS-B data; and

d) encourage CAAs and airlines to make the best use of the APRD to improve quality of their avionics equipage in ADS-B mandated airspace.

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Appendix 1 : Work Flow for Problem Reporting and Processing