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**Committee on the Peaceful  
Uses of Outer Space****Report on activities carried out in 2018 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 decided to establish 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 by being a gateway to space information for disaster management support, serving as a bridge to connect the disaster management and space communities and being a facilitator of capacity-building and institutional strengthening, in particular for developing countries.
2. At its fiftieth session, the Committee on the Peaceful Uses of Outer Space agreed that progress reports on the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (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.
3. The present report contains a summary of activities carried out under the UN-SPIDER programme in 2018.

**II. Organizational framework**

4. As part of the responsibility of the Office for Outer Space Affairs of the Secretariat concerning the promotion of 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 2018.



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

5. The overall supervision of the UN-SPIDER programme is the responsibility of the Director of the Office for Outer Space Affairs. 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; a programme officer in Vienna who supports outreach and capacity-building activities and advisory services; a junior professional officer in Bonn who supports awareness-raising and information management activities; two general services staff members; three non-reimbursable loans of personnel from the China National Space Administration (CNSA), the National Disaster Reduction Centre of China and the German Aerospace Centre (DLR); and a total of 17 interns in UN-SPIDER offices.

6. In 2017, the Ministry of Civil Affairs of China and the Office for Outer Space Affairs signed a new funding agreement that offers support to the UN-SPIDER office in Beijing and provides funding for its activities from 2017 to 2020.

7. In 2018, an agreement for a five-year joint project was signed between the University of Bonn and the UN-SPIDER office in Bonn, funded by DLR. Within the scope of that project, UN-SPIDER will plan and implement international conferences and expert meetings, carry out knowledge management efforts and provide technical advisory support to Member States, with a focus on Africa.

## **B. Network of regional support offices**

8. 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 and/or areas of expertise.

9. The 23 regional support offices<sup>1</sup> of UN-SPIDER are hosted by national and regional organizations. These regional support offices provide regional coverage to UN-SPIDER activities from institutions specialized in Earth observation, disaster risk reduction and emergency response.

## **III. Activities carried out in 2018**

10. The work carried out by UN-SPIDER in 2018 was implemented with the resources allocated through the regular budget of the United Nations and with voluntary and in-kind contributions from Member States and collaborating entities.

11. UN-SPIDER regional support offices, donors and other partners met in Vienna on 22 June 2018 in the context of UNISPACE+50, an event marking the fiftieth anniversary of the first United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE). The meeting served as an occasion to provide updates on present and upcoming activities and discuss contributions by the regional support offices and partners.

12. As part of its technical advisory support activities (see section A below), UN-SPIDER conducted a technical advisory mission to Zimbabwe, five follow-up activities in Ghana, Guatemala, Nepal, Sri Lanka and Viet Nam, and an advisory support activity in Cambodia. The programme also provided technical advisory support via the generation of tailor-made space-based information to three countries

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<sup>1</sup> Further information is available at [www.un-spider.org/network/regional-support-offices](http://www.un-spider.org/network/regional-support-offices).

facing floods (Ghana, Nigeria and Viet Nam), as well as countries experiencing droughts (Bolivia (Plurinational State of), Ecuador, El Salvador, Guatemala, Nigeria and Peru).

13. The outreach activities conducted by UN-SPIDER (see section B below) included 10 workshops, conferences, training courses and side events organized in China, Germany, Guatemala, India, Mongolia, South Africa and Ukraine.

14. The programme supported emergencies in five countries and promoted the universal access initiative of the Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters (also called the International Charter “Space and Major Disasters”) among disaster management authorities of five countries (see section D below).

15. The programme serves as the secretariat of the Global Partnership using Space-based Technology Applications for Disaster Risk Reduction (GP-STAR), a multi-stakeholder, voluntary partnership launched at the Third United Nations World Conference on Disaster Risk Reduction, held in Sendai, Japan, on 15 March 2015. GP-STAR supports the implementation of the Sendai Framework for Disaster Risk Reduction 2015–2030 by, inter alia, providing advice to Government organizations and projects on the use of space technologies and applications in disaster risk reduction efforts. In its function as the secretariat, the UN-SPIDER programme conducted regular videoconferences to ensure the implementation of the workplan and further developed the web page dedicated to GP-STAR in order to make information provided by partners more accessible.

