

Report on the Third Meeting of the International Committee on Global Navigation Satellite Systems (ICG) Providers' Forum

Pasadena, United States of America

7, 11 and 12 December 2008

1. The third meeting of the Providers' Forum, which consisted of three sessions (on 7, 11 and 12 December 2008), was held in conjunction with the Third Meeting of the International Committee on Global Navigation Satellite Systems. China, India, Japan, the Russian Federation and the United States, as well as the European Community, were represented at the Meeting. The first session of the Providers' Forum started with introductory and welcoming remarks by the chairman.
2. On 7 December 2008, participants in the Providers' Forum reviewed the agenda and meeting procedures for the Forum and the Third Meeting of ICG and discussed the terms of reference and the workplan of the Providers' Forum.
3. On 11 December 2008, participants dealt with the recommendations made by ICG working groups with regard to issues affecting system providers. On 12 December, participants adopted the terms of reference and the workplan of the Providers' Forum.
4. The terms of reference and the workplan of the Providers' Forum are included in the present report in annex I and annex II, respectively.

Terms of reference of the Providers' Forum

A. Background

1. The International Committee on Global Navigation Satellite Systems (ICG) was established on a voluntary basis as an informal body to promote cooperation, on matters of mutual interest related to civil satellite-based positioning, navigation, timing and value-added services, as well as the compatibility and interoperability of global navigation satellite systems, while increasing their use to support sustainable development, particularly in developing countries.
2. In response to a recommended action in the ICG workplan, providers of global and regional navigation satellite systems and satellite-based augmentation systems proposed establishing a Providers' Forum to enhance compatibility and interoperability among current and future systems. The first Providers' Forum meeting, co-chaired by the United States of America and India, was held on 4 September 2007, immediately preceding the second meeting of the ICG. China, India, Japan, the Russian Federation and the United States, as well as the European Community, were present at the meeting.

B. Objectives

3. The objectives of the Providers' Forum are to:
 - a) Promote compatibility and interoperability among current and future global and regional space-based systems by exchanging detailed information about planned or operating systems and the policies and procedures that govern their service provision, consistent with the template for information sharing among providers that was circulated prior to the first meeting;
 - b) Act as a mechanism to continue discussions on important issues addressed by the ICG that require focused inputs from system providers.
4. The Providers' Forum is not a policymaking body, but provides a means to promote discussion among system providers based on agreed guidelines for provision of open services, including transparency, cooperation, performance monitoring and spectrum protection; and agreed principles for ensuring compatibility and interoperability among systems.

C. Membership

5. The Providers' Forum will be open to States Members of the United Nations that are or will be global navigation satellite systems (GNSS) providers. Current members and their respective systems are as follows:
 - a) *China*: Compass/BeiDou Navigation Satellite System (CNSS);
 - b) *India*: Global Positioning System and Geostationary (GEO) Augmented Navigation System (GAGAN) and Indian Regional Navigation Satellite System (IRNSS);
 - c) *Japan*: Quasi-Zenith Satellite System (QZSS) and Multi-functional Transport Satellite (MTSAT) Satellite-based Augmentation System (MSAS);
 - d) *Russian Federation*: Global Navigation Satellite System (GLONASS) and Wide-area System of Differential Corrections and Monitoring (SDCM);
 - e) *United States*: Global Positioning System (GPS) and Wide-area Augmentation System (WAAS);
 - f) *European Community*: European Satellite Navigation System (Galileo) and European Geostationary Navigation Overlay Service (EGNOS).
6. Additional Member States who become GNSS service providers will be invited to join the Providers' Forum upon consensus of the current members.

D. Procedures of work, structure and organization

7. During each meeting, the members will select, on the basis of consensus, a chair for the next meeting. The Office for Outer Space Affairs of the United Nations Secretariat, consistent with its role as the Executive Secretariat of ICG, will also fulfil these responsibilities for the Providers' Forum, in support of the chair.
8. The Providers' Forum will convene once every year in conjunction with the ICG annual meeting and more often if needed. Actions and recommendations developed by working groups of ICG that could impact the compatibility and interoperability, system development and operations, and/or service provision policies and procedures of providers of GNSS will be of particular interest to the Providers' Forum. Therefore, the results of Providers' Forum deliberations and consensus decisions on these and other issues will be reported to ICG as appropriate and when possible, at the next scheduled plenary session of ICG immediately following a Providers' Forum meeting.
9. The meetings of the Providers' Forum will be organized by the chair and designated host, with support from the Executive Secretariat. Each member should designate its principal and additional points of contact.

10. Any recommendations resulting from Providers' Forum meetings will be decided on the basis of consensus of its members.
11. Members will fund their own participation in the activities of the Providers' Forum. Financial support (in-kind or direct funding) to the Executive Secretariat that is above and beyond the annual budget of the Office for Outer Space Affairs or existing funds provided for ICG secretariat services will be provided by members on a voluntary basis.
12. The Providers' Forum may revise these terms of reference on the basis of proposals made by members and adopted by consensus.

