
Report of Working Group C: Information Dissemination and Capacity Building

1. The Working Group C on Information Dissemination and Capacity Building (WGC) held its fifth meeting in Tokyo, Japan, on 7 and 8 September 2011 in conjunction with the Sixth Meeting of the International Committee on Global Navigation Satellite Systems (ICG), 5 – 9 September 2011 under the chairmanship of the United Nations Office for Outer Space Affairs and Japan.
2. The meeting was attended by representatives of China, Japan, Russian Federation, United States of America and European Union. The representative of Space Generation Advisory Council (SGAC) also participated in the meeting.
3. The Working Group in the course of its deliberations in 2010 in the Fifth Meeting of the ICG, Turin, Italy reviewed progress made in the implementation of and follow-up to its recommendations and the activities carried out by the Office for Outer Space Affairs in the framework of its Programme on GNSS Applications.
4. After brief introductory remarks focused on the expectations of the meeting, the co-chairs invited the presentations. Details of the meeting agenda and the presentations made are available at the ICG Information Portal¹.
5. The Working Group heard the following presentations:
 - i) “GNSS-R data collection experiment and applications”, by Mr. Dongkai YANG, Beihang University, China;
 - ii) “Public organization’s activities in the field of information dissemination on GNSS”, by Ms. Anastasia LYUBIMOVA, Association “GLONASS/GNSS – Forum”, Russian Federation;
 - iii) “Multimedia in Training of Specialists in GNSS: Russian Experience”, by Mr. Pavel KAZAKOV, JSC "Russian Space Systems", Russian Federation;
 - iv) “SGAC and YGNSS Outreach: Updates and Considerations of Synergies”, by Ms. Stephanie WAN, Space Generation Advisory Council;
 - v) “Education and Training Activities in China”, by Mr. Jingnong WENG, Beihang University, China;
 - vi) “USA Proposal: Add responsibility for outreach activities and workshops to the workplan of the ICG Working Group C”, by Mr. Rick HAMILTON, United States of America;
 - vii) “GNSS curriculum launched by ENAC Toulouse, FAF Munich and Politecnico di Torino”, by Mr. Frédéric BASTIDE, European Commission.
6. At the conclusion of the presentations from Working Group members, the Working Group discussed the USA proposal to consider adding the responsibility for ICG outreach activities to the work-plan of ICG WGC.
7. The representative of USA noted that ICG information dissemination was currently limited to requests made by external organizations, which was then fulfilled either by the Secretariat or Provider. Whereas, the members of WG C representing governmental/non-governmental organizations and academia, were particularly suited to having the necessary points of contact to arrange for internal and external requests

¹ See www.icgsecretariat.org

for ICG outreach activities. The available WGC's resources could contribute to providing further dissemination of information related to ICG. Based upon the decisions and recommendations of the ICG, members were also suited in developing and writing outreach press or media releases, and consider external venues for sharing ICG activities.

8. It was proposed that the outreach activities could be conducted on two different levels: internal to ICG, WGC could support ICG outreach requests proposed by the Providers' Forum based upon requirements; and externally, WGC could support inquiries on ICG activities and to consider venues to pursue and execute ICG outreach activities.
9. After extensive discussions and at the suggestions of the co-chairs, the Working Group agreed to continue discussing the US proposal at its next meeting and continued its discussion on the following two themes:
 - Education and training programmes on GNSS
 - GNSS Education Curriculum
10. The Working Group discussed about education and training programmes on GNSS. It was noted that to meet effectively work market demands for high-level technicians endowed with a broad vision of the state-of-the-art navigation/localization, new programmes on GNSS fundamental techniques were needed, including: (i) distance learning programmes and web-based education curriculum; (ii) multimedia softwares, and (iii) demonstration data sets to enrich the training and research programmes on GNSS. It was also noted that cooperation with industries should also be taken into consideration.
11. In order to facilitate its work on GNSS education curriculum, the Working Group had before it a draft GNSS education curriculum developed by the ad hoc group of experts for introduction at the Regional Centres for Space Science and Technology Education affiliated to the United Nations.
12. The Working Group discussed the content of the Education Curriculum. It was noted that the additional review of the curriculum was needed and recommended that: (i) the Providers' Forum members could enrich the depth and content of the curriculum taking into account the current status of the current and planned systems and their policies; (ii) the ICG associate members representing international and regional organizations/associations dealing with GNSS services and applications could improve, the modules related to the practical exercises (laboratory experiments, field visits, project work), and (iii) Space Weather-related topics should also be added taking into account growing interest in better understanding solar-terrestrial interactions, particularly patterns and trends in space weather and the space weather impact on GNSS-based applications.
13. The Working Group welcomed innovative programmes that increase access to education on GNSS and its applications, particularly in developing countries, including support for the establishment of international and/or regional centres for GNSS science, technology development and education.
14. The Working Group agreed to add a new action item to the workplan (see Attachment 1):

Build upon the existing educational programmes and support the creation of new under-/post- graduates programmes in both developing and developed countries, including distance learning programmes, web-based courses and tutorials, interactive programmes for middle/high schools, multimedia softwares and demonstration data sets to enrich the training and research programmes. Further consideration should be given to onsite "hands-on/off" training programmes. Support the establishment of International Centres for

GNSS Science, Technology Development and Education based on the existing national educational and research institutions.

15. The Working Group was also of the view that the ICG Information Portal (www.icgsecretariat.org) should be constantly updated and strengthened to reflect progress attained towards the recommendations made and the activities carried out in the framework of its workplan.

