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**Committee on the Peaceful
Uses of Outer Space**
Scientific and Technical Subcommittee
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Item 8 of the provisional agenda*
Space-system-based disaster management support

**Report on activities carried out in 2016 in the framework of
the United Nations Platform for Space-based Information for
Disaster Management and Emergency Response**

I. Introduction

1. In its resolution 61/110, the General Assembly established the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) as a programme within the United Nations to provide universal access to all countries and all relevant international and regional organizations to all types of space-based information and services relevant to disaster management to support the full disaster management cycle, and agreed that the programme should be implemented by the Office for Outer Space Affairs of the Secretariat.
2. At its fiftieth session, the Committee on the Peaceful Uses of Outer Space agreed that progress reports on UN-SPIDER and its future workplans should be considered by the Scientific and Technical Subcommittee under a regular agenda item on space-system-based disaster management support and that the agenda item should be included in the list of issues to be considered by its Working Group of the Whole.
3. The present report contains a summary of activities carried out under the UN-SPIDER programme in 2016.
4. In its resolution 71/90 the General Assembly noted with satisfaction the significant achievements made and the advisory support provided to more than 38 Member States within the framework of UN-SPIDER since its establishment in 2006 with the valuable contributions of its network of regional support offices, and encourages Member States, on a voluntary basis, to provide the programme with the additional resources necessary to address the increasing demand for support successfully and in a timely manner. It also reiterates the importance of the Sendai Framework for Disaster Risk Reduction 2015-2030 (Sendai Framework) in which the

* [A/AC.105/C.1/L.355](#).



value of space-based technology and Earth observation for disaster management and emergency response is recognized, and notes with satisfaction the efforts of the Office for Outer Space Affairs and its UN-SPIDER programme towards promoting international cooperation as a way to enhance the use of space-based technologies and related services at the national and local levels.

5. The other report for the year 2016 covers increasing efforts of the UN-SPIDER in knowledge management, outreach and collaborations: United Nations International Conference on Space-based Technologies for Disaster Risk Reduction — “Understanding Disaster Risk”, held in Beijing, China, from 19 to 21 September 2016 ([A/AC.105/1130](#)).

II. Organizational framework

6. As part of the responsibility of the Office for Outer Space Affairs for promoting international cooperation in the peaceful uses of outer space, UN-SPIDER fosters knowledge management, builds bridges between communities of providers of space-based information and users of services in the disaster risk management and emergency response communities, and provides technical advisory support to Member States. This section presents the team and the network of regional support offices which supported the implementation of the UN-SPIDER programme of activities in 2016.

A. Staff of the United Nations Platform for Space-based Information for Disaster Management and Emergency Response

7. The implementation of the UN-SPIDER Programme by the Office for Outer Space Affairs is under the responsibility of the Director. The Chief of the Space Applications Section, assisted by a senior programme officer, is responsible for planning and coordinating the activities with the support of a programme officer who leads the activities of the UN-SPIDER office in Bonn, Germany; a programme officer who leads the activities of the UN-SPIDER office in Beijing and a programme officer in Vienna who supports outreach and capacity-building activities as well as advisory services.

8. During 2016, 11 staff members worked in the framework of UN-SPIDER, including the 3 programme officers supported from the UN-SPIDER regular budget of the office, distributed as follows:

(a) In Vienna: a senior programme officer, a programme officer responsible for outreach, capacity-building activities and emergency response support, and a team assistant (on 50/50 share basis with the Programme on Space applications) to assist with the administrative tasks of the programme;

(b) In Bonn: a programme officer to lead the activities of the UN-SPIDER office in Bonn, and an expert (provided by the German Aerospace Centre (DLR) as a non-reimbursable loan) to support the implementation of knowledge management and advisory support activities. The administration and maintenance of the portal services was ensured by the programme officer, the experts, and two consultants. An expert from Japan as a visiting scientist for a period of six months starting in September 2016 supported some activities;

(c) In Beijing: a programme officer to lead the activities of UN-SPIDER implemented from the office in Beijing and coordinate technical advisory support to Member States, two experts to support the technical advisory support activities

(provided by the Government of China as non-reimbursable loans) from August 2016 onwards and a team assistant to assist with the administrative tasks of the office.

9. The Programme also benefited in 2016 from the regular support of 10 interns in its Beijing and Bonn offices to input reference material to the portal, to execute research in preparation of advisory services and support the organization of events.

B. Network of regional support offices

10. In its resolution 61/110, the General Assembly agreed that UN-SPIDER should work closely with regional and national centres of expertise in the use of space technology in disaster management to form a network of regional support offices for implementing the activities of the programme in their respective regions.

11. The UN-SPIDER twenty one regional support offices¹ are hosted by national and regional organizations. Negotiations are taking place at the time of the preparation of this report with two institutions to further increase the number of members but also to consolidate the regional coverage from specialised institutions in Earth observation, disaster risk reduction and in emergency response.

