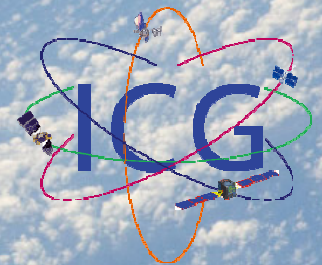




# SIXTH MEETING OF THE INTERNATIONAL COMMITTEE ON GLOBAL NAVIGATION SATELLITE SYSTEMS (ICG)

## ICG-6 Outcomes





# Outline of ICG-6

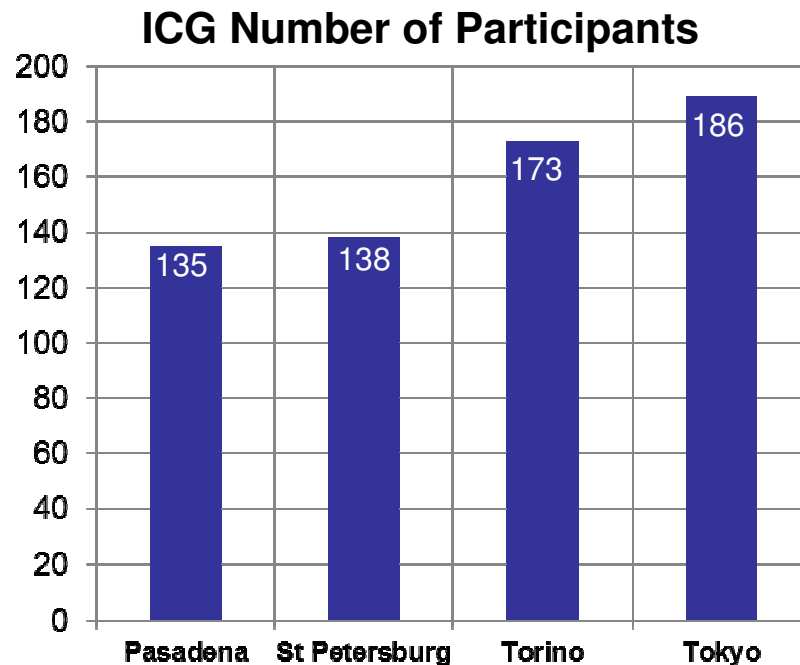
**The Sixth Meeting of the International Committee on Global Navigation Satellite Systems (ICG) was held in Tokyo, Japan from September 5-9 2011. The Plenary Session of the ICG was chaired by Japan.**



# Outline of ICG-6 (cont'd)

The number of ICG participants has been increasing year by year, and reached 186 in the ICG-6.

China, ESA, EU, India, Italy, Japan, Malaysia, Nigeria, Russia, UAE, USA, CGSIC, EUPOS, EUREF, FAI, FIG, IAG, IERS, IGS, UNOOSA, BIPM, COSPAR, IOAG, ITU, Australia, Nepal, Norway



## Outline of ICG-6 (cont'd)

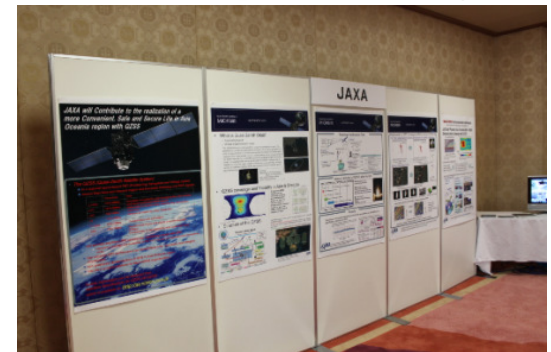
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**ICG continued reviewing and discussing developments in global navigation satellite systems (GNSS).**

**ICG also addressed GNSS space technology applications to agriculture, fishery, information technology construction (precision positioning), geographic information system (GIS), disaster mitigation, intelligent transportation system and location-based services.**

**The Interagency Operations Advisory Group (IOAG) and the Fédération Aéronautique Internationale (FAI) were recognized by ICG as a new observer and associate member respectively in the ICG-6.**