16. The UN-SPIDER programme also contributed to the International Network on Multi-Hazard Early Warning Systems, which was launched by the United Nations Office for Disaster Risk Reduction, the Office for Outer Space Affairs, the World Meteorological Organization and other organizations at the Third United Nations World Conference on Disaster Risk Reduction in March 2015. The Network, which includes international, regional and national partners, aims to make the routine use of drought indices derived from satellite imagery a part of the decision-support systems used in drought early warning.

17. UN-SPIDER programme staff also participates on behalf of the Office for Outer Space Affairs in the work of the Working Group on Disasters of the Committee on Earth Observation Satellites.

## **A. Technical advisory support**

18. Technical advisory support is one of the primary activities of UN-SPIDER at the national level and is aimed at providing Member States with support including the following: 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, inter alia, meetings, teleconferences and videoconferences; facilitating direct cooperation between national institutions and providers of space-based information and solutions; and support in accessing space-based information to support emergency responses.

19. The recommendations from the technical advisory missions cover various issues related to 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 and developing partnerships to build the required data infrastructure or analytical tools for the development of basic information for disaster risk reduction or emergency response.

20. The activities in 2018, covered in the present section, include a technical advisory mission to Zimbabwe, follow-up activities in Ghana, Guatemala, Nepal, Sri Lanka and Viet Nam, and an advisory support activity in Cambodia.

**1. Technical advisory support to Sri Lanka, 27 February–1 March 2018, and 22–28 March 2018**

21. Building on the outcomes of previous missions conducted to Sri Lanka in recent years, UN-SPIDER carried out two institutional-strengthening missions to Sri Lanka to address long-term capacity-building needs and discuss joint activities.

22. In late February, UN-SPIDER participated in a workshop and conference organized by the MOBILISE project, which is aimed at enhancing the use of digital platforms to facilitate collaboration between different types of stakeholders in disaster management efforts. In addition, UN-SPIDER followed up with the Disaster Management Centre of Sri Lanka regarding the technical inter-institutional team that the Centre, at the suggestion of UN-SPIDER, is setting up together with several institutions in that country for rapid mapping in the case of disasters.

23. From 26 to 30 March 2018, experts from UN-SPIDER and two regional support offices, namely the Asian Disaster Preparedness Centre and the International Water Management Institute, joined forces to conduct a national training course entitled “Application of disaster risk assessment for development planning and effective emergency response”. That training session was hosted at the University of Peradeniya in Kandy, Sri Lanka. Forty-one participants from the Disaster Management Centre, the National Building Research Organization, the Ministry of Disaster Management and the National Disaster Relief Services Centre and other institutions participated in the training course. The mission team also met with senior officials from the Ministry of Disaster Management to discuss long-term plans to support the implementation of the Sendai Framework in Sri Lanka.

**2. Technical advisory support to Guatemala**

24. Building on the outcomes of previous missions to Guatemala conducted by the programme between 2010 and 2017, UN-SPIDER conducted two expert missions in July and November that included exchanges with a wide range of stakeholders as well as joint seminars together with the National Secretariat for Science and Technology of Guatemala.

25. The missions were used to meet with high-ranking authorities of the National Institute for Seismology, Volcanology, Meteorology and Hydrology, the Executive Secretariat of the National Coordinating Agency for Disaster Reduction and other government agencies. The missions were also used to conduct meetings with members of the technical inter-institutional team on the use of remote sensing and geographic information systems for risk and disaster management.

26. Additional advisory support was provided to the Executive Secretariat of the National Coordinating Agency for Disaster Reduction to activate the Charter following a large eruption of the Fuego volcano that took place on 3 June 2018. UN-SPIDER facilitated access to satellite imagery donated by DigitalGlobe to support emergency response efforts and damage assessments.

**3. Technical advisory support to Viet Nam, 13–17 August 2018**

27. UN-SPIDER carried out an institutional strengthening mission upon invitation from the Viet Nam Disaster Management Authority and conducted multiple activities in Hanoi. This visit followed up on the progress on the recommendations of the 2013 technical advisory mission and was aimed at continuing ongoing engagement with the Disaster Management Authority and the Disaster Management Policy and Technology Centre, as well as assisting stakeholders in implementing those recommendations.

28. The mission team consisted of six experts from UN-SPIDER, Delta State University and the National Disaster Reduction Centre of China. Meetings were held

with key stakeholder organizations, and standard operating procedures for the utilization of Earth observation data during emergency responses in Viet Nam were discussed.