III. Activities carried out in 2016

12. The work carried out by UN-SPIDER in 2016 was implemented within the budget allocated through its regular budget and with the voluntary and in-kind contributions from Member States or collaborating entities.

13. On 6 June 2016, the 7th Annual of the regional support offices of UN-SPIDER was held back-to-back to the UN-SPIDER+10 Conference (7 to 8 June 2016) in Vienna. The conference was hosted on the side-line of COPUOS 2016 and it took stock of the efforts conducted by UN-SPIDER in the first ten years of its inception, to celebrate important achievements, and to outline strategies for the coming decade. The Conference was used to review efforts conducted during the last decade in four key areas: technical advisory support and institutional strengthening, knowledge management, awareness-raising and outreach, and capacity-building.

14. The UN-SPIDER+10 Conference proposed new projects which would also direct the plan of action for UN-SPIDER in future. The new projects are classified as global/strategic projects and specific initiatives projects based on the most indicative recommendations from the technical advisory missions implemented under UN-SPIDER.

15. As a part of technical advisory support activities (sub-section A), UN-SPIDER conducted one technical advisory mission to Georgia and seven follow-up activities to the Dominican Republic, El Salvador, Guatemala, Lao People's Democratic Republic, Myanmar and Viet Nam. The programme supported emergencies in five countries and promoted the Universal Access initiative of the International Charter Space and Major Disasters to disaster management authorities (sub-section D).

16. The outreach activities (sub-section B) conducted by UN-SPIDER included 6 workshops/conferences organized in India, China, Germany, the Dominican Republic, Indonesia (for ASEAN) and in the United States of America. Additionally, the programme organized 3 meetings as part of events organized under other initiatives (such as the United Nations Office for Disaster Risk Reduction, the International Union for Conservation of Nature and the European Association of

¹ <http://www.un-spider.org/network/regional-support-offices>.

Remote Sensing Laboratories) and contributed in 12 inter-agency coordination and other outreach activities.

17. The knowledge management activities are mentioned in sub-section C.

A. Technical advisory support and follow up activities

18. Technical advisory support is one of the prime activities of UN-SPIDER at the national level and is aimed at providing Member States with support that can include: technical advisory missions involving experts from space and disaster management agencies from other countries and relevant international and regional organizations and institutions; technical advice to national institutions by means of meetings, teleconferences, videoconferences, etc.; facilitating direct cooperation between national institutions and providers of space-based information and solutions; and support in accessing space-based information to support emergency response.

19. The recommendations from the technical advisory missions cover various issues related to the policy and coordination, data access, data availability, data sharing, capacity-building, and institutional strengthening. Following most technical advisory missions, countries request additional support from UN-SPIDER to implement recommendations. These can cover needs in capacity-building, institutional strengthening or in developing partnerships to build the required data infrastructure or the analytical tools for the development of basic information for disaster risk reduction or emergency response.

20. The activities covered under this sub-section in 2016 include a technical advisory mission to Georgia and follow-up activities to technical advisory missions in the Dominican Republic, El Salvador, Guatemala, Lao People's Democratic Republic, Myanmar and Viet Nam.

Technical advisory mission to Georgia (3 to 6 May 2016)

21. Following the invitation of the Government of Georgia, a technical advisory mission was organized which brought together five experts for consultations with various relevant institutions and assessing requirements as much as possible.

22. The host and governmental focal point was the National Crisis Management Centre of the State Security and Crisis Management Council of Georgia, and it ensured proper coordination and visits with relevant Ministries, Tbilisi City Hall, the National 112 Operations Centre and educational institutions. The visits enabled a detailed assessment of current use of space technologies in disaster management and the various needs and unmet requirements that exist in the country.

23. At the Ministry of Defence, innovative solutions and monitoring systems for reducing hailstorm risks were demonstrated, leading to discussions about potential use of such technologies in other countries where UN-SPIDER has identified such hazards as well.

24. Visits with the United Nations country team and United Nations Development Programme in particular highlighted a number of disaster management related projects under implementation in Georgia, including through bilateral donors, and discussions addressed the need for better coordination among the various stakeholders, and the careful consideration of situations where space technologies could outperform aerial imaging and other methods currently used in those projects.

Follow-up of the UN-SPIDER technical advisory mission to Viet Nam (7 to 13 May 2016, Hanoi, Viet Nam)

25. UN-SPIDER carried out this follow-up activity to the technical advisory mission of 2013 with the following objectives: promote the implementation of a Spatial Data Infrastructure (SDI) for disaster management and emergency response; prepare a draft outline of a standard operating procedure for the utilization of space-based and geospatial information for disaster management and emergency response; and strengthen capacity and cooperation at international level to share space-based information for disaster management.

26. The activity was carried out in close collaboration with the Disaster Management Centre and Vietnam Space Technology Institute and involving several other stakeholder organizations.

27. The team had a series of meetings with officials of the Disaster Management Centre and the Vietnam Space Technology Institute. A national workshop was organized involving a wide range of stakeholders. During the workshop, high-level officials were briefed about the efforts being carried out in Viet Nam.

