



General Assembly

Distr.: General
29 December 2006

Original: English

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**Committee on the Peaceful
Uses of Outer Space**

Meeting of the International Committee on Global Navigation Satellite Systems

(Vienna, 1 and 2 November 2006)

Note by the Secretariat

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I. Introduction

A. Background

1. By its resolution 54/68, the General Assembly endorsed the resolution entitled “The Space Millennium: Vienna Declaration on Space and Human Development”¹ adopted by the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III) in 1999. The Vienna Declaration called for action, inter alia, to improve the efficiency and security of transport, search and rescue, geodesy and other activities by promoting the enhancement of, universal access to and compatibility of space-based navigation and positioning systems. In response to that call, in 2001 the Committee on the Peaceful Uses of Outer Space established the Action Team on Global Navigation Satellite Systems (GNSS), under the chairmanship of Italy and the United States of America.

2. The Action Team on GNSS produced a final report, entitled *Report of the Action Team on Global Navigation Satellite Systems (GNSS): Follow-up to the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III)*.² That report was presented at the United Nations/United States of America International Meeting on the Use and Applications of Global Navigation Satellite Systems, convened from 13 to 17 December 2004 in Vienna as a meeting of GNSS experts who had attended one or more of the four United Nations/United States of America regional workshops, held in 2001 and 2002, or two international meetings, held between 2001 and 2003 (see para. 6 below). The report of the International Meeting in 2004 is contained in document A/AC.105/846.

3. The work of the Action Team on GNSS included comprehensive reviews of existing and planned GNSS and augmentations, their applications by system-provider and user communities, as well as activities carried out by various entities to promote GNSS. The Action Team also examined the requirements of developing countries and gaps in meeting those requirements, as well as existing education and training opportunities in the field of GNSS.

4. The Action Team on GNSS, consisting of 38 member States and 15 inter-governmental and non-governmental organizations, recommended, inter alia, that an international committee on GNSS should be established to promote the use of GNSS infrastructure on a global basis and to facilitate exchange of information. The Committee on the Peaceful Uses of Outer Space included this recommendation in the Plan of Action proposed in its report to the General Assembly on the review of the implementation of the recommendations of UNISPACE III (see A/59/174). In 2004, in its resolution 59/2, the Assembly endorsed the Plan of Action. In the same resolution, the Assembly invited GNSS and augmentation system providers to consider establishing an international committee on GNSS in order to maximize the benefits of the use and applications of GNSS to support sustainable development.

¹ *Report of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space, Vienna, 19-30 July 1999* (A/CONF.184/6, United Nations publication, Sales No. E.00.I.3), chap. I, resolution 1.

² United Nations publication, Sales No. E.05.I.30.

5. The work of the Action Team on GNSS serves as a model for how the United Nations can undertake action to follow up on global conferences and yield tangible results within a fixed time frame.

6. To implement the recommendation of UNISPACE III related to the use of global navigation and positioning systems and to support the work of the Action Team on GNSS, starting in 2001 the Office for Outer Space Affairs of the Secretariat organized regional workshops and international meetings focusing on capacity-building in the use of GNSS in various areas of applications that support sustainable development, as follows:

(a) United Nations/United States of America Workshop on the Use of Global Navigation Satellite Systems for the benefit of countries in Asia and the Pacific, held in Kuala Lumpur from 20 to 24 August 2001 (see A/AC.105/771);

(b) United Nations/United States of America Second Regional Workshop on the Use and Applications of Global Navigation Satellite Systems for the benefit of countries in Eastern Europe, held in Vienna from 26 to 30 November 2001 (see A/AC.105/776);

(c) United Nations/United States of America Third Regional Workshop on the Use and Applications of Global Navigation Satellite Systems for the benefit of countries in Latin America and the Caribbean, held in Santiago from 1 to 5 April 2002 (see A/AC.105/795);

(d) United Nations/United States of America Workshop on the Use of Global Navigation Satellite Systems for the benefit of countries in Africa, held in Lusaka from 15 to 19 July 2002 (see A/AC.105/785);

(e) International Meeting on the Use and Applications of Global Navigation Satellite Systems, held in Vienna from 11 to 15 November 2002;

(f) United Nations/United States of America International Workshop on the Use and Applications of Global Navigation Satellite Systems, held in Vienna from 8 to 12 December 2003;

(g) United Nations/United States of America International Meeting on the Use and Applications of Global Navigation Satellite Systems, held in Vienna from 13 to 17 December 2004 (see A/AC.105/846);

(h) United Nations International Meeting for the Establishment of the International Committee on Global Navigation Satellite Systems, held in Vienna on 1 and 2 December 2005.

