

ICG WORKING GROUP S
Systems, Signals, and Services

ICG-14 Meeting

Bangalore, India
10-12 December 2019
AGENDA (as of 09 December 2019)

Tuesday, 10 December

0900-0915 Introduction

- 1) WG-S Co-chairs Opening Remarks
- 2) Approval of the Agenda
- 3) WG-S Events in 2019

0915-1000 GNSS System Provider Updates*

- 1) BeiDou (BDS)
- 2) Galileo
- 3) GLONASS
- 4) GPS
- 5) QZSS
- 6) IRNSS/NAVIC
 - a. NavIC performance using S-band signals
 - b. NavIC Availability, Performance and Advantages

V.M. TIRLAPUR, India

Anindya BOSE, India

* Note: This is an opportunity for group discussion on any information relevant to WG-S that requires clarification or elaboration based on the system provider updates presented in the plenary session on Monday, 09 December.

1000-1100 GNSS Compatibility & Spectrum (*IDM Standards and Information Exchange*)

- 1) PRESENTATIONS

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- a. BDS Status Information Service

Changjiang GENG, China

- b. GNSS interference detection and localization in city and civil aviation

Weimin ZHEN, China

- c. New steps in the navigation conditions monitoring project

Sergey SILIN, Russia

- 2) IDM Task Force Report

Rick HAMILTON, Weimin ZHEN

- 3) Review actions and next steps

1100-1120 Coffee Break

1120-1300 GNSS Compatibility & Spectrum (*Signal Compatibility and Spectrum Protection*)

- 1) PRESENTATIONS

- a. Compatibility experiment of BeiDou RDSS and 5G

WenJun ZHAO, China

- b. Message Authentication for Legacy GNSS Systems

Durga DIGADARSINI, India

- c. Progress report regarding development of new Recommendation for protection GNSS spectrum

Dmitry ARONOV, Russia

- d. ITU Report on WRC-19 Outcomes

Hon Fai NG, ITU

- e. RNSS related discussion at WRC-19, including results from WRC-19 and WRC-23 agenda items

Dominic HAYES, EU & Takahiro MITOME, Japan

1300-1400 Lunch

1400-1500 System-of-Systems Operation (Orbital Debris Mitigation)

- 1) PRESENTATIONS

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- a. Disposal strategy of BDS Satellites Based on Long-term Collision Probability

Jing ZHOU, China

- 2) Status of **Recommendation 13S.2**: IADC study

David TURNER, U.S. & Sergey REVNIVYKH, Russia

1500-1600 Interoperability & Service Standards (*Open Service Standards*)

- 1) PRESENTATIONS

- a. Status of «Interoperability-2030» Project

Sergey Silin, Russia

- 2) Update from the Performance Standards Team

Sergey KAPLEV, Russia & John LAVRAKAS, U.S.

- 3) Review Actions

1600-1620 Coffee Break

1600-1630 Joint Working Group Session (S, D invited): Open Service Information Sharing and Service Performance Monitoring (International GNSS Monitoring and Assessment)

- 1) APSCO-IGMA Project Update

Manop Aorpimai, APSCO

- 2) Report of the IGMA Task Force

Satoshi KOGURE, Shuli SONG

- 3) Review Actions and Next Steps

1630-1800 Joint Working Group Session (S, D invited): Interoperability & Service Standards (Multi-GNSS Interoperability – Timing)

- 1) PRESENTATIONS

- a. IGS Timing Activities and WG on Clock Parameters

Allison Craddock, IGS

- b. Time Transfer by GNSS

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Tatiana PRIMAKINA, Russia

- c. Use of current broadcast time-offsets for multi-constellation users in harsh environments