28. As a result of the UN-SPIDER engagement in Viet Nam and based on recommendations of the technical advisory mission, the Disaster Management Centre: established a Geospatial Division with the help of staff partly trained through UN-SPIDER; signed a memorandum of understanding with the Space Technology Institute and Japan Aerospace Exploration Agency (JAXA) for sharing satellite images during emergencies; and developed capacity to access and use satellite images to generate the products needed for risk assessment and emergency response.

Follow-up of the UN-SPIDER technical advisory mission to Myanmar (27 June to 1 July 2016, Nay Pyi Taw, Myanmar)

29. This activity was follow-up of the technical advisory mission conducted in March 2012 with the aim to improve the utilization of space-based and geospatial information in all stages of disaster management. In November 2012, UN-SPIDER visited Myanmar again for dissemination of the report of the technical advisory mission and offered the training on “Geo-informatics for Disaster Risk Management” in collaboration with the International Centre for Integrated Mountain Development (ICIMOD). As a follow up, UN-SPIDER revisited Myanmar from 27 June to 1 July 2016 to take account of the progress since 2012 in using space-based information in disaster management.

30. The follow up activity in 2016 included three important events:

(a) High-level advocacy meeting of stakeholders: The meeting was led by the Union Minister to address important issues at policy and coordination level to act on the recommendations of technical advisory mission and support implementation of Sendai Framework;

(b) Technical consultation meeting with stakeholders of Relief and Resettlement Department of the Ministry of Social Welfare, Relief and Resettlement; and

(c) Training on “Earth Observation Technologies for Landslide Hazard and Risk Assessment” was conducted in the Emergency Operation Centre of the Relief and Resettlement Department in collaboration with ICIMOD.

31. As a result of engagement of UN-SPIDER in Myanmar and based on recommendation of the technical advisory mission, the Ministry of Social Welfare, Relief and Rehabilitation established the Emergency Operation Centre which hosts a section dedicated to the use of Earth observation data, and a Satellite Imagery and

Research Section. An official trained through UN-SPIDER is leading the activities related to use of satellite images and mapping. UN-SPIDER is continuing its engagement with the Ministry in updating its Action Plan for Disaster Risk Reduction and support through training the Disaster Management Training Centre (DMTC). This support is offered in collaboration with the country offices of the United Nations Human Settlements Programme (UN-HABITAT) and the United Nations Development Programme (UNDP).

Follow-up of the UN-SPIDER TAM to Guatemala (7 to 11 July 2016, Guatemala City, Guatemala)

32. In the last decades Guatemala has suffered the effects of more frequent and intense droughts, and in the last two years the drought conditions were worsened as a result of the El Niño ENSO event that took place from the end of 2014 to 2016. This expert mission was used:

(a) To provide to the staff of the Geographic Information system (GIS) unit of the Secretariat of the National Coordinating Agency for Disaster Reduction of Guatemala (SE-CONRED) a set of updated maps which were elaborated by UN-SPIDER as part of the project to strengthen drought early warning systems (SEWS-D); and

(b) To participate in the meeting organized by SE-CONRED with representatives of various government agencies as a way to re-start the inter-institutional team that had been established by SE-CONRED and four additional government agencies in 2012.

33. The mission to Guatemala was also used to meet with the Executive Secretary of the Central American Coordination Center for Natural Disaster Prevention (CEPRENAC) and with the Director of the Research Center for Economic Integration of the Secretariat for Economic Integration of Central America (SIECA), which are based in Guatemala City, Guatemala. They were briefed on the recent actions of UN-SPIDER in the region and on the benefits of the increased regional coordination in disaster risk reduction.

Follow-up of the UN-SPIDER TAM to El Salvador (12 to 15 July 2016, San Salvador, El Salvador)

34. The expert mission to El Salvador was used:

(a) To provide to the staff of national Civil Protection Directorate and of the Environmental Observatory of the Ministry of Environment and Natural Resources (MARN) a set of updated maps which were elaborated by UN-SPIDER as part of the project to strengthen drought early warning systems (SEWS-D);

(b) To participate in the meeting organized by the Civil Protection Secretariat and the Ministry of Foreign Affairs with representatives of various government agencies as a way to start the inter-institutional team that has been suggested by UN-SPIDER as a TAM recommendation in 2014.

The mission to El Salvador was also used to accompany the Director of the Office for Outer Space Affairs in her official visit to this Member States. This official mission included an outreach event, the signature of an agreement outlining the framework for cooperation between the Ministry of Foreign Affairs of El Salvador and the United Nations represented by the Office for Outer Space Affairs, and institutional visits to several ministries and government agencies. Institutional visits were made to the Ministries of Agriculture and Livestock; Environmental and Natural Resources, and the Vice Ministry of Science and Technology. Additional visits were made to the Civil

Protection Directorate, the National Geographic Institute. A meeting was also conducted with technical staff of the Ministry of Public Health.