# Working Group A : Compatibility and Interoperability

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## WG-A Recommendation

- Continuation of WG-A compatibility subgroup
- Proposed workshop on GNSS Spectrum Protection and Interference
  - Detection and Mitigation for ICG Providers' Forum Member Consideration*
  - *USG and GOJ jointly proposed this workshop.*
- Consensus on Open Service GNSS performance parameters, including Definitions and Calculation Methods
- International GNSS Monitoring and Assessment



# Working Group B :

## Enhancement of the Performance on GNSS Services

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### WG-B Recommendation

- Integrity via ARAIM
- Satellite Navigation in Natural Disasters
- Workshop on New Message Broadcasts in New Signals
- Establishment of a sub-group on ‘Applications’ in WG-B
  - *Japan will serve as the co-chair with China.*
- Meeting of WG-B subgroup on “Applications” during Munich Satellite Navigation Summit
- Interoperable GNSS Space Service Volume
- Standardization for Maritime Applications





# **Working Group C : Information Dissemination and Capacity-building in Developing Countries**

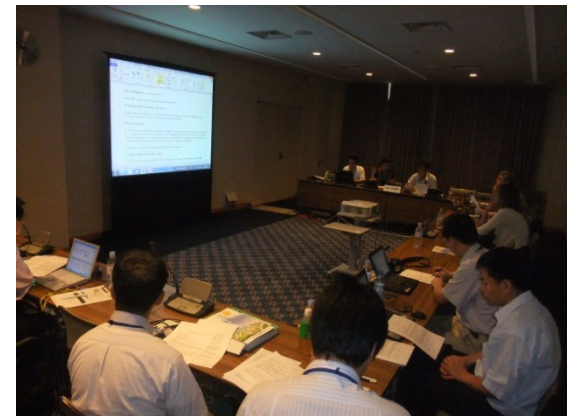
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## **WG-C Recommendation**

- **Education and training programs on GNSS**
- **Education curriculum on GNSS**

**Japan served as the co-chair for WG-C this time.**



# Working Group D :

## Reference Frames, Timing and Applications

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### WG-D Recommendation

- Finalization and Publication of Templates on Geodetic and Timing References
- Interoperability of geodetic references among the different GNSS systems
- International GNSS Service Multi-GNSS Global Experiment – IGS M-GEX
  - *It noted that the IGS was simultaneously harmonizing the IGS M-GEX in support of the JAXA CfP ‘Multi-GNSS Demonstration Asia and Oceania’.*





# Providers' Forum

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**The Seventh Meeting of the Providers' Forum, co-chaired by Japan and the United States, was held in conjunction with the ICG meeting.**

## **A. Summary of discussions and recommendations**

- **Open service information dissemination**
- **Service performance monitoring**
- **Spectrum protection: interference detection and mitigation**

# Providers' Forum (cont'd)

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## **B. Other matters**

- **Report on a multi-GNSS demonstration project in the Asia/Oceania region**
- **ICG information centres**
- **ICG information portal**
- **Glossary of terms related to the work of the ICG and the Providers' Forum**
- **Document consolidating decisions and conclusions**

## **Providers' Forum (con'd)**

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- **Future structure of ICG**
- **Review and discussion of presented ICG working group reports**
- **Membership in ICG**
- **Replacement and succession of the European Community by the European Union in the terms of reference of ICG and its Providers' Forum**
- **Chair and next meeting of the Providers' Forum**

# Applications and Experts Seminar

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**"Applications and Experts Seminar"** was held as part of the Meeting from September 5-6, 2011.