29. The team also conducted an expert meeting with the Viet Nam Disaster Management Authority to define the long-term engagement of UN-SPIDER in Viet Nam, as well as long-term plans to support the implementation of the Sendai Framework. In addition, concrete actions for developing the national spatial data infrastructure in Viet Nam and steps for the Disaster Management Policy and Technology Centre to become an authorized user of the Charter were addressed.

30. A three-day hands-on training programme on “Unmanned aerial vehicles and space technology for disaster management” was given for key stakeholder organizations. The training programme addressed the use of Earth observation data obtained from space platforms and unmanned aerial vehicles and highlighted how microwave remote-sensing can support assessments of the impact of floods. Fifteen officials from different government agencies participated in the course.

31. During the same period, UN-SPIDER initiated an activation of the Charter on behalf of the Viet Nam Disaster Management Authority to monitor the impact of typhoon Bebinca (see para. 76 below for further details).

#### **4. Technical advisory support for drought-prone regions in Latin America and Africa**

32. Maps of drought indicators using free-access satellite data, prepared by UN-SPIDER, were provided to Bolivia (Plurinational State of), El Salvador, Guatemala, Nigeria and Peru through institutional partners. As an example of drought early warning practices, these maps were used to encourage continuous monitoring efforts. In the case of El Salvador and Guatemala, these maps contributed to raising awareness about the longer than usual reduction in rainfall that took place during the months of July and August of 2018, which triggered drought conditions in the two countries.<sup>2</sup>

#### **5. Technical advisory support to Ghana, 15–19 October 2018**

33. UN-SPIDER conducted an institutional-strengthening mission, from 15 to 19 October 2018, at the request of the National Disaster Management Organization of Ghana. The mission was a follow-up activity to a technical advisory mission conducted in 2013 upon the invitation of the Government of Ghana. It included a seminar held on 15 October 2018 with representatives of government agencies and universities, and a four-day training course for 30 participants from more than eight different institutions including the Ghana Space Science and Technology Centre and the University of Ghana.

34. The training course focused on recommended practices for dealing with floods and droughts. It was aimed at building capacities within Ghana to make use of radar satellite imagery to map the extent of floods. The training course was used as a case study of the floods that took place in northern Ghana in August and September 2018. The course was also used to build capacities within Ghana to generate maps depicting the comparative impacts of droughts on vegetation, and that segment of the course used as an example the droughts occurring in the central part of the country.

35. The training course was used to start the establishment of a technical inter-institutional team that would focus its efforts on the generation of geospatial information extracted from space and in situ data in order to contribute to disaster risk reduction and preparedness and emergency response efforts related to different types of events.

<sup>2</sup> More information on this event and its impact is available at <https://reliefweb.int/report/guatemala/gIEWS-update-central-america-drought-causes-crop-losses-dry-corridor-central>.

36. During the mission, a plan was created for the Ghana Space Science and Technology Centre to hold a training course on the RStudio software and for the Centre for Remote Sensing and Geographic Information Services of the University of Ghana to hold a training course on the SNAP<sup>3</sup> software in the following months.

37. The mission made it possible for UN-SPIDER to support the National Disaster Management Organization of Ghana in its application to become an authorized user of the Charter.

**6. UN-SPIDER advisory support activity in Cambodia, 29 October–1 November 2018**

38. UN-SPIDER and World Vision organized a training course and simulation exercise for emergency response in the case of a typhoon, which was held in Phnom Penh from 29 October to 1 November 2018. The objective was to engage with, and build the capacity of, the Humanitarian Response Forum, which comprises international non-governmental organizations and governmental departments. Participants simulated the immediate, initial phase of response to a disaster (i.e., the first month), enacting to the extent possible normal operating procedures in a disaster while still carrying out their regular duties. The activity also generated awareness and understanding of satellite imaging and related mechanisms in the process of emergency management.

39. Communications were made with the National Committee for Disaster Management of Cambodia with respect to a proposal for a UN-SPIDER technical advisory mission to be conducted in 2019 to support the National Committee and other stakeholder organizations with the aim of strengthening their disaster risk management and emergency response by effectively using space-based information.

**7. UN-SPIDER technical advisory mission to Zimbabwe, 19–23 November 2018**

40. UN-SPIDER carried out a technical advisory mission to Zimbabwe to evaluate the current and potential use of space-derived information in all aspects of disaster management and make recommendations for strengthening disaster risk management and emergency response in the country. The mission team visited all relevant disaster management-related organizations in the country, consulted with the United Nations country team and was received by two key ministers of the Government of Zimbabwe.