Follow-up of the UN-SPIDER TAM to Dominican Republic (18 to 22 July 2016, Santo Domingo, Dominican Republic)

35. This mission was conducted with the Director of the Office for Outer Space Affairs as a way to strengthen the link between the National Emergency Commission of the Dominican Republic and UN-SPIDER, particularly noting the effort made by the Dominican Republic to work with other selected Members States to incorporate specific texts on the use of space-based applications and geospatial information in the Sendai Framework for Disaster Risk Reduction 2015-2030.

36. This mission to the Dominican Republic included a training course on the use of the UN-SPIDER Recommended Practices which have been developed by regional support offices focusing on drought indicators.² It was also used by the National Emergency Commission of the Dominican Republic and UN-SPIDER to conduct the Regional Expert Meeting on the Use of Space-based Information in Drought Early Warning Systems. This expert meeting was conducted in Santo Domingo on 18 and 19 July 2016.

37. The mission contributed to the strengthening of the inter-institutional Geospatial Information Team which has been set up by the National Emergency Commission to generate relevant geospatial information to be used in disaster risk reduction efforts as well as in disaster response operations.

National Training Course on the use of the UN-SPIDER Recommended Practices on drought (20 to 22 July 2016, Santo Domingo, Dominican Republic)

38. Since 2013 the National Emergency Commission of the Dominican Republic established the Inter-Institutional Geospatial Information Team for Risk Reduction and Emergency Response (EIGEO) with 13 institutions. By 2016, the team has incorporated 8 additional institutions. The training course was conducted with the support of experts from the Central American Integration System, Geographic Institute Agustín Codazzi, Colombia (IGAC) and the Federal University of Santa Maria in Brazil (UFSM) and focused on the two Recommended Practices which have been developed by the Iranian Space Agency³ and by the experts from UFSM.⁴

The training course is of special relevance to the Dominican Republic, as in 2015 and 2016, this Member States experienced, along with all Central American countries, the effects of a drought which has been more severe due to the presence of the El Niño phenomenon. The course was used to provide to all members of the EIGEO team the most up-to-date maps that have been developed by UFSM regarding the Standard Vegetation Index (SVI) or vegetation anomaly related to drought.

Follow-up of the UN-SPIDER technical advisory mission to Lao People's Democratic Republic (25 to 29 July 2016, Vientiane, Lao People's Democratic Republic)

39. The follow up activity was organized from 25-29 July 2016 and included:

(a) A technical meeting with key stakeholders organizations involved in the generation of geospatial information;

² <http://www.un-spider.org/advisory-support/recommended-practices>.

³ <http://www.un-spider.org/advisory-support/recommended-practices/recommended-practice-agricultural-drought-monitoring>.

⁴ <http://www.un-spider.org/advisory-support/recommended-practices/recommended-practice-drought-monitoring-using-standard>.

(b) A high-level advocacy meeting involving decision makers and political leaders;

(c) A training programme on “Space-based technologies exploring the use of Earth observation data and modelling tools in flood risk mapping and flood early warning” with the UN-SPIDER Regional Support Office, International Water Management Institute based in Sri Lanka; and

(d) The formation of a voluntary association named “National Geospatial Information Utilization and Management” (LaoNGUM), which is a voluntary initiative offering a platform to address technical issues related to geospatial information generation, sharing and dissemination.

40. The results of the technical advisory mission were presented and the report, translated in Laotian language, was distributed to the participants of all meetings.

International Training Course on Space-based Technologies for Flood and Drought Monitoring and Risk Assessment (22 to 27 September 2016, Beijing, China)

41. The training course was co-organized with the National Disaster Reduction Center of China, the Asia Pacific Space Cooperation Organisation (APSCO), the Beihang University and the Regional Centre for Space Science and Technology Education in Asia and the Pacific (RCSSTEAP). It was held back-to-back with the United Nations International Conference on Space-based Technologies for Disaster Risk Reduction, “Understanding Disaster Risk”, that was co-organized by the Office for Outer Space Affairs and the Ministry of Civil Affairs of the People’s Republic of China from the 19 to 21 September 2016 in Beijing.

42. A total of 30 participants from 19 countries participated in the training programme, most of which already received technical advisory service from UN-SPIDER. The hands-on sessions were offered by experts from UN-SPIDER, the International Water Management Institute (IWMI), the Iranian Space Agency and the National Disaster Reduction Center of China (NDRCC).

43. The training addressed the following topics: (a) remote sensing for flood and drought monitoring; (b) flood risk assessment; (c) open-source data and products acquisition; (d) emergency response mapping; and (e) remote sensing based drought monitoring.

Drought Early Warning Efforts

44. Since 2014 UN-SPIDER has been dedicating efforts to contribute to the strengthening of drought early warning systems. These efforts include the development and promotion of the use of drought indices elaborated by the space community in the format of UN-SPIDER Recommended Practices, and the project “Strengthening Early Warning Systems for Drought” (SEWS-D).

