



International Civil Aviation Organization

**FIRST MEETING OF IONOSPHERIC STUDIES
TASK FORCE (ISTF/1)**

27 – 29 February 2012, Tokyo, Japan



Agenda Item 2: Review of relevant meetings/conference

REVIEW OUTCOME OF APEC GIT/16 AND AOSWA/1

(Presented by the Secretariat)

SUMMARY

ICAO APEC Office participated in the APEC GIT Sixteenth meeting and the AOSWA First Workshop and presented information on the relevant activities taken up by APANPIRG bodies in the region. Presentation also appealed to both the groups for support in data collection, analysis and the development of a regional ionospheric model and both the groups supported the concept of data sharing and cooperation in the studies.

This paper relates to -

Strategic Objective:

C – Environmental Protection and Sustainable Development of Air Transport

Global Plan Initiative:

GPI-21 Navigation

1. INTRODUCTION

1.1 Sixteenth meeting of the Asia Pacific Economic Cooperation (APEC) GNSS Implementation Team (GIT/16) was held in Bangkok, Thailand from 15 to 17 February, 2012. The meeting was attended by 24 members from 8 APEC economies, 1 international organization and 2 industry organizations. Meeting, in addition to discussing two Concept Notes and Project proposals, also reviewed the status of GNSS implementation in various Economies of the region. The meeting was also attended by Dr. Susumo Saito, Chairman ISTF representing Japan.

1.2 The First Workshop of Asia Oceanic Space Weather Alliance (AOSWA) was held in Chiang Mai, Thailand from 22 to 24 February, 2012. In addition to discussing work being done in different States in the Asia Oceania region, the Workshop exclusively discussed the space weather studies related activities taken up in different States.

2. DISCUSSION

APEC GIT/16 Meeting

2.1 ICAO APAC Office, through its presentation briefed the meeting about various initiatives the aviation community had taken up to progress implementation of GNSS and its applications in the Asia Pacific region. Meeting was informed about a number of Conclusions, APANPIRG had taken, in its Twenty Second meeting (September, 2011) to support PBN and ADS-B implementations in various Administrations.

2.2 Responding to the ICAO APAC Office request for help in developing a regional Ionospheric Model for GBAS and SBAS, member economies which contributed data towards APEC GIT Test Bed Project agreed to make the data available. Philippines, a member Economy, which also contributed data for the Test Bed Project supported the sharing of data. Philippines also agreed to the sharing of data collected from 17 stations (to be expanded to 38 stations in future) belonging to the National Mapping Agency. Meeting also appealed to the member Economies to share their single/dual frequency archival data with ICAO APAC Office Ionospheric Studies Task Force to support the Characterization of Ionosphere project taken up by the Ionospheric Studies Task Force. Meeting adopted following Conclusion/Action Item on the subject:

Conclusion 16-2: The APEC GIT agrees to provide APEC GNSS Test-bed data to support the ICAO Ionospheric Studies Task Force. Coordination activities should be coordinated between ICAO APAC Office and APEC GIT Co-Chairs.

Action Item 16-7: For the GIT member Economies to continue collecting single/dual frequency GNSS data and to provide the GNSS and Ionospheric data to support activities by the ICAO Ionospheric Studies Task Force.

AOSWA/1 Meeting

2.3 Viet Nam informed the meeting about the research work taken up by them from 1962 onwards on the subject. Monitoring of GPS scintillation is being carried out at Phu Thuy from 2007 onwards for studying the moving of the plasma bubble in the magnetic equator region. Vietnam also mentioned about the work taken up in Hanoi Institute of Geophysics (HIG) at its establishments in Hanoi and in Ho Chi Minh with many more stations located all over the territory for studying tectonic movement and for studying the TEC as well as total water vapor etc. Now there are 10 stations in Vietnam carrying out studies in Viet Nam.