41. The Minister for Higher and Tertiary Education, Science and Technology informed the team of the recent establishment of the National Geospatial and Space Agency of Zimbabwe, which would help in the implementation of the recommendations of the technical advisory mission. On the advice of the mission team, the Department of Civil Protection, as the national disaster management authority, also decided to request becoming an authorized user of the Charter.

42. The mission team also met with a team from the Directorate-General for European Civil Protection and Humanitarian Aid Operations of the European Commission that was visiting the country to implement disaster preparedness projects at the local level. The two teams discussed ways to cooperate in the future in order to jointly address the recommendations and findings of the technical advisory mission.

**8. Technical advisory support for Nepal, 17–21 December 2018**

43. The institutional strengthening mission to Nepal conducted on 17–21 December 2018 was a follow-up to the technical advisory mission conducted in August 2017 with the aim of improving the utilization of space-based and geospatial information in all stages of disaster management and assisting the stakeholders in implementing the recommendations issuing from that mission.

44. The mission team comprised eight experts from UN-SPIDER, the Office for the Coordination of Humanitarian Affairs, the International Centre for Integrated

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<sup>3</sup> For further information, see <http://step.esa.int/main/toolboxes/snap/>.

Mountain Development, the Aga Khan Foundation, New Brunswick Community College and DigitalGlobe.

45. The follow-up activities included a meeting with Ministry of Home Affairs and key stakeholders on the recommendations and suggested actions contained in the report on the technical advisory mission of 2017; the report was presented to the key stakeholders, and an awareness-raising workshop was held for high-level decision makers to define the long-term engagement of UN-SPIDER in Nepal to support the implementation of the Sendai Framework. In addition, the Ministry of Home Affairs was briefed on becoming an authorized user of the Charter.

46. The capacity-building programme was carried out for 25 officials, demonstrating the use of space technology for floods, droughts, landslides and earthquakes.

## **B. Outreach and networking activities**

47. The present section covers events organized or co-organized under the UN-SPIDER programme (section 1); and contributions to events organized under initiatives of partners (section 2).

### **1. Events organized or co-organized by UN-SPIDER**

#### **(a) United Nations International Conference on Space-based Technologies for Disaster Risk Reduction: Enhancing Disaster Preparedness for Effective Emergency Response, held in Beijing, 24–26 October 2018**

48. The United Nations International Conference on Space-based Technologies for Disaster Risk Reduction: Enhancing Disaster Preparedness for Effective Emergency Response was co-organized by the UN-SPIDER office in Beijing and the Ministry of Emergency Management of China, in collaboration with the Ministry of Foreign Affairs of China, CNSA and the Asia-Pacific Space Cooperation Organization. One hundred participants from 34 countries attended the conference.

49. The report on the International Conference provides a detailed account of its proceedings (see [A/AC.105/1198](#)).

#### **(b) International training course on space-based technologies for emergency response, Beijing, 28 October–1 November 2018**

50. The international training course on space-based technologies for emergency response was conducted back-to-back with the United Nations International Conference on Space-based Technologies for Disaster Risk Reduction: Enhancing Disaster Preparedness for Effective Emergency Response.

51. Twenty-four participants from the Conference attended the training course, which was hosted by the Regional Centre for Space Science and Technology Education in Asia and the Pacific based at Beihang University, Beijing. Experts from the UN-SPIDER regional support offices of Delta State University (United States of America) and the International Water Management Institute (Sri Lanka), as well as from National Disaster Reduction Centre of China, contributed to the training programme.

#### **(c) UN-SPIDER international expert meeting entitled “Towards big (space) data in support of disaster risk reduction and emergency response in Africa”, Bonn, Germany, 12 November 2018**

52. The UN-SPIDER international expert meeting, conducted at the United Nations campus in Bonn, Germany, was aimed at contributing to an increased use of big data

approaches and satellite technologies in African countries to respond to challenges posed by natural hazards.

53. More than 45 participants from space agencies, civil protection authorities, development cooperation actors, international organizations, technical relief and humanitarian aid providers, national ministries and the private sector came together at the event. The outcomes, results and key recommendations of this international expert meeting will be incorporated into the UN-SPIDER activities for the coming years.