7. The above workshops and meetings were co-sponsored by the Government of the United States, which also provided substantive technical support for the workshops and meetings. The European Space Agency co-sponsored the workshops held in Santiago and Lusaka in 2002. Starting in 2001, additional meetings of the Action Team on GNSS and other interested parties were held in the margins of the meetings of the Committee on the Peaceful Uses of Outer Space and its Scientific and Technical Subcommittee. The participants in the international and additional meetings developed the draft terms of reference for the international committee on GNSS. At the international meeting held in December 2005, interested Governments and intergovernmental and non-governmental organizations agreed to establish the international committee.

8. Those participating in the establishment of the international committee on GNSS agreed that an open-ended ad hoc working group would be established to discuss pending issues already identified in the draft terms of reference. The working group would also consider by electronic mail the development of the substantive workplan of the international committee and its tentative schedule of work. The first meeting of the international committee would consider the proposals made by the working group. It was also agreed that the Office for Outer Space Affairs would serve as the focal point for matters relating to organizing the first meeting of the international committee.

9. In its resolution 61/111, the General Assembly noted with appreciation that the International Committee on Global Navigation Satellite Systems had been established on a voluntary basis as an informal body to promote cooperation, as appropriate, 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.

B. Structure and programme of the meeting

10. At the opening of the meeting of the International Committee on Global Navigation Satellite Systems, introductory and welcoming statements were made by representatives of the Office for Outer Space Affairs.

11. The programme of the meeting consisted of plenary sessions. The presentations made at the plenary focused on the status of activities and developments relating to GNSS service providers and augmentation system providers, and GNSS applications, education and capacity-building activities at the international, regional and national levels. Plenary sessions reviewed and identified specific actions to be undertaken under the workplan of the International Committee and focused on the terms of reference of the Committee. The plenary also dealt with a proposal for the creation of a providers forum. Taking into account the recommendations of the open-ended ad hoc working group of the International Committee, the meeting reached the results summarized in chapter II below, which presents the conclusions adopted by the meeting.

C. Attendance

12. Representatives of the following States participated in the meeting of the International Committee on Global Navigation Satellite Systems: China, India, Italy, Japan, Nigeria, Russian Federation and United States. Representatives of the Office for Outer Space Affairs of the Secretariat and the International Telecommunication Union (ITU) also participated. The following intergovernmental and non-governmental organizations were also represented at the meeting: Civil Global Positioning System Service Interface Committee, Committee on Space Research, European Space Agency, Fédération internationale des géomètres, International Association of Geodesy, International Association of Geodesy Reference Frame Sub-Commission for Europe, International Association of Institutes of Navigation,

International Cartographic Association, International GNSS Service and International Steering Committee of the European Position Determination System.

II. Conclusions of the meeting

13. The International Committee recalled that, in 2004, in its resolution 59/2, the General Assembly had invited GNSS and augmentation providers to consider establishing an international committee on GNSS, based on the recommendation of the Committee on the Peaceful Uses of Outer Space to implement one of the major actions called for in the resolution entitled “The Space Millennium: Vienna Declaration on Space and Human Development”¹ adopted by UNISPACE III and endorsed by the Assembly in its resolution 54/68. On that basis, the International Committee on Global Navigation Satellite Systems was established in December 2005. It was agreed that participation in the work of the International Committee as members, associate members and observers would be reconfirmed through the Office for Outer Space Affairs.

14. Representatives of the States Members of the United Nations and international organizations and entities listed in paragraph 12 above met in Vienna on 1 and 2 November 2006 to review and discuss matters relating to GNSS and their promising applications. Those applications included safety and economic development, particularly the efficiency and safety of transport, search and rescue, geodesy, land management and sustainable development, and other activities. The International Committee addressed the use of the applications to promote the enhancement of universal access to, and compatibility and interoperability of, space-based navigation and positioning systems and the integration of those services into national infrastructures, particularly in developing countries.

15. The International Committee adopted its terms of reference and workplan as developed in international meetings held since 2002 and incorporating the proposals made by the open-ended ad hoc working group of the International Committee, which met in Vienna in March, June and October 2006. The current workplan included compatibility and interoperability; enhancement of performance of GNSS services; information dissemination; interaction with national and regional authorities and relevant international organizations; and coordination. All participants would cooperate, as appropriate, on matters of mutual interest related to civil satellite-based positioning, navigation, timing and value-added services. In particular, they would cooperate to the maximum extent practicable to maintain radio frequency compatibility in spectrum use between different GNSS systems in accordance with the ITU Radio Regulations. The Office for Outer Space Affairs was currently serving as the secretariat of the international committee.

