



**Committee on the Peaceful
Uses of Outer Space
Scientific and Technical Subcommittee
Fifty-fourth session
Vienna, 30 January-10 February 2017****Draft report****VI. Space-system-based disaster management support**

1. In accordance with General Assembly resolution 71/90, the Subcommittee considered agenda item 8, "Space-system-based disaster management support".
2. The representatives of Canada, Chile, China, Costa Rica, France, Egypt, Germany, India, Indonesia, Italy, Japan, Mexico, Pakistan, the Russian Federation, the United States of America and Venezuela (Bolivarian Republic of) made statements under agenda item 8. A statement was also made under the item by the representative of Argentina on behalf of the Group of Latin American and Caribbean States. During the general exchange of views, statements relating to the item were also made by representatives of other member States.
3. The Subcommittee had before it the following:
 - (a) Report on the United Nations/India workshop on the use of Earth observation data in disaster management and risk reduction: sharing the Asian experience, held in Hyderabad, India, from 8 to 10 March 2016 ([A/AC.105/1125](#));
 - (b) Report on the United Nations International Conference on Space-based Technologies for Disaster Management: Understanding Disaster Risk, held in Beijing from 19 to 21 September 2016 ([A/AC.105/1130](#));
 - (c) Conference room paper containing a report on joint activities carried out in 2016 in the framework of the United Nations Platform for Space-based Information for Disaster Management and Emergency Response ([A/AC.105/C.1/2017/CRP.16](#)).
4. The Subcommittee noted with satisfaction the progress made with regard to activities held in 2016 and planned for 2017 in the framework of UN-SPIDER, including the continuing advisory support and other support provided through it for emergency response efforts.
5. Some delegations reiterated the importance of intensifying coordination and international cooperation as a way of carrying out training programmes in Latin America and the Caribbean.



6. The Subcommittee noted that in 2016, UN-SPIDER had celebrated its 10th anniversary by holding the UN-SPIDER+10 Conference, on the margins of the fifty-ninth session of the Committee on the Peaceful Uses of Outer Space.
7. The Subcommittee also noted that, with the continued support of its network of partners, the programme had carried out missions for advisory support and assessment in Georgia, as well as follow-up activities in the Dominican Republic, El Salvador, Guatemala, the Lao People's Democratic Republic, Myanmar and Viet Nam. The Subcommittee noted with satisfaction the capacity-building efforts in the form of training sessions that had been held in China, the Dominican Republic, the Lao People's Democratic Republic and Myanmar, addressing specific requirements and providing follow-up to the UN-SPIDER technical advisory missions carried out in previous years.
8. The Subcommittee noted the activities planned for 2017 and the synergies and cross-border actions facilitated by the UN-SPIDER programme. It also noted other capacity-building sessions that were planned and emphasized the need for increased capacity-building support in the various regions.
9. The Subcommittee welcomed the planned outreach activities of the Office for Outer Space Affairs, represented by UN-SPIDER, and its developing partnerships with United Nations entities, international organizations and Member States to continue promoting the use of space-based tools and information in global and regional initiatives, such as under the Sendai Framework for Disaster Risk Reduction 2015-2030, the 2030 Agenda for Sustainable Development and the Paris Agreement. It noted that more complementary relationships between UN-SPIDER and other initiatives should be established and existing relationships strengthened, including with Sentinel Asia.
10. The Subcommittee noted with satisfaction the ongoing activities of States members of the Committee to increase the availability and use of space-based solutions in support of disaster risk reduction, particularly in the context of the Sendai Framework for Disaster Risk Reduction 2015-2030, and also in support of the UN-SPIDER programme. Those activities included promoting emergency observation in the event of natural or technological disasters under the Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters, and under the Sentinel Asia programme and the Regional Visualization and Monitoring System (SERVIR) in Asia, Africa and the Himalayas, funded by the United States.
11. The Subcommittee also noted with satisfaction the efforts conducted by the Charter to support disaster response efforts in countries in Asia, Europe, North, Central and South America and the Caribbean in 2016, as well as the contribution of satellite data by its members for use in several activations of the Charter.
12. The Subcommittee noted that the Charter had been activated 517 times since its creation, supporting 119 countries. Sentinel Asia had been activated 34 times in 2016.
13. The Subcommittee noted with satisfaction the activities conducted by several member States, directly or through the Charter, to facilitate access to satellite imagery and space-based information to support disaster response efforts following earthquakes in Ecuador and Italy, tropical storms in Costa Rica, the Dominican Republic and Haiti, forest fires in Canada, Chile and the Russian Federation and floods in China and Venezuela (Bolivarian Republic of).
14. The Subcommittee also noted with satisfaction other activities of member States in the same area, such as the promotion, with the support of UN-SPIDER, of the

universal access initiative of the Charter and the provision of national or regional data portals for the dissemination of information in near-real time.

