International Civil Aviation Organization

Twenty-Eighth Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/28)

Bangkok, Thailand, 21 – 24 August 2023

Agenda Item 5: Airspace Safety Monitoring Activities/Requirements in the Asia/Pacific Region

FEASIBILITY VERIFICATION OF USING BDS DATA FOR AIRCRAFT MONITORING

(Presented by China RMA)

SUMMARY

This paper introduces the concept of an experiment validating BDS as a source of data to support height keeping capability monitoring. It describes a trial based on antennas capable of receiving both GPS and BDS, and followed by data analysis.

1. INTRODUCTION

1.1. The aircraft height keeping performance (HKP) monitoring plays an important role ensuring safety of RVSM airspace. It is measured by equipment independent from the airborne altimetry system, such as EGMU/E^{2}GMU， ADS-B Height Monitoring System (AHMS), Aircraft Geometric Height Monitoring Elements (AGHME) and Height Monitoring Unit (HMU). Through that equipment, data are available for the Altimetry System Error (ASE) estimation.

1.2. In February 2022, the Beidou Navigation Satellite System (BDS), a navigation system reflected in Annex 10, is recognized one of the four GNSS service provider. In February 2022, the commitment letter of the provision of BDS Open Service (OS) to civil aviation was accepted by the ICAO council.

1.3. At present, BDS sees wide varieties of application in different industries, aviation serves one example. While GPS has become a time-tested means for height-keeping capabilities verification, BDS-based monitoring is currently a blank. This paper describes the concept of such trial for monitoring with data from such source.

2. DISCUSSION

General purpose

2.1. While the vision is to benefit the monitoring program with an additional source of navigation information, the aim of this trial specifically focusses on the verification of a method to estimate HKP parameters based on BDS data.

Supporting equipment

2.2. BDS data collection is an apparent first step, this means signal receivers are essential, it requires proper antenna as supporting instrument.

2.3. The sensors are currently being developed by Beijing University of Aeronautics and Astronautics (BUAA) and Aviation Data Communication Corporation (ADCC) availing BDS and GPS data collection for this trial.

Next steps

2.4. It is designed to be able to receive both signals from BDS and GPS. Such concept may allow possibilities for further experiments in the future.

2.5. Once the receivers are ready for operation, accuracy tests will become a natural priority. In that case, performance data of a monitoring group based on BDS data is planned to be analyzed and compared with various sources.

Expected benefits

2.6. If the result sees positive conclusion, the additional data source is anticipated to provide additional proof of compliance, many of the noise factors will be excluded from the estimation, since both data sets are collected during one single flight, where the environmental parameters, such as atmosphere, altitude, and temperature, are kept consistent.

3. CONCLUSION

3.1. The meeting is invited to:

a) note the information contained in this paper; and

b) discuss any relevant matters as appropriate.

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