(a) Recommended Practices: UN-SPIDER elaborated step-by-step procedures to process satellite imagery to generate specific geospatial information. In the case of droughts, a specific procedure or Recommended Practice has been developed by IGAC to determine the expansion and contraction of water bodies.⁵ Another Recommended Practice on the Standard Vegetation Index (SVI) was developed by UFSM.⁶ UN-SPIDER also worked on improving the Recommended Practices developed by the Iranian Space Agency and by UFSM through the removal of pixels

⁵ <http://www.un-spider.org/advisory-support/recommended-practices/pr%C3%A1ctica-recomendada-la-generaci%C3%B3n-de-mapas-de-expansi%C3%B3n-y>.

⁶ <http://www.un-spider.org/advisory-support/recommended-practices/recommended-practice-drought-monitoring-using-standard>.

covered with clouds prior to the calculation of the Vegetation Condition Index (VCI) and the SVI;

(b) SEWS-D Project: As a way to promote the use of space-based information to contribute to drought management efforts, UN-SPIDER is conducting a pilot project with government agencies of the Dominican Republic, El Salvador, Guatemala and Honduras; and with regional and international organizations as a way to strengthen drought early warning systems through the incorporation of the routine use of space-based information, namely maps depicting vegetation indexes that have been derived from satellite imagery.⁷ The aim of this pilot project is to strengthen such systems through the incorporation of the use of space-based information and the strengthening of national drought policies. In addition to the Recommended Practices presented above, the project will also promote other products and services developed by partners. Partners include the FAO's Sub-Regional Office for Mesoamerica, the United Nations Convention to Combat Desertification (UNCCD), International Research Centre on El Niño (CIIFEN), the Regional Centre for Space Science and Technology Education for Latin America and the Caribbean (CRECTEALC), the Central American Agricultural Council, the Central American Coordination Centre for Natural Disaster Prevention (CEPREDENAC) of IGAC, the Mexican Space Agency and UFSM; as well as government ministries, meteorological departments, and civil protection or disaster management institutions of several countries in Central America and in the Caribbean. The project will target National Food Security and Nutrition Commissions or Committees, Ministries of Agriculture and Environment, as well as national civil protection agencies.

B. Outreach and networking activities

45. This sub-section has two groups reflecting the areas of work of the UN-SPIDER team: (1) events organized or co-organized under the UN-SPIDER Programme; and (2) contributions to events organized under initiatives of partners.

1. Events organized or co-organized under the UN-SPIDER Programme

4th Association of South East Asian Nations (ASEAN) workshop on "Simulation exercise on the procedural guidelines for sharing space-based information during emergency response" (19 to 21 April 2016, Bogor, Indonesia).

46. The ASEAN workshop was co-organized with the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) and the Indonesian Space Agency (LAPAN) and supported by the ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA Centre) and an expert from United Nations Institute for Training and Research (UNITAR). The workshop was attended by 33 participants from 10 countries.

47. The purpose of the 4th ASEAN workshop was to work with ASEAN countries to conduct a simulation exercise on the procedural guidelines for sharing space-based information during emergency response. The workshop was built on the outcomes of the 1st and 2nd ASEAN workshops on "Development of mechanisms for acquisition and utilization of space-based information during emergency response", which were held in April 2014 (Jogjakarta, Indonesia) and June 2015 (Hangzhou, China) respectively; and the 3rd ASEAN workshop entitled "Workshop to finalise the procedural guidelines for requesting space-based information during emergency response in ASEAN", which was held in December 2015 (Sriracha, Thailand).

⁷ For more information on this project, please see [A/AC.105/C.1/2016/CRP.19](#) and visit <http://www.un-spider.org/projects/SEWS-D-project-caribbean>.

UN-SPIDER Regional Expert Meeting on the Use of Space-based Information in Early Warning Systems for Drought (Santo Domingo, Dominican Republic, 18 and 19 July 2016)

48. The expert meeting was co-organized with the National Emergency Commission of and support of Secure World Foundation. They brought together nearly 70 experts from countries and international organizations in the region.

49. The meeting included a high-level panel, technical presentations, and group discussions and has allowed members of the SEWS-D project to agree on the plan of work for the period from August 2016 to July 2017; and for international, regional and national organizations to work together to address efforts related to drought early warning in a unified way.

50. The meeting included the high-level panel moderated by the National Emergency Commission which included the participation of directors and leading officers of the Office for Outer Space Affairs, CEPREDENAC, and several government agencies from the Dominican Republic.

51. The regional expert meeting allowed UN-SPIDER:

(a) To facilitate the discussion regarding methods to process satellite imagery that aim to enhance the understanding of drought risk, particularly drought indices derived from satellite imagery including the Vegetation Condition Index (VCI) the Standard Vegetation Index (SVI), and the Agricultural Stress Index System (ASIS);

(b) To facilitate and encourage the interaction among researchers involved in the development of Earth observation techniques and professionals;

(c) To provide visibility to methods and tools that have been elaborated to generate maps depicting the VCI and the SVI which can be used along with other tools to monitor the temporal and spatial evolution of droughts;

(d) To contribute to the identification of strategies which can be used by regional and international organizations to contribute to the implementation and strengthening of drought early warning systems as elements of national drought policies.