54. The meeting was organized together with DLR and benefited from financial support provided by the German Federal Ministry for Economic Affairs and Energy (BMWi). The Center for Remote Sensing of Land Surfaces (ZFL) at the University of Bonn, a UN-SPIDER regional support office, also provided support to the meeting.

**(d) Regional workshop and capacity-building programme for the utilization of space-based and geospatial information for achieving the targets of the Sendai Framework for Disaster Risk Reduction, South Asian Association for Regional Cooperation Disaster Management Centre, Ahmedabad, India, 4–8 December 2018**

55. The regional workshop and capacity-building programme was the first regional event to be held in South Asia under the umbrella of the South Asian Association for Regional Cooperation (SAARC) Disaster Management Centre (Interim Unit) and the Office for Outer Space Affairs through UN-SPIDER.

56. The workshop brought together disaster management officials and experts to draw up a sustained plan for the utilization of space-based technologies for achieving targets of the Sendai Framework. Thirty-five representatives attended this workshop, and training including experts from disaster management authorities and space agencies in States members of SAARC, academic institutes and regional and international organizations.

57. The workshop and training course were hosted by the SAARC Disaster Management Centre, based at Ahmedabad, India. Experts from UN-SPIDER, the UN-SPIDER regional support office, the International Water Management Institute and from the Centre for Space Science and Technology Education in Asia and the Pacific contributed to the training programme.

58. This activity included a one-day workshop as an outreach event for high-level decision makers and to collect needs for the design of future programmes in the region, and a hands-on training programme for disaster management officials on flood and drought risk assessment and response.

59. The activity enhanced cooperation and the sharing of best practices among disaster management agencies and experts in the region and increased awareness and capacity in the region to take necessary steps in the use of space-based and geospatial information in disaster management.

**2. Contributions to events organized under other initiatives**

**(a) Second Asian Science and Technology Conference for Disaster Risk Reduction, Beijing, 17 and 18 April 2018**

60. UN-SPIDER organized and co-chaired a session entitled “Progress on strengthening disaster risk governance in Asia” during the Second Asian Science and Technology Conference for Disaster Risk Reduction. The session included nine presentations from co-chairs and panellists representing various national and international organizations. It focused on three areas: strengthening the science-policy nexus, development of national science and technology plans to support the Sendai Framework and partnerships with local communities.



**(b) Earth Observation-based Information Products for Drought Risk on a National Basis (EvIDENz) project deliverables**

61. The Earth Observation-based Information Products for Drought Risk on a National Basis (EvIDENz) project developed and tested new Earth observation-based methods to assess the impacts of droughts and to contribute to the quantitative measurement of drought indicators established to track progress in the implementation of the Sendai Framework for Disaster Risk Reduction 2015–2030. The methods were developed by ZFL and the United Nations University Institute for Environment and Human Security with the support of the Space Research Institute of the National Academy of Sciences of Ukraine and the National Space Agency of Ukraine and the Disaster Management Training and Education Centre for Africa at the University of the Free State in South Africa. The project was conducted in the pilot regions of Kyiv and Eastern Cape, South Africa, with the intention of generating transferable workflows which could be used in other countries and regions of the world.

62. UN-SPIDER tested the workflows developed by the project consortium and subsequently incorporated into the UN-SPIDER knowledge portal for easy access by users.

**(c) Earth Observation-based Information Products for Drought Risk on a National Basis (EvIDENz) stakeholder workshops in Ukraine, 14 to 16 May, and South Africa, 4 to 8 June 2018**

63. The workshops brought together stakeholders, key decision makers, operational technical audiences from the rural development and agricultural sectors, space agencies, research and technology entities as well as members of water, sanitation, economic and disaster management communities. The aim of the EvIDENz stakeholder workshops was to make decision makers and technical staff from various institutions in Ukraine and South Africa aware of the workflows developed by the Centre for Remote Sensing of Land Surfaces of the University of Bonn and the Institute for Environment and Human Security of the United Nations University as part of the project. Such workflows can be used to understand drought risk and to estimate the impact of droughts on crops and livestock. In addition, the workshops discussed a methodological approach to the implementation of the workflows, and a training session was held to build the skills of technical staff on the use of the workflows made available on the UN-SPIDER knowledge portal.