16. A proposal to establish a providers forum to enhance compatibility and interoperability among current and future global and regional satellite-based systems was also noted by the International Committee. The potential members of the providers forum could include China, the European Community, the European Space Agency, India, Japan, the Russian Federation and the United States. The potential members would advise the International Committee through the Office for Outer Space Affairs upon final agreement to establish the forum.

17. The terms of reference, the workplan of the International Committee and the list of Member States and intergovernmental and non-governmental entities participating in the meeting of the International Committee, as agreed by the Committee, are attached as annexes to the present report. The annexes are in English only and have not been formally edited.

18. The International Committee, a forum for discussion of matters related to GNSS on a worldwide basis, will continue to meet regularly to address issues of common interest. The Committee accepted the invitation of India to host the second meeting, to be held in 2007.

Annex I

ICG/REP/1/NOV2006
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Terms of Reference of the International Committee on Global Navigation Satellite Systems

A. Background

1. Global navigation satellite systems (GNSS) have evolved from an early period of limited programmes to a point where a number of systems and their augmentations are operating or planned. In the future, a number of international and national programmes will operate simultaneously and support a broad range of interdisciplinary and international activities. Discussions taking place at national, regional and international levels have underscored the value of GNSS for a variety of applications. The emergence of new GNSS and regional augmentations has focused attention on the need for the coordination of programme plans among current and future operators in order to enhance the utility of GNSS services.

2. The representatives of GNSS core system providers, GNSS augmentation providers and the international organizations primarily associated with the use of GNSS and representatives of international projects in developing countries,

Aware of the overlap of GNSS mission objectives and of the interdisciplinary applications of GNSS services,

Recognizing the advantages of ongoing communication and cooperation among operators and users of GNSS and their augmentations,

Recognizing the need to protect the investment of the current user base of GNSS services through the continuation of existing services,

Aware that the complexity and cost of user equipment should be reduced whenever possible,

Convinced that GNSS providers should pursue greater compatibility and interoperability among all current and future systems in terms of spectrum, signal structures, time and geodetic reference standards to the maximum extent possible,

Desiring to promote the international growth and potential benefits of GNSS,

Noting that General Assembly resolution 59/2 (paragraph 11) invites GNSS and augmentation providers to consider establishing an international committee on GNSS in order to maximize the benefits of the use and applications of GNSS to support sustainable development,

Have agreed to establish on the basis of these non-binding terms of reference, the International Committee on GNSS for the purpose of promoting the use and application of GNSS on a global basis.

B. Objectives

3. The objectives of the Committee are to:

(a) Benefit users of GNSS services through consultations among members of the Committee;

(b) Encourage coordination among providers of GNSS core systems and augmentations in order to ensure greater compatibility and interoperability;

(c) Encourage and promote the introduction and utilization of satellite positioning, navigation and timing services, particularly in the developing countries through assistance with the integration of GNSS services into their infrastructures;

(d) Assist both the members of the Committee and the international user community by, inter alia, serving as the focal point for international information exchange related to GNSS activities, respecting the roles and functions of GNSS service providers and intergovernmental bodies such as the International Telecommunication Union (ITU), the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO);

(e) Better address future user needs in the GNSS development plans and applications; and

(f) Report periodically on its activities to the Committee on the Peaceful Uses of Outer Space.

These objectives will be accomplished by an indicative workplan of the International Committee.

C. Participants (Members, Associate Members and Observers)

4. The International Committee will be open to States Members of the United Nations, international organizations or international entities that are responsible for GNSS and their augmentations operating under governmental authority or involved in implementing or promoting GNSS services and applications. There will be three categories of participants in the Committee: Members, Associate Members and Observers.