ATTACHMENT 1

Revised Workplan Working Group C – Information Dissemination and Capacity Building (Lead: United Nations Office for Outer Space Affairs)

Introduction

Efforts to build capacity in space science and global navigation satellite systems (GNSS) technology are considered a major focus of the Office for Outer Space Affairs and are of specific interest to ICG. Such efforts should aim to provide support to the regional centres for space science and technology education affiliated to the United Nations, which would also act as ICG information centres, to foster a more structured approach to information exchange in order to fulfil the mutual expectations of a network linking ICG and the regional centres; and to connect the institutions involved or interested in GNSS applications with GNSS system providers. The regional centres for Africa are located in Morocco and Nigeria; for Latin America and the Caribbean, in Brazil and Mexico; and for Asia and the Pacific, in India. Therefore, the Office for Outer Space Affairs will lead the working group and ensure that the work is carried out, milestones are reached and deliverables are met. As work of the working group proceeds, additional UN entities, institutions or organizations may join, thus ensuring wider participation. The workplan consists of 4 actions and it consolidates ICG activities implemented as part of the workplan approved at the first meeting of ICG in 2006 (A/AC.105/879, annex 1, ICG/WP/NOV2006).

Training for Capacity Building in Developing Countries

Action C1: Establish and support education and training programmes related to satellite navigation and location-based services for purposes of building capacity in developing countries through the regional centres for space science and technology education affiliated to the United Nations and other centres of excellence. This will consolidate the regional centres as ICG information centres and lead to the development of a GNSS education curriculum. In addition, update and maintain the ICG information portal's education-focused page to incorporate e-learning based mode of knowledge transfer and a list of relevant textbooks on GNSS in English and other languages.

Action C2 (new): Build upon the existing educational programmes and support the creation of new under and post graduates programmes in both developing and developed countries, including distance learning programmes, web-based courses and tutorials, interactive programmes for middle/high schools, multimedia softwares and demonstration data sets to enrich the training and research programmes. Further consideration should be given to onsite "hands-on/off" training programmes. Support the establishment of International Centres for GNSS Science, Technology Development and Education based on the existing national educational and research institutions.

Promoting the Use of GNSS Technologies as Tools for Scientific Applications

Action C3: Promote the use of GNSS technologies as tools for scientific applications in developing countries, with emphasis on Africa. This action will lead to the development and implementation of a training programme for the end users in various disciplines, such as geodesy, geophysics, space weather and meteorology, and to provide a forum for exchanges among scientists and organizers of networks of instruments.

International Space Weather Initiative

Action C4: Build upon the International Space Weather Initiative (ISWI) and support the establishment of ground-based world-wide instrument arrays for exploring atmospheric phenomena related to space weather and climate change. The initiative is to address all aspects of the response of the mid- and low-latitude ionosphere to magnetic storms and space weather effects of such storms, including *in situ* and ground-based observations as well as modeling and theoretical studies.

Regional Workshops on Applications of GNSS

Action C5: Organize a series of workshops focusing on capacity-building in the use of GNSS in various areas of applications that support sustainable development, in particular in developing countries.

ATTACHMENT 2**WG-C Recommendation 1 for Committee Decision**

Prepared by: Working Group C
Date of Submission: 8 September 2011
Issue Title: Education and training programmes on GNSS

Background/Brief Description of the Issue:

A lack of graduate and undergraduate education in GNSS fundamental techniques; a new action item “Education and training programmes on GNSS” to be added into the WG workplan.

Discussion/Analyses:

To meet effectively work market demands for high-level technicians endowed with a broad vision of the state-of-the-art navigation/localization, new programmes are needed, including: (i) distance learning programmes and web-based education curriculum; (ii) multimedia softwares and, (iii) demonstration data sets in order to enrich the training and research programmes.

Cooperation with industries should also be taken into consideration.

Recommendation of Committee Action:

To add a new action to the workplan of the working group on “Education and training programmes on GNSS”

Build upon the existing educational programmes and support the creation of new under and post graduates programmes in both developing and developed countries, including distance learning programmes, web-based courses and tutorials, interactive programmes for middle/high schools, multimedia softwares and demonstration data sets to enrich the training and research programmes. Further consideration should be given to onsite “hands-on/off” training programmes. Support the establishment of International Centres for GNSS Science, Technology Development and Education based on the existing national educational and research institutions.

WG-C Recommendation 2 for Committee Decision

Prepared by: Working Group C
Date of Submission: 8 September 2011
Issue Title: Education curriculum on GNSS

Background/Brief Description of the Issue:

The ad hoc group of experts drew up a GNSS education curriculum for introduction at the regional centres for space science and technology education affiliated to the United Nations. The ICG membership is invited to improve the course content

Discussion/Analyses:

The WG meeting considered that the additional review of the curriculum by (i) the Providers' Forum members could enrich the depth and content of the curriculum taking into account the current status of the current and planned systems and their policies; (ii) the ICG associate members representing international and regional organizations/associations dealing with GNSS services and applications could improve the content of the education curriculum, in particular the part related to the practical exercises (laboratory experiments, field visits, project work), and (iii) Space Weather-related topics should also be added taking into account growing interest in better understanding solar-terrestrial interactions, particularly patterns and trends in space weather and the space weather impact on GNSS-based applications.

Recommendation of Committee Action:

Support of the ICG membership in further development (possible improvement) of the current content of the GNSS education curriculum to address the following topics: (i) Current status of planned or operating systems and policies and procedures that govern their service provision; (ii) GNSS services and applications; (iii) Atmospheric phenomena related to space weather and climate change.