The seminar consisted of 3 sessions, namely

**"Session 1: Agriculture, Fishery and Information Technology Construction (Precise Positioning)",**

**"Session 2: Geographic Information System (GIS) and Disaster Mitigation"**

**"Session 3: Intelligent Transportation System (ITS) and Location Based Services (LBS)".**

**Experts from Indonesia, Vietnam, Thailand, and South Korea were invited as presenters in addition to ICG Members, Associate Members and Observers.**



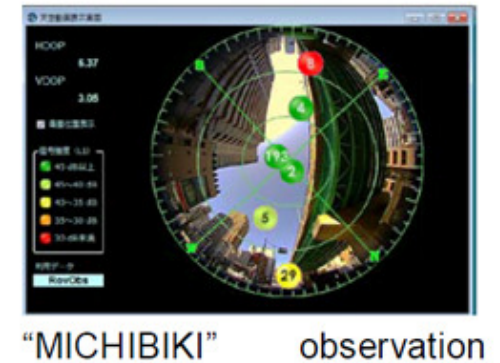


# Technical Tour

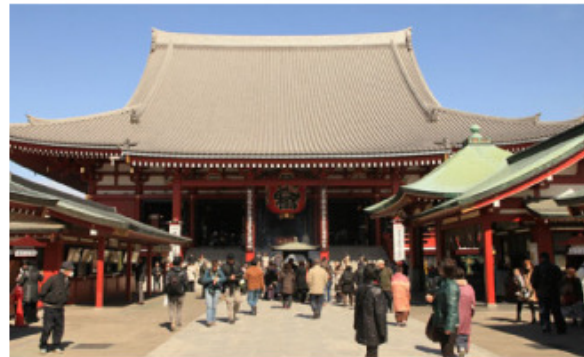
## "MICHIBIKI" (QZS-1)

### Experience during Bus-Ride to TUMSAT

\*TUMSAT: Tokyo University of Marine Science and Technology



## Tourist Navigation @ Senso-ji temple

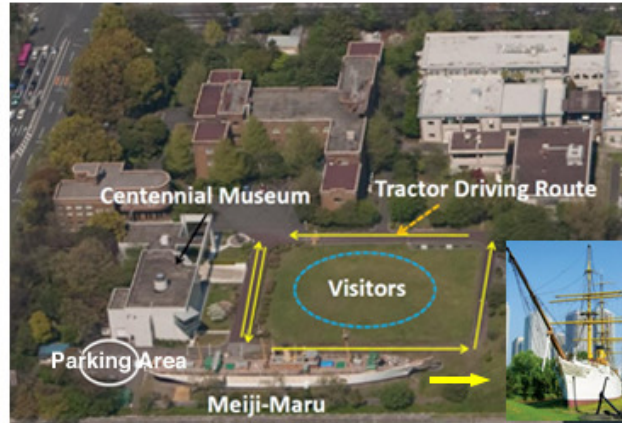


# Technical Tour (cont'd)

## Automatic Driving @ TUMSAT



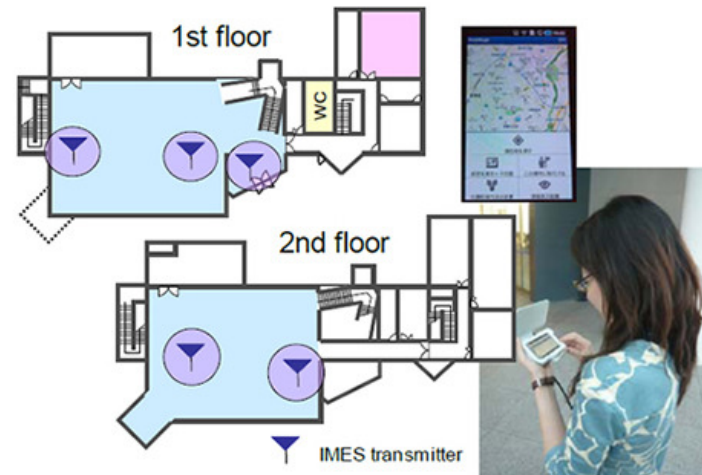
Robot Tractor



The Meiji-maru is the oldest surviving iron ship in Japan.