15. The Subcommittee noted the efforts of several member States through the Committee on Earth Observation Satellites (CEOS), in particular in the context of its Working Group on Disasters. Among the activities conducted by the Working Group was the use of satellite data, including radar data generated using the German TerraSar-X satellite, to monitor volcanic activity in Latin America.

16. The Subcommittee noted the recently launched Global Partnership using Space-based Technology Applications for Disaster Risk Reduction (GP-STAR), a voluntary effort among the Office for Outer Space Affairs, represented by UN-SPIDER, and Member States, entities of the United Nations system and international intergovernmental and other organizations to support the implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030, to foster the use of space-based technologies and applications and Earth observation in disaster risk reduction efforts worldwide and to provide advice to Governments, organizations and projects on the use of space technologies and applications in disaster risk reduction efforts.

17. The Subcommittee noted the relevance of online platforms for sharing and disseminating space-based data and information to monitor the impacts and evolution of natural disasters. Examples given were flood monitoring (e.g. DisasterWatch in Pakistan), mapping and assessing landslide events in Pakistan and monitoring cyclone storms in India.

18. The Subcommittee noted the in-kind contributions made by States members of the Committee and regional support offices in 2016, including the provision of experts, to all technical advisory missions and related activities conducted by the Office for Outer Space Affairs through UN-SPIDER, and their efforts to share experiences with other interested countries.

19. The Subcommittee noted with appreciation the voluntary contributions made to the Office for Outer Space Affairs and its UN-SPIDER programme that were being made by member States, including the cash contributions from Austria, China and Germany, and again encouraged other member States to provide the Office activities and programme, including UN-SPIDER, with all necessary support, including increased financial support, to enable it to better respond to member States' requests for assistance and to fully carry out its workplan for the next biennium.

VII. Recent developments in global navigation satellite systems

20. In accordance with General Assembly resolution 71/90, the Subcommittee considered agenda item 9, "Recent developments in global navigation satellite systems", and reviewed issues related to the International Committee on Global Navigation Satellite Systems (ICG), the latest developments in the field of global navigation satellite systems (GNSS) and new GNSS applications.

21. The representatives of China, India, Indonesia, Japan, Mexico, Pakistan, the Russian Federation and the United States made statements under agenda item 9. During the general exchange of views, statements relating to the item were also made by representatives of other member States.

22. The Subcommittee heard the following scientific and technical presentations:

(a) "GNSS spectrum protection and IDM in China", by the representative of China;

(b) “QZSS: Japan’s Satellite Positioning System”, by the representative of Japan;

(c) “Joint Africa/Asia-Pacific Regional Centres Collaborative Training Efforts on GNSS”, by the representative of Nigeria;

(d) “GNSS Interference Detection and Mitigation”, by the representative of the United States.

23. The Subcommittee had before it the following documents:

(a) Note by the Secretariat on the eleventh Meeting of the International Committee on Global Navigation Satellite Systems ([A/AC.105/1134](#));

(b) Report of the Secretariat on activities carried out in 2016 in the framework of the workplan of the International Committee on Global Navigation Satellite Systems ([A/AC.105/1136](#));

(c) A conference room paper containing a summary of the United Nations/Nepal workshop on the applications of global navigation satellite systems held in Kathmandu from 12 to 16 December 2016 ([A/AC.105/C.1/2017/CRP.19](#));

(d) A conference room paper entitled “International Committee on Global Navigation Satellite Systems (ICG): call for participation in ICG spectrum protection and interference detection and mitigation activities — request for voluntary reporting on national radionavigation satellite service spectrum protection practices and global navigation satellite systems interference detection and mitigation capabilities” ([A/AC.105/C.1/2017/CRP.18](#)).