52. The meeting included a plenary session to discuss and agree on a plan of work for the coming years related to the SEWS-D project; and ended with the following policy-relevant recommendations to be elevated to the Committee as part of the UNISPACE+50 process:

(a) The Office for Outer Space Affairs and the space community should continue supporting the efforts to promote the use of space-based information in drought early warning systems as part of the national drought policies;

(b) Taking into consideration the efforts that are conducted by different international, regional and national organizations using satellite technologies to address droughts, the Committee should consider the establishment of a coordination platform as a way to facilitate synergies;

(c) The Office for Outer Space Affairs and the Committee should find ways to promote the incorporation of satellite applications use in existing efforts related to these regional initiatives.

United Nations International Conference on Space-based Technologies for Disaster Risk Reduction — “Understanding Disaster Risk” (Beijing, China, 19 to 22 September 2016)

53. The conference was co-organized with the Ministry of Civil Affairs (MoCA) of the People’s Republic of China (PRC), in collaboration with the Ministry of Foreign

Affairs of PRC (MoFA), the China National Space Administration of PRC (CNSA), the Asia Pacific Space Cooperation Organization (APSCO), the Regional Centre for Space Science and Technology Education in Asia and the Pacific (RCSSTEAP-China).

54. The aim of the conference was to contribute to the process of producing guidelines to Member States to integrate Earth observation (EO) and geospatial technologies in supporting the first priority of the Sendai Framework: Understanding Disaster Risk. The Report of the United Nations International Conference on Space-based Technologies for Disaster Risk Reduction — “Understanding Disaster Risk”, Beijing, China, 19 to 22 September 2016 (A/AC.105/1130) provides a detailed account of the conference.

Workshops and education programme on Geospatial Technologies and Crisis Management (Shepherdstown, Reston and Cleveland, United States of America, 27 September to 3 October 2016)

55. The programme was co-organized in collaboration with the Delta State University and with support from the Mozambique Office of UNDP. It focused on means and methods by which geospatial technologies may be applied as an intelligence toolset to reduce the risk of loss of life and property to disaster, improve resiliency to climate change, and respond to crisis.

56. The programme provided an opportunity to senior level officials from China, Mozambique and Viet Nam to interact with the members of the National Geospatial Advisory Committee of the United States of America, attend the United States Geospatial Intelligence Foundation “Geospatial Congress” in Reston, 30 September to 2 October 2016 and participated to the workshop on Disaster Management using Geospatial Technologies at Delta State University, Cleveland, including a visit to the Mississippi Emergency Operations Center in Jackson.

United Nations/Germany International Expert Meeting on the Global Partnership on Space Technology Applications for Disaster Risk Reduction (Bonn, Germany, 18 and 1 and 2 December 2016)

57. The Sendai Framework for Disaster Risk Reduction 2015-2030 provides continuity to the efforts that have been conducted at the global, regional, national and local levels to reduce the impacts of natural hazards on communities worldwide. To guide efforts worldwide and at all levels (from local to global), the Sendai Framework includes four Priorities for Action.

58. Recognizing the usefulness of international partnerships, during the Third World Conference on Disaster Risk Reduction in Sendai in 2015, the Office for Outer Space Affairs worked together with 17 partners to design and launch a global partnership as a vehicle “to foster the use of Earth Observations and space-based technologies at all levels by strengthening existing mechanisms, and ultimately contributing to a better integrated and wider use of such technologies in disaster risk reduction around the world with a concerted approach”. The continuous efforts of the Office for Outer Space Affairs since Sendai continued in 2016 with the United Nations/Germany International Expert Meeting on the Global Partnership on Space Technology Applications for Disaster Risk Reduction (GP-STAR) brought together representatives of sixteen partner organizations and contributed to the implementation of the partnership through agreements regarding:

- (a) The Terms of Reference for the partnership and its governance mechanism;
- (b) The plan of work of the partnership for the coming years;

(c) Five working groups geared to promote the use of satellite technologies to contribute to disaster risk reduction efforts focusing on floods, droughts, earthquakes and volcanic activity, tsunamis, and dust storms; and

(d) In collaboration with AEM, a plan of action targeting efforts to be conducted in the context of the upcoming Global Platform Session, to be held in Cancun, Mexico, in May 2017.

59. The meeting recommended that GP-STAR be one of the vehicles to facilitate synergies among space agencies to contribute to the implementation of the Sendai framework for disaster risk reduction 2015-2030.

2. Contributions to events organized under other initiatives

Thematic session on disaster risk management during the 36th EARSeL 2016 “Frontiers in Earth Observation” (Bonn, Germany, 19 to 24 June 2016)

60. The European Association of Remote Sensing Laboratories (EARSeL) conducted its 36th Symposium in Bonn, Germany, from 19 to 24 June 2016. The local main organizer was the Remote Sensing Center of the Geography Department of the University of Bonn (ZFL); which was incorporated as a UN-SPIDER Regional Support Office in the spring of 2016. The session organized by UN-SPIDER focused on the use of remote sensing in disaster risk reduction and preparedness efforts; contributing to the enhancement of resilience and sustainable development.