**(d) Side event on Earth observation at the Asian Ministerial Conference on Disaster Risk Reduction, Ulaanbaatar, 4 July 2018**

64. The Office, through UN-SPIDER, conducted a side event at the Asian Ministerial Conference on Disaster Risk Reduction, held in Ulaanbaatar, on using Earth observation to implement the Sendai Framework. The session was aimed at demonstrating the benefits of space-based technologies for the implementation of the Sendai Framework, provide a forum to share experiences Asian countries have had in using space technologies for disaster management and identify opportunities for collaboration between disaster management authorities in Asia and UN-SPIDER.

**(e) UN-SPIDER/National Secretariat of Science and Technology of Guatemala seminar entitled “Science and technology, its applications in disaster preparedness and response in case of disasters in Guatemala: Fuego volcano”, 24 July 2018**

65. UN-SPIDER co-organized a seminar together with the National Secretariat of Science and Technology in Guatemala City on 24 July 2018. The seminar, which brought together more than 40 participants, focused on the use of science, technology and innovation in disaster risk reduction and response efforts in Guatemala with an emphasis on geological hazards. The seminar brought together experts from public

and private institutions, universities and non-government organizations as well as researchers and students from various universities.

66. The seminar explored the use of technology used to be more aware of risks associated with volcanic and seismic activity, the benefits of satellite-based solutions and unmanned aerial vehicles to map affected areas in the case of disasters, and the applications of geospatial technologies in Guatemala's Secretariat of the Presidency for Planning and Programming as well as in the Executive Secretariat of the National Coordinating Agency for Disaster Reduction.

**(f) UN-SPIDER/National Secretariat of Science and Technology of Guatemala seminar entitled “Mitch+20: Guatemala 20 years after Hurricane Mitch”, 30 and 31 October 2018**

67. UN-SPIDER and the National Secretariat of Science and Technology of Guatemala also joined forces to conduct a second seminar, entitled “Mitch+20: Guatemala 20 years after Hurricane Mitch”. The seminar was held in Antigua, Guatemala on 30 and 31 October and marked the twentieth anniversary of Hurricane Mitch which devastated several countries in Central America at the end of October and early November 1998. The seminar brought together nearly 70 participants from more than 30 government agencies, private companies and universities as well as from regional and international organizations. It was used to compile information on the technological and institutional progress made in Guatemala since 1998 in prevention, preparedness and response during disaster situations triggered by hydrometeorological hazards. Participants also identified needs in terms of science and technology to support disaster risk reduction and emergency response efforts.

68. During the two-day event, participants discussed topics related to information technologies, satellite technologies and communication to enhance disaster preparedness and response. The seminar provided an opportunity for members of the technical inter-institutional team to present the results of the use of satellite imagery to compare the extent of floods in 2017 and 2018, and to map the extent of droughts, including the recent drought triggered by the climate anomaly in the summer of 2018.

### **C. Knowledge management**

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

#### **Knowledge portal**

70. The UN-SPIDER knowledge portal ([www.unspider.org](http://www.unspider.org)) is one of the cornerstones of the programme as it hosts information on all activities conducted by the programme and relevant information on the disaster risk, the emergency response and what the space communities are doing. The portal is increasingly recognized as making a significant contribution to strengthening existing networks.

71. The number of visitors to the portal has continually increased since it was launched. In 2018, the average number of monthly visits to the knowledge portal increased by almost 50 per cent from 15,000 to around 22,000. By the end of 2018, the number of content items had grown to nearly 8,300. The sections with the highest addition rates include the news, events, data sources and institutions sections.

72. In 2018, UN-SPIDER became a data provider in the Group on Earth Observations System of Systems (GEOSS) platform. Under the arrangement, selected

resources from the UN-SPIDER knowledge portal, such as data sources, are made available through the GEOSS platform. The Office for Outer Space Affairs participated in the third GEO Data Providers Workshop, held in Frascati, Italy, from 2 to 4 May to present the results of that integration, conduct exchanges with other data providers and explore bringing data relevant for disaster management efforts from the GEOSS portal into the UN-SPIDER knowledge portal.

73. To enable access to information to a broader audience, a drought risk-mapping procedure was translated into French and was transposed to open source software. A further procedure using new high-resolution optical satellite imagery to map flood extents and providing a methodology for flood damage assessment was added to the portal. High interest topics, such as oil spills, harmful algae blooms and land deformation mapping using radar image analysis, as well as an overview of easily accessible flood web maps, were added to the section of the portal called “data application of the month”.