F. MELMAN, X. OTERO, P. CROSTA, R. LUCAS, ESA

- d. Comparative Study on different GNSS Time Offsets Monitoring Methods

Haibo YUAN, China

- e. Use of UTC to Support GNSS Interoperability

P. Tavella, BIPM

- f. Use of GGTO

P. Tavella, BIPM

- g. The Problems of GNSS Time Monitoring

JSC Russian Institute of Radionavigation and Time

- 2) Discuss outcomes and actions from 2019 WG-S Intersessional Meeting and Timing Workshop

Jeff AUERBACH, U.S. & Xiaochun LU, China

- 3) Review Actions and Next Steps

Wednesday, 11 December

0900-1100 Joint Working Group Session (S, B, C, D invited): PPP Interoperability

- 1) PPP Interoperability

- a. Discuss outcomes and conclusions from June 2019 PPP Workshop

Suelynn Choy, Daniel Blonski, Workshop Co-Chairs

- b. PRESENTATIONS

- i. Precise Point Positioning with Standalone NavIC

R. BABU, India

- ii. High-end GNSS receivers capable of IRNSS L5/S-band signal tracking for RTK/PPP positioning services

Alexei ZINOVIEV, Ukraine

- c. Review draft recommendation
- 2) Other Joint Working Group Topics for Discussion
 - a. PRESENTATION: Recent Developments and Efforts Undertaken by the UN GGIM Subcommittee on Geodesy in Support of Geodetic Capacity Building

WG-D Co-chairs

1100-1120 Coffee Break

1120-1210 GNSS Compatibility & Spectrum

- 1) Report of the Compatibility & Spectrum Sub-Group

Dominic HAYES, EU & Takahiro MITOME, Japan

- 2) Review Recommendations, actions and next steps

Draft **Recommendation 14S.1**: Spectrum Protection Booklet

Recommends:

1. that the WG-S Compatibility and Spectrum subgroup, in coordination with the ICG Secretariat, produce a draft booklet on GNSS/RNSS Spectrum Protection based on the briefing material used for the ongoing spectrum seminars:
 - Fundamentals of GNSS
 - Interference and Spectrum Management
 - Interference Threats
 - [Methods of Interference Detection and Mitigation]
 - [Current Interference Challenges]
2. that the ICG consider formal endorsement of the draft booklet at a future meeting

1210-1300 Interoperability & Service Standards

- 1) Report of the Subgroup Co-chairs

Jeff AUERBACH, U.S. & Xiaochun LU, China

- 2) Review recommendations, actions and other discussion items

- a. Proposal for an IGMA and Performance Standards Workshop in 2019
- b. Draft **Recommendation 14S.2**: PPP Interoperability Task Force

The ICG should establish a Task Force within the WG-S Interoperability Subgroup, with participation from WG's B and D. The Task Force will draft a

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work plan focused on the objective of improving the interoperability of Precise Point Positioning (PPP) services

Specifically, the Task Force will:

- Consider involving/discussing with the SBAS Interoperability Working Group and the ICAO Navigation Systems Panel moving forward
- Concentrate on establishing the foundational documents, and baseline language to develop a common language on the basic parameters, etc. – WG-D Proposal: Publish and disseminate PPP signal and system information
- Seek answers from Service Providers (governmental and commercial) to the questions formulated at the 1st PPP Workshop and follow-on issues identified by the Task Force

1300-1400 Lunch

1300 Technical Tour

Thursday, 12 December

0900-1100 *Review and Consensus on Working Group Actions and Recommendations; Refinement of the WG-S Report to the Committee and Providers Forum*

1) Compatibility and Spectrum Actions and Recommendations

Takahiro MITOME, Dominic HAYES, Sergey REVNIVYKH & David TURNER

2) Interoperability and Service Provision Actions and Recommendations

Xiaochun LU, Jeff AUERBACH, Sergey REVNIVYKH & David TURNER

3) Review of Co-Chairs Presentation to the ICG Plenary

4) Possible Times and Locations for Intersessional Meeting(s)

5) Closing Remarks

David TURNER, U.S. & Sergey REVNIVYKH, Russia

1100-1130 Coffee Break