Workshop on Ecosystem based Disaster Risk Reduction, side event at the World Conservation Congress (Honolulu, United States of America, 5 September 2016)

61. The International Union for Conservation of Nature (IUCN) organized the World Conservation Congress from 1 to 10 September 2016 in Honolulu, United States of America. The workshop on Ecosystem based Disaster Risk Reduction, as a side event, was co-organized with UNESCO Category 2 Centre for Asia Pacific, IUCN and UNESCO. UN-SPIDER was represented on a panel delivering a talk on ecosystem-based disaster risk reduction (EcoDRR).

Thematic Sessions at the 6th Asian Ministerial Conference on Disaster Risk Reduction (AMCDRR) (New Delhi, India, 2 to 5 November 2016)

62. AMCDRR is a biennial event, this year co-organized by the Government of India and the United Nations Office for Disaster Risk Reduction (UNISDR). This event aimed to prepare the road map for implementation of the Asia Pacific plan for disaster risk reduction and implementation Sendai Framework for Disaster Risk Reduction 2015-2030.

63. The Office for Outer Space Affairs, through UN-SPIDER, organized and lead the theme “Applications of Science and Technology for disaster risk reduction” by organizing a thematic session titled “Strengthening the contribution of science and technology for disaster risk reduction: Emphasising the role of climate science, Earth observation and information technologies for building resilience”. The thematic session was attended by about 75 participants.

64. A representative of the Office for Outer Space Affairs also delivered a talk in the thematic session on “Making World Heritage Risk Resilient Using Ecosystem based Disaster Risk Reduction and Participatory Management and Planning Strategies in Asia”, which was organized by the United Nations Educational, Scientific and Cultural Organization (UNESCO) Category 2 Centre on World Natural Heritage Site Training and Management for Asia Pacific region.

C. Knowledge management

65. Knowledge management is at the core of UN-SPIDER's activities. By systematically and continuously compiling the knowledge and available resources held by individuals and institutions, UN-SPIDER aims to transfer lessons learnt, point-out innovations and foster collaborative practices. The communities involved in UN-SPIDER's field of work include many different actors: disaster responders, disaster risk specialists, policymakers, remote sensing experts, space technology providers, academics and researchers, and their needs, prerequisites and capabilities vary considerably.

Knowledge Portal

66. The UN-SPIDER Knowledge Portal⁸ is one of the cornerstones of the programme as it hosts information on all activities conducted by the programme and relevant information on what the disaster-risk, the emergency response and the space communities are doing. The portal is increasingly recognized as making a significant contribution to strengthening existing networks.

67. As in previous years, the number of visitors has increased consistently since the Portal was launched. Between August 2015 and July 2016, the average monthly visits to the Knowledge Portal were in the order of 14,000. By the end of 2016 the number of content items has increased to nearly 7,400 items. The sections with the highest addition rates include the news, events, data sources and institutions sections.

68. Two procedures focusing on drought indices have been developed and published in the Portal in 2016. These procedures are being implemented as part of a project conducted by UN-SPIDER to strengthen national drought early warning systems in Central America and Dominican Republic (SEWS-D), and are being promoted in Africa and Asia. A Recommended Practice was also developed by the Agustín Codazzi Geographic Institute of Colombia (IGAC) in its role as an RSO to map the expansion and contraction of water bodies including lakes; and another one to map the extent of exposed elements to natural hazards. These procedures are frequently visited and downloaded by visitors to the Portal.

69. The Portal is being migrated to the services of the IT Service of the United Nations Secretariat in New York to offer access to the Portal on a 24/7 basis and to benefit from a highly secure environment.

D. Support to emergencies

Charter activation for floods for floods in Iran

70. The Office for Outer Space Affairs/UN-SPIDER activated the International Charter Space and Major Disasters (the Charter) to provide satellite imagery for the floods that occurred due to heavy rains in the south and south-west of Iran on 15 April 2016. The activation was done on behalf of the Iranian Space Agency, host of a UN-SPIDER's Regional Support Office. The Iranian Space Agency was the project manager for this activation.

Charter activation for volcanic eruption in Indonesia

71. UN-SPIDER played a critical role in activating the International Charter for the volcanic eruption in Mount Sambaing in Indonesia on 21 May 2016. The request came

⁸ <http://www.unspider.org>.

from the Centre of Volcanology and Geology Disaster Mitigation (PVMGB) following a training delivered by the Office for Outer Space Affairs in April 2016 to PVMGB officials during its ASEAN workshop. The request from PVMGB was routed through the Indonesian Space Agency (LAPAN) which is also a Regional Support Office of UN-SPIDER. Since the Office for Outer Space Affairs is a Cooperating Body to the International Charter for United Nations entities, Asian Disaster Reduction Centre (ADRC) as an authorised user, came forward to activate the Charter. ADRC is another Regional Support Office of UN-SPIDER in the region. The UN-SPIDER also channelled an additional support from CNSA which provided high resolution images at no cost to LAPAN to monitor the impacts of the volcano.