## Indoor Messaging System (IMES) Demo @ TUMSAT



# Future Schedule of ICG Meeting

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**ICG accepted the invitation of China to host its **Seventh Meeting in Beijing, from November 4-9, 2012.****

**The Office for Outer Space Affairs, in its capacity as the Executive Secretariat of ICG and its Providers' Forum, will assist in the preparations for the meeting and for interim planning meetings and Working Groups activities.**

**ICG noted the expression of interest by the United Arab Emirates to host the Eighth Meeting of ICG in December 2013.**



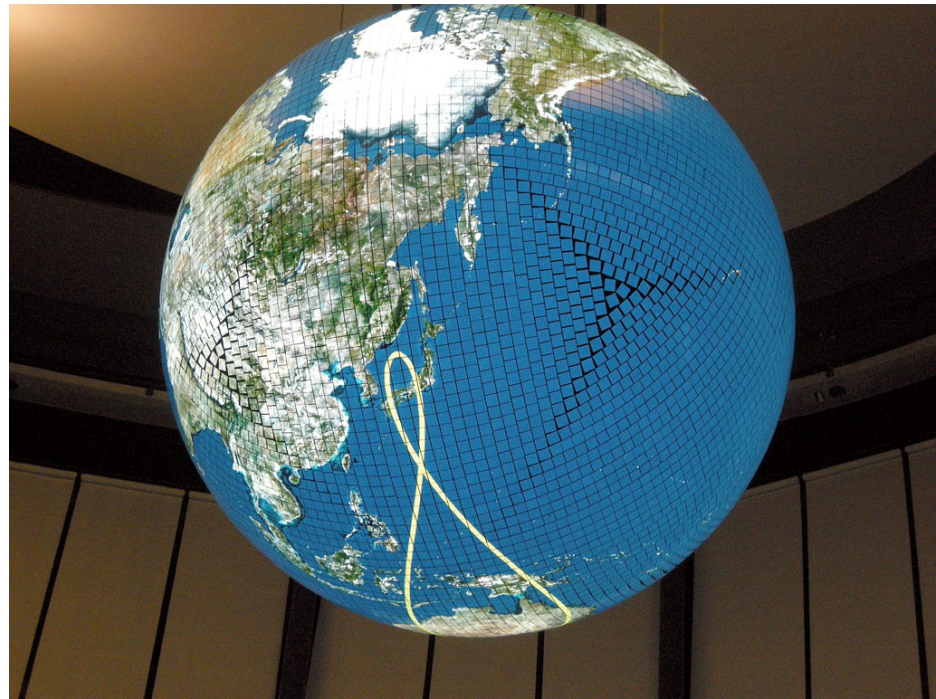


# Thank you

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## Geo-Cosmos QZSS Demonstration at Miraikan, Tokyo



The Geo-Cosmos "Globe-like display", the symbol exhibit of Miraikan, produces a rendition of our Earth shining brightly in space. Size: Diameter 6 meters (Approx. 1/2 millionth the size of the Earth)

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# Joint Statement of ICG-6

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The Sixth Meeting of the International Committee on Global Navigation Satellite Systems (ICG) was held in Tokyo, Japan from 5 to 9 September 2011, to continue reviewing and discussing developments in global navigation satellite systems (GNSS) and to allow ICG members, associate members and observers to address recent developments in their organizations and associations with regard to GNSS services and applications. ICG also addressed GNSS space technology applications to agriculture, fishery, information technology construction (precision positioning), geographic information system (GIS), disaster mitigation, intelligent transportation system and location-based services.

The Meeting was hosted by the Government of Japan. Attendees included China, India, Italy, Japan, Malaysia, Nigeria, the Russian Federation, the United Arab Emirates, the United States of America, and the European Union, as well as the following intergovernmental and nongovernmental organizations: Civil Global Positioning System Service Interface Committee (CGSIC), Committee on Space Research (COSPAR), European Space Agency (ESA), European Position Determination System (EUPOS), International Federation of Surveyors (FIG), International Association of Geodesy (IAG), IAG Reference Frame Sub-Commission for Europe (EUREF), International Bureau of Weights and Measures (BIPM), International Earth Rotation and Reference Systems Service (IERS), International GNSS Service (IGS). The representatives of the United Nations Office for Outer Space Affairs and International Telecommunication Union (ITU) also attended. Australia attended as an invited observer.

