CNS SG/24 – **IP/13**
Agenda Item 5.5
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International Civil Aviation Organization

Twenty Fourth Meeting of the Communications/ Navigation and Surveillance Sub-group (CNS SG/24) of APANPIRG

Web-conference, 30 November – 4 December 2020

Agenda Item 5: Navigation

5.5 Other navigation related issues

STATUS OF GBAS IMPLEMENTATION IN JAPAN

(Presented by Japan)

SUMMARY

This information paper provides the status of GBAS implementation as well as the research and development related to GBAS in Japan. GBAS at Tokyo Haneda is in an operational trial phase from July 2020.

1. INTRODUCTION

1.1 CAT(Category)-I GBAS has been implemented in the world, and there are several projects to implement GBAS in the APAC region.

1.2 At the global level, the ICAO standards on the CAT-II/III GBAS (GAST-D) have been published.

1.3 JCAB (Japan Civil Aviation Bureau) has been working on implementing CAT-I GBAS in Japan including development of specifications, certification framework, ionospheric threat model, and other operation related frameworks.

1.4 Japan has also been working on various aspects of GBAS including the development of a CAT-I GBAS prototype, APAC common GBAS ionospheric threat model, validation of GAST-D standards by developing an experimental prototype, and evaluation of dual-frequency and multi-constellation (DFMC) GBAS concepts.

2. DISCUSSION

2.1 CAT-I GBAS implementation at Tokyo Haneda

2.1.1 The first GBAS system intended for operation has been installed at Tokyo Haneda. The system was manufactured by NEC Corporation and has been delivered in March 2020.

2.1.2 The ionospheric threat model used is based on the APAC common GBAS ionospheric threat model with some modification based on the observation and analysis by Electronic Navigation Research Institute (ENRI).

2.1.3 The GBAS at Tokyo Haneda has two ionosphere field monitor (IFM) stations in addition to four reference stations to mitigate threats associated with the ionospheric activities.

2.1.4 The GBAS at Tokyo Haneda is in the operational trial phase. Information on the trial including CAT-1 GBAS approach procedures for runway 34R and 34L has been published as AIP supplement. The trial is available from 14 to 21 UTC (23 to 06 JST). Two Japanese airlines, ANA and JAL have conducted GLS approaches in the trial. Pilots reported that the provided GLS approach was more stable as compared to that of ILS.

2.1.5 GBAS at HND will provide CAT-1 approach service by the end of March 2021.

2.2 GBAS research and development

2.2.1 A GAST-D ground experimental prototype and an airborne experimental subsystem have been developed by ENRI. The ground subsystem was installed at Ishigaki in Japan to evaluate the validity of the GAST-D standards under the ionospheric disturbances in the low magnetic latitude region together with the airborne experimental subsystem. The results contributed to the standardization of GAST-D. Japan continues to support refining the GAST-D standards for better performances in the low magnetic latitude region in collaboration with the ICAO NSP.

2.2.2 Japan started research and development on DFMC GBAS in 2015. DFMC GBAS will improve availability by mitigating ionosphere induced threats. It will also provide mitigation means for constellation failure and radio frequency interference. The DFMC GBAS study is conducted by ENRI with a main objective of evaluating concepts of DFMC GBAS. The testbed of DFMC GBAS developed and deployed at Ishigaki by replacing the GAST-D experimental prototype in 2019. Japan will contribute to ICAO activities on DFMC GBAS standardization.

2.3 GBAS related contribution to ICAO APAC region

2.3.1 Japan is actively contributing to the APAC GBAS/SBAS Implementation Task Force (ITF). Japan will continue to support the task force activity. And as noted in the reports of the 2nd meeting of the GBAS/SBAS ITF, Japan would welcome the first face-to-face meeting of the task force, when the COVID-19 situation improves and restrictions on international travel are relaxed.

2.3.2 In line with the GBAS/SBAS ITF activities, Japan will continue to contribute to the ICAO NSP activities to enhance the GAST-D performance in the low magnetic latitude region by mitigating ionosphere induced threats.

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.

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