24. The Subcommittee was informed that the Office for Outer Space Affairs, as the executive secretariat of ICG, handled coordination for the planning of meetings of ICG and its Providers’ Forum, in conjunction with sessions of the Committee and its subsidiary bodies. It was noted that the executive secretariat also maintained a comprehensive information portal for ICG and users of GNSS services.

25. The Subcommittee expressed its appreciation to the Office for Outer Space Affairs for its efforts in promoting the use of GNSS throughout its capacity-building initiatives and information dissemination, particularly in developing countries.

26. The Subcommittee noted that the ICG information centres, hosted by the regional centres for space science and technology education, affiliated to the United Nations, were working towards the establishment of a network of institutions involved or interested in GNSS. The main objective of the information centres was to enhance the capabilities of member States to use GNSS and related applications at the regional and international levels so as to advance their scientific, economic and social development. The centres coordinated their activities closely with ICG and its Providers’ Forum through the ICG executive secretariat.

27. The Subcommittee noted with appreciation the financial contributions made by the United States and the European Commission to the Office for Outer Space Affairs in support of GNSS-related activities, ICG, its Providers’ Forum and its working groups.

28. The Subcommittee noted that a United Nations/Nepal workshop on the applications of GNSS had been held in Kathmandu from 12 to 16 December 2016. The focus of the workshop was on the importance of and need for cooperation to apply GNSS solutions through the exchange of information and the scaling up of capacities among countries in the region. It was also noted that a special seminar on GNSS spectrum protection and interference detection and mitigation had been organized

during the workshop in order to highlight the importance of GNSS spectrum protection at the national level and explain how to reap the benefits of GNSS.

29. The Subcommittee noted with satisfaction that the eleventh meeting of ICG and the seventeenth meeting of the Providers' Forum, organized by the Roscosmos State Corporation on behalf of the Government of the Russian Federation, had been held in Sochi, Russian Federation, from 6 to 10 November 2016.

30. The Subcommittee noted that the matters on the ICG meeting agenda included compatibility and interoperability of satellite navigation systems; reference frames and timing; enhancement of GNSS performance, and development of new navigation services and capabilities. It was also noted that ICG was progressing significantly in establishing an interoperable GNSS space service volume, and that exploiting the interoperability between all systems had allowed achievement of GNSS signal availability of very close to 100 per cent.

31. The Subcommittee welcomed the proposal by ICG for the Subcommittee to consider issues related to GNSS spectrum protection and interference detection and mitigation under its current agenda item on recent developments in GNSS. The Subcommittee noted that the intent behind the proposal was to raise awareness of the issue among States members of the Committee on the Peaceful Uses of Outer Space as part of efforts to promote the effective use of GNSS open services by the global community.

32. The Subcommittee noted that the twelfth meeting of ICG would be hosted by Japan, in Kyoto, from 2 to 7 December 2017. The Subcommittee also noted the expression of interest by China in hosting the thirteenth meeting of ICG, in 2018, by India to host the fourteenth meeting, in 2019, and by the Office for Outer Space Affairs to host the fifteenth meeting, in 2020.

33. The Subcommittee noted that the Global Positioning System (GPS) of the United States continued to be a central pillar in the expansion of GNSS coverage and use, and that GPS accuracy currently averaged a user range error of 70 centimetres. It was noted that the United States continued to broadcast GPS signals free of direct user charges and continued to strongly support international cooperation for peaceful civil, commercial and scientific purposes among current and future GNSS providers.

34. The Subcommittee noted that the United States had completed its implementation of the 12 GPS Block IIF satellites, which had led to incremental increases in overall system performance and more satellites transmitting the new civilian GPS signals known as "L2C" and "L5". The Subcommittee also noted that the United States continued to work toward the launch of the next generation of satellites, GPS Block III, which would provide improved service with the broadcast of the third civilian signal, "L1C". Work on an upgraded ground control system, called "OCX", in support of the new GPS Block III satellites would also continue.