(a) Members:

Current and future core system providers, including the European Community (Galileo), the Russian Federation (GLONASS) and the United States of America (GPS);

States Members of the United Nations with an active programme in implementing or promoting a wide range of GNSS services and applications (Italy);

Current and future space-based regional or augmentation system providers including, for example, China (Compass), the European Space Agency (EGNOS), India (GAGAN/INRSS), Japan (MSAS/QZSS), Nigeria (NigComsat-1 SBAS, Nigerian Communication Satellite Space Based Augmentation System) and the United States (WAAS);

(b) Associate Members:

International and regional organizations and associations dealing with GNSS services and applications, including the Office for Outer Space Affairs of the United Nations Secretariat, the Civil GPS Service Interface Committee (CGSIC), the International Association of Geodesy (IAG), the International Cartographic Association (ICA), the International GNSS Service (IGS, formerly International GPS Service), the International Society for Photogrammetry and Remote Sensing (ISPRS), the International Earth Rotation and Reference Systems Service (IERS), the Fédération internationale des géomètres (FIG), the European Position Determination System (EUPOS) and the International Council for Science (ICSU);

(c) Observers:

The Committee on Space Research (COSPAR), the Bureau international des poids et mesures (BIPM), the International Association of Institutes of Navigation (IAIN), the Union radio-scientifique internationale (URSI) and the International Telecommunication Union (ITU).

5. The Committee will make decisions by consensus of the Members. Associate Members and Observers will provide advice, monitor the work of the Committee, participate in working groups established in accordance with paragraph 8 below, participate in activities identified in the workplan of the International Committee and report back to their own organizations. Members and Associate Members may host meetings of the Committee and chair and participate in working groups and host or provide support to a permanent secretariat that may be established to support the Committee. The admission of new Members, Associate Members and Observers will be with the consensus of the Members of the Committee.

D. Procedures of work, structure and organization

6. The proposed structure for an International Committee could consist of a chairperson, a plenary session of the Committee, an executive secretariat and working groups. The chair will rotate on an annual basis among the Members and Associate Members.

7. The Committee will convene at least once every year in plenary session. Meetings of the Committee will be organized by the designated host. Each Member, Associate Member and Observer should designate its principal and its point of contact. Any change to the principals and/or points of contact should be communicated to the chairperson of the Committee.

8. The Committee may establish, as mutually agreed and on an ad hoc basis, working groups to investigate specific areas of interest, cooperation and coordination and to report at subsequent plenary sessions. Continuation of each working group requires confirmation at each plenary session by the Members.

9. Recommendations resulting from the plenary sessions or the findings and recommendations of working groups will be decided on the basis of consensus of the plenary session, do not create legal obligations and will be acted upon at the discretion of each Member, Associate Member or Observer.

10. The Committee may revise these terms of reference on the basis of proposals made by Members and adopted by consensus.
11. The Committee may revise the workplan on the basis of proposals made by Members, Associate Members and Observers and adopted by consensus of the Members, in consultation with the Associate Members.
12. Members, Associate Members and Observers will fund their own participation in the activities of the International Committee, including the working groups. In the event that the Committee establishes an executive secretariat, support (in-kind or direct funding) will be determined by the Members and Associate Members of the Committee.

Annex II

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Workplan of the International Committee on Global Navigation Satellite Systems

The Committee's indicative workplan contains the following elements:

(a) Compatibility and interoperability

Since compatibility and interoperability are highly dependent on the establishment of standards for service provision and user equipment, the Committee might need to address the topic of the adoption of common guidelines. However, the Committee would not itself set guidelines; instead it will identify applications where no guidelines currently exist (i.e. such as land transport use of global navigation satellite systems (GNSS) through interoperability of regional ground based differential GNSS (DGNSS) augmentation systems), and recommend possible organizations that could appropriately set new guidelines. Consultation with existing standard-setting bodies, such as the International Civil Aviation Organization (ICAO), the International Maritime Organization (IMO), the International Telecommunication Union (ITU) and the International Organization for Standardization (ISO) will also be required.

The working group formed to address compatibility and interoperability, to be co- led by the United States of America and the Russian Federation, will pursue the following actions:

Action A1: Establish a providers forum to enhance compatibility and interoperability among current and future global and regional space-based systems.

Action A2: Organize a workshop(s) on measures being taken by Members, Associate Members and Observers to enhance interoperability and compatibility of (1) global and regional space-based systems and (2) regional ground-based DGNSS.

Action A3: Survey the level of interoperability and standardization among GNSS constellations and augmentations in order to identify concrete steps that can be taken at different levels (regulatory, system implementation, user algorithms) to improve interoperability and standardization. It is expected that the situation is well advanced in civil aviation and maritime areas, therefore, the effort would probably need to concentrate on land-based applications and users.

Action A4: Consider guidelines for the broadcast of natural disaster alarms via GNSS.