Charter activation for floods in the Dominican Republic

72. UN-SPIDER supported the National Emergency Commission of the Dominican Republic due to the floods and landslides triggered by hurricane Matthew in October 2016. The charter was activated by the National Emergency Commission as an Authorised User on 5 October 2016 after communications with CONAE, DLR and UN-SPIDER. The Charter selected the Crisis Information Centre of the German Aerospace Center (DLR) as project manager. EIGEO contributed to the generation of maps under this activation that were used to characterise damages and in emergency response efforts. The National Emergency Commission became an Authorised User of the Charter in 2015 due to the joint efforts of Office for Outer Space Affairs, CONAE and DLR.

Charter activation for landslides in Costa Rica

73. UN-SPIDER supported the National Emergency Commission of Costa Rica after floods and landslides were triggered by hurricane Otto in November 2016. The charter was activated by the United States Geological Survey on behalf of the National Emergency Commission on 29 November 2016 after communications with CONAE, DLR and UN-SPIDER.

Other activities related for improving emergency response

74. The cooperation between the Charter and the Office for Outer Space Affairs was highlighted and detailed in statements and presentations during a number of international events and conferences during the reporting period. Every opportunity was used by staff to raise awareness on the opportunities offered by the Charter and particularly its Universal Access initiative.

75. Joint efforts have been conducted with the Argentina National Space Activities Commission (CONAE) to promote the Universal Access initiative in countries of Latin America and the Caribbean where Spanish is the official language. Several countries including Chile, the Dominican Republic, El Salvador, Guatemala, and Uruguay have been accepted by the Charter as Authorised Users in Latin America and the Caribbean in recent years. Efforts are underway by CONAE and UN-SPIDER to incorporate additional countries as Authorised Users. Similar efforts are promoted in the ASEAN region through the series of ASEAN workshops and advisory missions in Asia and Africa.

76. As a way to support the EIGEO group in its efforts to contribute to disaster response efforts in the Dominican Republic and in Haiti due to hurricane Matthew in October 2016, the Italian Space Agency facilitated access to radar imagery to be used to generate maps of affected areas in the border region between these two countries.

77. To complement the efforts of the emergency response, the Office for Outer Space Affairs contributed to the International Working Group on Satellite-based Emergency

Mapping (IWG-SEM);⁹ a voluntary group of organizations involved in satellite-based emergency mapping. The Office for Outer Space Affairs/UN-SPIDER chaired IWG-SEM from May 2015 to May 2016.

IV. Voluntary contributions

78. In its resolution [A/C.4/71/L.2/Rev.1](#) the General Assembly of the United Nations encouraged Member States, on a voluntary basis, to provide the programme with the additional resources necessary to address the increasing demand for support successfully and in a timely manner.

79. Accordingly, the successful implementation of activities benefited from the support and voluntary contributions received from:

(a) The Government of Germany contributing 300,000€ for the UN-SPIDER activities generated from the Bonn office;

(b) The Government of China contributing RMB 1,250,000 to support the activities of the UN-SPIDER office in Beijing and the services of two experts from NDRCC and CNSA on a non-reimbursable loan basis from January to August 2015;

(c) DLR providing the services of one expert on a non-reimbursable loan basis;

(d) The National Emergency Commission of the Dominican Republic contributed in kind support in the amount of USD 45,000.00 toward the conduction of the UN-SPIDER Regional Expert Meeting held in Santo Domingo, Dominican Republic, on 18 and 19 July 2016;

(e) The Secure World Foundation (SWF) contributing to UN-SPIDER Regional Expert Meeting in Dominican Republic;

(f) CNSA, APSCO and RCSSTEAP contributing to the annual conference organized by UN-SPIDER in Beijing, China;

(g) UN-ESCAP contributing to the ASEAN workshop;

(h) UFSM contributing with experts to develop the SVI Recommended Practice, the elaboration of updated maps for the Dominican Republic and the conduction of the training course in Santo Domingo, Dominican Republic from 20 to 22 July 2016;

(i) Delta State University contributing to the events organized in the United States of America;

(j) ICIMOD contributing to the training in Myanmar, IWMI contributing to the training in Lao People's Democratic Republic and ADPC contributing to the training in Myanmar and Lao People's Democratic Republic; and

(k) NDRCC contributing to the Beijing training programme.

80. The in-kind contributions of members of the network of regional support offices has been acknowledged in this report already but the programme aims at increasing these inputs as the demand for support from member States increases in an important manner.

81. The in-kind and sometimes financial contributions of those organizations are recognized as central to the success of the Programme in 2016 but also demonstrate the value of UN-SPIDER in building partnerships to improve the capabilities of national and regional institutions with a role in disaster risk reduction and emergency response in developing countries.

⁹ <http://un-spider.org/network/iwg-sem>.