## **D. Support to emergencies**

### **1. Support to Charter activation for the volcanic eruption in Guatemala on 5 June 2018**

74. UN-SPIDER played a critical role in supporting the response to the Fuego volcano eruption in Guatemala. The activation was requested by the Executive Secretariat of the National Coordinating Agency for Disaster Reduction in response to a joint evaluation of the situation by the National Institute for Seismology, Volcanology, Meteorology and Hydrology and the National Coordinating Agency for Disaster Reduction. The UN-SPIDER technical advisory mission to Guatemala in 2010 and further follow-up missions successfully supported the Executive Secretariat of the National Coordinating Agency for Disaster Reduction in becoming an authorized user of the Charter in 2016. DLR acted as the project manager for that activation.

### **2. Office for Outer Space Affairs and the Operational Satellite Applications Programme joint activation of the Charter for floods in the Lao People’s Democratic Republic, 24 July 2018**

75. The Office for Outer Space Affairs activated the Charter on behalf of the Ministry of Science and Technology and the Department of Disaster Management and Climate of the Lao People’s Democratic Republic, while the Operational Satellite Applications Programme (UNOSAT) of the United Nations Institute for Training and Research (UNITAR) activated the emergency mechanism on behalf of the World Food Programme. UNITAR-UNOSAT acted as project manager for the activation. Two UN-SPIDER regional support offices acted as value added providers by interpreting satellite imagery and developing maps: the Asian Disaster Preparedness Centre and the International Water Management Institute.

### **3. Charter activations for typhoon, floods and landslides in Viet Nam, 17 August 2018**

76. The Office for Outer Space Affairs activated the Charter for typhoon Bebinca in Viet Nam. The Charter activation aided disaster managers in Viet Nam to fully assess the impact of the typhoon and the extent of the floods, and helped to allocate resources and provide aid more effectively. The International Water Management Institute acted as project manager for the activation. The Viet Nam Disaster Management, Policy and Technology Centre, which is a close national partner of UN-SPIDER, acted as a value added provider by assessing satellite imagery and developing maps.

**4. Drought early warning and mapping support for floods in Nigeria, September 2018**

77. The National Space Research and Development Agency (NASRDA) of Nigeria requested the support of UN-SPIDER with methodologies and recommendations regarding UN-SPIDER procedures for flood and drought monitoring. In order to support NASRDA with information regarding the geographical extent of the floods that took place in September 2018, maps of flooded areas were generated using the Moderate Resolution Imaging Spectroradiometer (MODIS) Terra data and Sentinel-1 radar imagery respectively based on the UN-SPIDER recommended practices. These products were specifically tailored for monitoring flooding of the Benue river of Nigeria. Additional maps for droughts in Katsina State were generated and provided to NASRDA. A staff member of NASRDA was given a short training course describing how the maps were generated and could be used for integrated decision support for droughts and floods. In addition, the complete set of raw satellite imagery and MODIS composite products, as well as tailor-made power point presentations, were provided to the staff member for subsequent training activities in Nigeria.

**5. Mapping support for floods in Viet Nam and Ghana in September and October 2018**

78. In response to requests for flood monitoring support in September and October 2018, the UN-SPIDER programme processed free access satellite imagery to generate and provide maps of flooded areas to the Viet Nam Disaster Management Authority and the National Disaster Management Organization of Ghana.

79. UN-SPIDER also supported the Viet Nam Disaster Management Centre on 14 September in obtaining satellite data for the Mangkhut super typhoon. On the basis of a bilateral agreement between the Office for Outer Space Affairs and CNSA, CNSA acquired Feng-Yun satellite images on the same day that the Centre requested support. The Viet Nam Disaster Management Policy and Technology Centre used the images for mapping the impact of the typhoon.

**6. Raising awareness of the Charter**

80. The cooperation between the Charter secretariat 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 the Office to raise awareness of the opportunities offered by the Charter, in particular its universal access initiative.

81. Activities conducted by UN-SPIDER included high-level advocacy meetings at ministerial level and technical workshops in which all stakeholders with roles or interest in disaster risk reduction and emergency response were informed about different data and services sources, with a focus on the Charter.

82. UN-SPIDER has been working with relevant institutions in Cameroon, Ghana, South Africa, Viet Nam and Zimbabwe to support those institutions in becoming authorized users of the Charter.