2.4 Indonesia informed about the activities in National Institute of Aeronautics and Space (LAPLAN) and the ionospheric research being carried out in the Institute. Meeting was reminded that ionospheric studies are relevant for the Radio Communication, the Navigation Systems, micro satellite systems, Geomagnetic studies and for the Power Supply Systems. Research and modeling is being carried out in satellite and terrestrial communication. Indonesia is carrying out work on ionospheric observations, developing regional ionospheric modeling over Indonesia, ionospheric irregularities and ionospheric precursors of earthquake. MSILRI (Model of Simplified Ionosphere for Low Latitude Region over Indonesia) is the regional ionospheric model developed for predicting HF communication on Long Term. For short term prediction, Australian ASAPS model is considered to be used in Indonesia.

2.5 Presentation by China discussed the space weather activities in National Center for Space Weather (CMA) and informed about the observation facilities of space weather in CMA and its proposal to include space-based payloads onboard FY meteorological satellites. Presentation also informed about the ground based instruments for monitoring the solar and ionospheric activities, and the GPS/MET network.

2.6 National Institute of Information and Communication Technology (NICT), Japan informed the meeting about the ICSU World Data System (WDS) a global federated system of long time data archive and data related services covering a wide spectrum of natural sciences and encouraging interdisciplinary science approaches. Main focus of the activity was defined as 1) long term stewardship of scientific data, 2) data and metadata services including data analysis and 3) data publication services. The WDS has been opened to world-wide data community for membership applications (<http://icsu-wes.org/>) in 2011. Japan, with the help of data collected has developed a time dependent plot of the ionospheric anomaly. A new supercomputer is being installed in November this year, which will be of bigger help in developing the ionospheric model. A new website Science Cloud is being opened up. Participants will be able to save their data on that to the extent of 10 kilo byte. NICT was collecting data from 5000 receivers as of 2010. In its presentation, NICT promoted sharing of the basic TEC data and promoted cooperation.

2.7 Thailand presented its efforts in creating a GPS and ionospheric data-base. NICT and King Mongkut's Institute of Technology Ladkrabang (KMITL) have cooperated in implementing GPS receivers in several provinces of Thailand such as Chiangmai, Chumphon, Bangkok and Phuket. Department of Land has and operates 11 stations, Royal Thai Navy owns three ionosonde stations, the Thai Meteorological Department operates 5-7 GPS receivers and the Aeronautical Radio of Thailand owns 3-4 receivers. The aim is to create the database of GPS data and ionospheric parameters in Thailand. Presently, the raw data is being collected and is being sent to KMITL. The database is useful for the determination of TEC and enhances the study of the ionosphere. Thailand can provide data from SEALION and KMITL sources. SEALION is a cooperation project between Thailand and Indonesia. The website address '161.246.22.239/data/node/11' provides further information on the project. The data can be retrieved directly from the site.

2.8 Elaborating the Space Weather Research Activity in Korea Astronomy and Space science Institute KASI (Korea), Korea informed the meeting about their study of ionospheric irregularities through radar. Studies are being carried out for both the E and the F regions. Study demonstrates occurrence rate for seasonal variations both for the E region and F region. A Sky Imager was installed in Mount Bohyur in 2008 which can provide image of ionospheric phenomenon. Travelling ionospheric disturbance was described as one of the sources for ionospheric irregularities. Data is also observed through network of 11 GNSS stations. KASI has implement Scintillation Monitor, developed by Cornell University since 2008. KASI uses their own 9 receivers and gets some more IGS station. For requesting KASI to share ionospheric data, query can be addressed to yskwak@kasi.re.kr.

2.9 Space Science Research at University Kebangsaan Malaysia or UKM (National University of Malaysia) is engaged in the space weather research activities. Malaysia is located in equatorial anomaly region and hence can provide important ionospheric data. Presentation described the infrastructure deployed for data collection (including in Antarctica). In Malaysia, ionospheric studies carried out by local scientists started in the late 1990s using GPS data from the Department of Surveying and Mapping, Malaysia (DSMM).

2.10 Subsequently, it was assured that cooperation between AOSWA and ICAO APAC Office would be in the benefit of both the organizations.

3. ACTION REQUIRED BY THE MEETING

3.1 The meeting is invited to note the related activities that are being carried out in the States located in low latitude region in Asia Pacific. Meeting also invited to note that APEC GIT has assured all support for the work programme of the Task Force.