35. The Subcommittee noted that the satellite-aided search and rescue programme known as Cospas-Sarsat, for which the Medium-altitude Earth Orbit Search and Rescue (MEOSAR) distress signals relayed by GPS and Galileo of the European Union were in early operational capability, had been used in search and rescue efforts. It was noted that the MEOSAR system had been using upgraded GPS satellites, GLONASS of the Russian Federation and Galileo of the European Union, orbiting in space at an altitude of between 19,000 and 24,000 km. The Subcommittee also noted that the MEOSAR system provided near-instantaneous distress alerts and locations as well as a significant increase in satellites compared with the current constellations used in search and rescue.

36. The Subcommittee noted that the civilian services of GLONASS were provided free of direct user charges, were accessible, effective and fully responsive to the needs of different users and that the launch of the latest GLONASS-M navigation satellite into orbit supported the space segment of the system.
37. The Subcommittee also noted that the System of Differential Correction and Monitoring, an augmentation to GLONASS, continued to be updated and was to be used in civil aviation for enhancing navigation precision. The provision of GLONASS-based precise point positioning to support applications requiring real-time access was beginning to be organized.
38. The Subcommittee further noted that the interface control document for GLONASS Code Division Multiple Access signals in bands L1, L2 and L3 had been published. An open service performance standard was currently being developed, which demonstrated commitment to providing a basic performance standard for the system's users. The Subcommittee noted that international cooperation existed that was aimed at making GLONASS an essential element of the international GNSS infrastructure, with benefits for users worldwide.
39. The Subcommittee noted that the initial services of the European GNSS Galileo had been declared operational in December 2016. Galileo provided a range of state-of-the-art positioning, navigation and timing services to users worldwide. The Galileo constellation consisted of 18 satellites; however, the full constellation would consist of a total of 30 satellites and was expected to be completed by 2020.
40. The Subcommittee also noted that the BeiDou Navigation Satellite System, a global navigation satellite system compatible with other GNSS, had been established by China. The System was in full service and had provided positioning, navigation, timing and short-message communication services to the Asia-Pacific region since 2012. A new generation of satellites had been tested and verified in 2016, and six to eight satellites were scheduled to be launched in 2017. The System would constitute a complete space constellation and would provide global coverage by 2020.
41. The Subcommittee further noted that India was currently implementing its satellite navigation programme made up of two systems: the GPS-aided Geostationary-augmented Navigation System (GAGAN), which was a satellite-based augmentation system, and the Indian Regional Navigation Satellite System (IRNSS), which was an independent regional system. GAGAN had been certified for Navigation Performance, 0.1 Nautical Mile service level and for Approach with Vertical Precision certification by the Directorate General of Civil Aviation of India, thus enabling en route navigation and precision approach services using GAGAN. It was also noted that, in addition to using GAGAN in the aviation sector, India was taking initiatives to use it in non-aviation sectors.
42. The Subcommittee noted that the IRNSS constellation, also known as NavIC, provided satellite-based navigation service. It consisted of seven satellites: three in geostationary orbits and four in geosynchronous orbits. All the seven IRNSS satellites, including IRNSS 1A and IRNSS 1G, had been put into orbit using the Polar Satellite Launch Vehicle of India. The IRNSS signal-in-space was being broadcasted by IRNSS satellites and was being received successfully.
43. The Subcommittee also noted that the Quasi-Zenith Satellite System (QZSS), a Japanese satellite positioning system composed mainly of satellites in quasi-zenith orbits, was being developed, and that Michibiki, the first QZSS satellite, was currently performing all its functions. The QZSS satellite positioning function, which was compatible and interoperable with GPS, had been enabled to extend availability time by sharing the same positioning signals. In addition to positioning and GPS

augmentation, QZSS could provide a messaging service that would contribute to disaster management.

44. The Subcommittee further noted that QZSS would be expanded and upgraded to become an operational regional satellite-based navigation system to improve positioning in the Asia-Pacific region. A constellation of four satellites would be established and the formal operation would begin in 2018. A constellation of seven satellites would enable sustainable positioning to be completed in 2023.

45. The Subcommittee noted with appreciation that Indonesia, Mexico and Pakistan had reported on their projects and activities in the use of GNSS technology for environmental management and protection, disaster risk reduction, agriculture and food security, emergency response, more efficient surveying and mapping and safer and more effective transportation by land, sea and air, as well as ionospheric and tropospheric scientific research. They had also reported on their efforts to ensure the participation of international partners in those projects and activities.