Annex II

ICG/PF/WP/DEC2008

Workplan of the Providers' Forum

In order to accomplish the objectives of the Providers' Forum as described in the terms of reference, the members of the Providers' Forum have agreed to pursue the following actions.

Promotion of compatibility and interoperability

1. The principles of compatibility and interoperability and their definition were adopted at the first meeting of the Providers' Forum, held in Bangalore, India, in September 2007 (A/AC.105/901). At the third meeting of the Providers' Forum, held in Pasadena, California, United States of America, in December 2008, these principles and their definition were updated (see appendix). The Providers' Forum will continue to refine these principles of compatibility and interoperability and their definition.
2. The providers will actively support the actions of the working group of the International Committee on Global Navigation Systems (ICG) on compatibility and interoperability, which is focused on defining these principles from the perspective of various user applications and equipment manufacturers. This may require sponsoring and participating in workshops and meetings designed to solicit input from users of global navigation satellite systems (GNSS). It may also require elaboration of an approach for quantitative interoperability evaluation.
3. The providers will draft individual reports on their respective planned or operating systems and the policies and procedures that govern their service provision, consistent with the template for information sharing:
 - a) The reports will be consolidated and maintained by the ICG Executive Secretariat on behalf of the providers and updates will be provided at least annually in preparation for each major meeting of ICG;
 - b) The reports will emphasize each provider's current and planned efforts to ensure compatibility and interoperability among the global, regional and augmentation system components of the global system of navigation satellite systems.

Open service information dissemination

4. Consistent with the principle of transparency in the provision of open services, each individual provider will strive to publish and disseminate all signal and system information necessary to allow manufacturers to design and develop GNSS receivers on a non-discriminatory basis.
5. Based on individual publication of open service signal information, the Providers' Forum will consider developing a template for sharing and disseminating information from individual GNSS open service signal specifications and service standards.

Service performance monitoring

6. Providers will consider the development and discussion of proposals to widely monitor the performance of their open signals and provide timely updates to users regarding critical performance characteristics such as timing accuracy, positioning accuracy and service availability.
7. These discussions should focus on potential cooperation in the development of the necessary ground infrastructure to monitor signal and service performance for open services, recognizing that the actual implementation of this infrastructure is subject to the budgetary limitations of each system provider, and the completion of provider-to-provider agreements as necessary and appropriate.

Spectrum protection: interference detection and mitigation

8. The Providers' Forum will pursue the protection of radio-navigation satellite services (RNSS) spectrum through appropriate domestic and international regulation. When necessary and appropriate, providers will share their views on RNSS spectrum issues and related agenda items under consideration by the International Telecommunication Union and its working parties.
9. In addition, the Providers' Forum will pursue the development of a strategy to detect and mitigate interference in GNSS worldwide by supporting the efforts of the ICG working group on compatibility and interoperability in this regard. This could lead to concrete proposals for detecting interference.
10. This workplan will be reviewed on an annual basis and revised as necessary in order to address important issues that require the attention and focus of system providers.

Providers' Forum principles of compatibility and interoperability and their further definition

Global and regional system providers agreed that at a minimum, all global navigation satellite systems (GNSS) signals and services must be compatible. To the maximum extent possible, open signals and services should also be interoperable, in order to maximize benefit to all GNSS users. For many applications, common carrier frequencies are essential to interoperability and commonality of other signal characteristics is desirable. In some cases, carrier frequency diversity may be preferable to improve performance. The Providers' Forum will continue to investigate the benefits of carrier frequency commonality and diversity, as well as of compatibility and interoperability, as these latter terms are defined below:

(a) *Interoperability* refers to the ability of global and regional navigation satellite systems and augmentations and the services they provide to be used together to provide better capabilities at the user level than would be achieved by relying solely on the open signals of one system:

- (i) Interoperability allows navigation with signals from different systems with minimal additional receiver cost or complexity;
- (ii) Multiple constellations broadcasting interoperable open signals will result in improved observed geometry, increasing end-user accuracy everywhere and improving service availability in environments where satellite visibility is often obscured;
- (iii) Geodetic reference frames realization and system time steerage standards should adhere to existing international standards to the maximum extent practical;
- (iv) Any additional solutions to improve interoperability should be encouraged.

(b) *Compatibility* refers to the ability of global and regional navigation satellite systems and augmentations to be used separately or together without causing unacceptable interference and/or other harm to an individual system and/or service:

- (i) The International Telecommunication Union provides a framework for discussions on radiofrequency compatibility. Radiofrequency compatibility should involve thorough consideration of detailed technical factors, including effects on receiver noise floor and cross-correlation between interfering and desired signals;
- (ii) Compatibility should also respect spectral separation between each system's authorized service signals and other systems' signals. Recognizing that some signal overlap may be unavoidable, discussions among providers concerned will establish the framework for determining a mutually acceptable solution;
- (iii) Any additional solutions to improve compatibility should be encouraged.