

Highlights of ICG-02

(Held at Bangalore, India during September 4 to 7, 2007)

Presentation to COSPAR Meeting, Montreal

July 15, 2008.



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Highlights of ICG-02

- **Held in Bangalore, India from 4 to 7 September 2007.**
 - **To review and discuss GNSS and their promising applications**
- **ISRO hosted the meeting**
 - **About 150 GNSS Experts participated**
 - **China, the European Union, India, Italy, Japan, the Russian Federation, the United States and various international organizations and GNSS service providers.**
 - **Malaysia and United Arab Emirates - new members**

Highlights of ICG-02

- **Providers Forum Established**

- China, the European Union, India, Japan, the Russian Federation and the United States
- Addressed key technical issues and operational concepts:
 - Compatibility and interoperability
 - Protection of GNSS spectrum
 - Orbital debris/orbit de-confliction
 - Other matters related to the work of ICG

- **Working Groups were established:**

- Compatibility and interoperability
- Enhancement of performance of GNSS services
- Information dissemination
- Interaction with National and Regional authorities and relevant international organization
- Satellite Based Augmentation System (SBAS) certification

Highlights of ICG-02

Compatibility and interoperability:

- Common center frequencies
- Commonality of other signal characteristics.
- Multiple constellations of broadcasting interoperable open signals
 - improved observed geometry
 - increases end user accuracy everywhere
 - improves service availability in environments where satellite visibility is often obscured.
- Adhere geodetic reference frames realization and system time steering to the existing international standards

Highlights of ICG-02

Compatibility and interoperability

- continued

➤ Time Scales of GNSS

- Already existing GNSS maintain internal system times that are steered to different time scales.
- Synchronize reference times (modulo 1 s) of satellite navigation systems to UTC
- Reference frames shall be in conformity with the ITRF.

➤ EMI:

- Bring out simple set of procedures for isolating EMI problem from the local equipment and space segment.
- Disseminate the optimum mitigation solutions for the benefit of the GNSS user community

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Enhancement of performance of GNSS services:

- The paper “Ionospheric effects on GNSS Aviation Operations” submitted by ICAO GNSS panel in December 2006 as a model for further work by ICG
- Proper choice of advanced GNSS signal structures, ranging codes and center frequencies
 - addresses multi path problems.
- Modern GNSS signal structures and a powerful pilot carrier
 - Improves tracking and acquisition performance of a receiver.

Information Dissemination:

- Work with UNOOSA to develop a curriculum on GNSS as a course discipline.
- Include applications specific to the individual requirements of the developing countries in the training program.

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Interaction with National and Regional authorities and relevant international organization:

- Develop template for information sharing between GNSS service providers and densify the IGS network particularly in sparse areas
- Recommends to place retro reflectors on all GNSS satellites

Satellite Based Augmentation System (SBAS) certification:

- Experts from FAA, ISRO and AAI addressed SBAS certification issues
 - SBASs to be compliant with ICAO standards and recommended practices (SARPs)
 - System operators to define vertical and horizontal alert limits

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Conclusion:

- Compatibility and Interoperability depends not only on signal structure and center frequency issue but depends on the geodetic reference frame and atomic time scale and its steerage to UTC.
- Bilateral and Multilateral discussions between service providers to resolve issues of mutual interference.
- organize workshops to cover technical aspects of detection and mitigation of mutual interference.
- Streamline areas of work of WGs to avoid repetition of work.
- Creation of web portal for ICG.
- **Accepted the invitations for holding next ICG meetings:**
 - **United States to hold 3rd ICG meeting in 2008**
 - **Russian Federation to hold 4th ICG meeting in 2009**



THANK YOU
For Your Attention