Action A5: Develop a strategy for support by the International Committee of mechanisms to detect and mitigate sources of electromagnetic interference, taking existing regulatory mechanisms into consideration.

(b) Enhancement of performance of GNSS services

As a unique combination of GNSS service providers and major user groups, the Committee will work to promote and coordinate activities aimed at enhancing GNSS performance, recommending system enhancements and meeting future user needs. Specifically, the following actions will be taken by a working group co-led by India and the European Space Agency:

Action B1: Develop a reference document on models and algorithms for ionospheric and tropospheric corrections.

Action B2: Examine the problem of multi-path and related mitigation actions affecting both GNSS systems and user receivers, especially for mobile receivers.

Action B3: Examine the extension of GNSS service to indoor applications.

(c) Information dissemination

The Committee will consider the establishment of user information centres by GNSS providers. The maintenance of a globally focused website will be a major task of these centres. The United Nations, through the Office for Outer Space Affairs of the Secretariat and on behalf of the Committee, will combine all the websites into a single site to act as a portal for users of GNSS services. Therefore, the Office for Outer Space Affairs will lead a working group to accomplish the following actions:

Action C1: Establish the International Committee information portal drawing on contributions from Members, Associate Members and Observers of the Committee. This will include a calendar of GNSS-related events.

Action C2: Identify undergraduate and graduate courses on GNSS to be included on the Committee portal.

Action C3: Consider the possibility of disseminating a list of relevant textbooks on GNSS in English and other languages through the Committee portal. Consideration will also be given to developing a glossary of terms and definitions.

Action C4: Consider the use of the Regional Centres for Space Science and Technology Education, affiliated to the United Nations, to promote GNSS use and applications.

Action C5: Identify international conferences where Members, Associate Members and Observers will make presentations on the existence and work of the International Committee. A list of such events will be maintained on the Committee information portal.

Action C6: Develop a proposal for further mechanisms to promote the applications of GNSS.

(d) Interaction with national and regional authorities and relevant international organizations

The Committee will establish links with national and regional authorities and relevant international organizations, particularly in developing countries.

The Committee will organize and sponsor regional workshops and other types of activity in order to fulfil its objectives. The Fédération internationale des géomètres (FIG), the International Association of Geodesy (IAG) and the International GNSS Service will co-lead the activities listed below:

Action D1: Define minimum operational performance standards for GNSS performance monitoring networks.

Action D2: Establish a working group focused on Site Quality, Integrity and Interference Monitoring (SQII).

Action D3: Establish a working group to develop a strategy for support by the International Committee of regional reference systems (e.g., the African Geodetic Reference Framework (AFREF), the European Position Determination System (EUPOS), the IAG Reference Frame Sub-Commission for Europe (EUREF) and the Geocentric Reference System for the Americas (SIRGAS)).

Action D4: Establish a working group to develop a strategy for support by the International Committee of mechanisms to detect and mitigate sources of electromagnetic interference, taking existing regulatory mechanisms into consideration.

(e) Coordination

In the future, the Committee will consider, make recommendations and agree on actions to promote appropriate coordination across GNSS programmes. Furthermore, the Committee will encourage its Members, Associate Members and Observers to maintain communication, as appropriate, with other groups and organizations involved in GNSS activities and applications, through the relevant channels within their respective Governments and organizations.

The Committee could also support the establishment of national and/or regional planning groups for GNSS that would address regulations associated with the use of GNSS services and suggest organizational models to use at the national level for co-ordinating and governing GNSS use.

Annex III

ICG/REP/1/NOV2006

List of States Members of the United Nations and intergovernmental and non-governmental organizations participating in the International Committee on Global Navigation Satellite Systems

1. China
 2. European Commission
 3. India
 4. Japan
 5. Nigeria
 6. Russian Federation
 7. United States of America
 8. Italy
 9. Bureau international des poids et mesures (BIPM)
 10. Civil GPS Service Interface Committee (CGSIC)
 11. Committee on Space Research (COSPAR)
 12. European Space Agency (ESA)
 13. International EUPOS Steering Committee (EUPOS)
 14. IAG Reference Frame Sub-Commission for Europe (EUREF)
 15. Fédération internationale des géomètres (FIG)
 16. International Association of Geodesy (IAG)
 17. International Association of Institutes of Navigation (IAIN)
 18. International Cartographic Association (ICA)
 19. International GNSS Service (IGS)
 20. International Telecommunication Union (ITU)
 21. Office for Outer Space Affairs
 22. Union radio-scientifique internationale (URSI)
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