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## Joint Statement of ICG-6 (cont'd)

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The Interagency Operations Advisory Group (IOAG) and the Fédération Aéronautique Internationale (FAI) also attended and were recognized by ICG as a new observer and associate member respectively. The representatives of Indonesia, Vietnam, Thailand, and South Korea also participated.

ICG recalled that the General Assembly, in its resolution 65/97 of 10 December 2010 welcomed the progress made by the ICG towards achieving compatibility and interoperability among global and regional space-based positioning, navigation and timing systems and in the promotion of the use of global navigation satellite systems and their integration into national infrastructure, particularly in developing countries, and noted with satisfaction that the ICG had held its fifth meeting in Turin, Italy, from 18 to 22 October 2010, which was jointly organized by Italy and the European Commission.

ICG noted that the working groups focused on the following issues: compatibility and interoperability; enhancement of the performance of GNSS services; information dissemination and capacity-building; and reference frames, timing and applications.

ICG noted that the Working Group A on compatibility and interoperability addressed all four areas of its current work plan through an intersessional meeting held in June, 2011 at the United Nations Office at Vienna, Vienna, Austria and the two days of presentations and discussions conducted during the sixth meeting of the ICG.

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# Joint Statement of ICG-6 (cont'd)

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Interference detection and mitigation, and open service provision and performance monitoring by multi-GNSS networks were the major areas of focus, leading to three of the working group's four recommendations. The session on multi-GNSS monitoring was held jointly with Working Groups B and D, as was the session on interoperability. This resulted in constructive dialogue with these working groups and an agreed plan of practical steps including establishment of a subgroup to collectively investigate international GNSS monitoring and assessment.

The Working Group B on enhancement of the performance on GNSS services discussed among other aspects the disaster information dissemination. Satellite navigation systems may provide essential contributions but the service concept still needs further elaboration. Due to the importance of this issue a new work item was introduced in the work plan of the group. In addition the existing actions in the current work plan were confirmed and were also reflected by the working group members' presentations and good progress was shown in various areas including indoor positioning, signal authentication, precise positioning, transportation, maritime and space applications. Since more and more application-related issues are introduced and discussed within Working Group B it was agreed to form a dedicated subgroup on applications.

The Working Group C on information dissemination and capacity-building addressed further aspects of its workplan, including training for capacity-building in developing countries; promoting the use of GNSS technologies as tools for scientific applications; the International Space Weather Initiative; and regional workshops on applications of GNSS. A new item on education and training programmes on GNSS was added to the workplan.

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## Joint Statement of ICG-6 (cont'd)

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The Working Group D on reference frames, timing and applications completed development of templates describing the geodetic and timing references for the navigation satellite systems currently represented in the ICG. The Working Group also proposed that the templates be published on the ICG Information Portal. ICG also welcomed progress by BIPM work towards production of “Rapid Coordinated Universal Time (UTC)” as a more immediately accessible time reference that could be used to better harmonize the UTC broadcast by each GNSS. The Working Group recommended that interested System Providers supply data from their respective Monitor Stations for inclusion in regular processing with the IGS network of reference stations. Such inclusion is aimed at improving the alignment of the various GNSS reference frames with each other and with the International Terrestrial Reference Frame. An important new development was the endorsement by the ICG of the IGS Multi-GNSS Experiment, which follows on from the ICG’s previous endorsement of the Multi-GNSS campaign in Asia and Oceania.

ICG accepted the invitation of China to host its Seventh Meeting in Beijing, from 4 to 9 November 2012. The Office for Outer Space Affairs, in its capacity as the Executive Secretariat of ICG and its Providers’ Forum, will assist in the preparations for the meeting and for interim planning meetings and Working Groups activities. ICG noted the expression of interest by the United Arab Emirates to host the Eighth Meeting of ICG in December, 2013.