**7. Raising awareness of the Copernicus Emergency Mapping Service**

83. In addition to raising awareness regarding the Charter, the Copernicus Emergency Mapping Service was also highlighted and detailed in statements and presentations at international events and in missions during the reporting period. Every opportunity was used by the Office for Outer Space Affairs to raise awareness of the opportunities offered by this emergency mechanism, including during the UN-SPIDER international expert meeting held in Bonn, Germany, in November 2018.

**8. Other emergency support activities**

84. 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),<sup>4</sup> a voluntary group of organizations involved in satellite-based emergency mapping.

85. The first meeting of IWG-SEM in Asia was hosted during the United Nations International Conference on Space-based Technologies for Disaster Risk Reduction: Enhancing Disaster Preparedness for Effective Emergency Response, which took place in Beijing from 24 to 26 October 2018.

#### IV. Voluntary contributions

86. In its resolution 73/91, the General Assembly encouraged Members States, on a voluntary basis, to provide UN-SPIDER with the additional resources necessary to address the increasing demand for support successfully and in a timely manner.

87. Accordingly, the successful implementation of activities benefited from the support and voluntary contributions received from the following Governments and entities:

(a) The Government of China contributed 1.25 million renminbis to support the activities of the UN-SPIDER office in Beijing and the services of two experts from the National Disaster Reduction Centre of China and CNSA on a non-reimbursable loan basis from January to August 2018;

(b) The Government of Germany allowed the UN-SPIDER office in Bonn to continue using remaining funds already provided in the funding agreement for the period 2014–2017;

(c) The Government of Germany contributed the services of an associate expert, and DLR provided the services of one expert on a non-reimbursable loan basis;

(d) CNSA, the Asia-Pacific Space Cooperation Organization and the Regional Centre for Space Science and Technology Education in Asia and the Pacific contributed to the annual conference organized by UN-SPIDER in Beijing;

(e) DLR and ZFL contributed to the annual international expert meeting organized by UN-SPIDER and DLR in Bonn, Germany;

(f) The National Secretariat for Science and Technology of Guatemala provided in-kind support in the amount of \$20,000 to carry out its joint seminars with UN-SPIDER in Guatemala and for the travel of UN-SPIDER staff to Guatemala to conduct these events;

(g) The National Disaster Reduction Centre of China contributed to the Beijing training programme.

88. In-kind contributions made by members of the network of regional support offices have been acknowledged above in this report. The programme aims at increasing those inputs as the demand for support from Member States increases significantly. The in-kind and in some cases financial contributions of those organizations are recognized as key to the success of the programme in 2018 and 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.

#### V. Conclusions

89. UN-SPIDER is systematically working to achieve its mission by being a gateway to space information for disaster management, by serving as a bridge between the disaster management, risk management and space communities and by

<sup>4</sup> For more information, see <http://un-spider.org/network/iwg-sem>.

being a facilitator of capacity-building and institutional strengthening, particularly for developing countries.

90. As a result of its awareness-raising activities in 2018, notably through the UN-SPIDER knowledge portal, States Members of the United Nations, especially developing countries, are now more aware of how space-based information can support disaster management efforts as well as of the efforts of UN-SPIDER worldwide.

91. The UN-SPIDER network and outreach work, through international expert meetings and other formats, has strengthened the links between the space and disaster management community so as to ensure that space technologies reach end users, especially in developing countries, and that user requirements reach space agencies and feed into their research and development activities. Through memorandums of understanding with private sector entities, the Office for Outer Space Affairs has mobilized new actors with the objective of facilitating access to further data sets, tools and information products for Member States.

92. Through its capacity-building efforts, UN-SPIDER continued to support a number of countries in developing their technical skills and institutionalizing the use of space-based information in disaster management and emergency response. Member States and their civil protection agencies are now better equipped to use relevant data and tools in order to develop information products, such as flood hazards and drought maps, which are used to support decision-making with regard to disaster management.

93. In addition to working closely with Member States so that they can become authorized users of the Charter, UN-SPIDER capacity-building activities have helped civil protection agencies to be able to serve as project managers for an activation of the Charter. In 2018, the Disaster Management Centre of Sri Lanka served for the first time as project manager for a Charter activation, which has demonstrated that the timeliness and quality of the Charter's activations can be improved through the use of national or regional capacities.

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