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Committee on the Peaceful Uses of Outer Space

Report on activities carried out in 2024 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 for 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. As part of the responsibility of the Office for Outer Space Affairs of the Secretariat for promoting international cooperation in the peaceful uses of outer space, and in line with its mandate, UN-SPIDER fosters knowledge management, builds bridges between 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 as needed.

4. The 28 regional support offices of UN-SPIDER are hosted by relevant national and regional organizations. Those offices provide, on a voluntary basis, regional coverage for UN-SPIDER activities, rendering valuable support from institutions specialized in Earth observation, disaster risk reduction and emergency response.

5. Some of the regional support offices also contribute pro bono to UN-SPIDER international conferences, capacity-building activities and technical advisory and institutional strengthening missions. They also provide content for the UN-SPIDER knowledge portal.

6. In 2024, the South African National Space Agency was incorporated as a regional support office, and two new regional support office agreements were being prepared.

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7. The present report contains a summary of activities carried out under the UN-SPIDER programme in 2024.

II. Activities carried out in 2024

8. The work of UN-SPIDER in 2024 was carried out with the resources allocated through the regular budget of the United Nations and with voluntary cash and in-kind contributions from Member States and collaborating entities.

9. An in-person coordination meeting of focal points of UN-SPIDER regional support offices was held on 15 March 2024. The meeting served as an opportunity to provide updates on ongoing and upcoming activities and discuss thematic issues as well as joint workplans and potential cooperation for 2024 and beyond.

10. As part of its technical advisory support activities (see sect. II.A below), UN-SPIDER carried out institutional strengthening missions to Morocco, Nepal and Tonga, and provided virtual support to the Dominican Republic, Malawi, Namibia, Somalia and Saint Vincent and the Grenadines.

11. The outreach and networking activities carried out by UN-SPIDER (see sect. II.B below) included one international conference, workshops, expert meetings and training courses. UN-SPIDER also contributed to the organization of the World Space Forum and to various outreach activities and training courses organized by its partners.

12. The programme supported emergency response operations in several 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 referred to as the International Charter on Space and Major Disasters) among the disaster management authorities of countries in Africa, Asia and the Pacific and Latin America and the Caribbean.

13. In addition, the programme continued to raise awareness regarding other key emergency response mechanisms such as the Copernicus Emergency Mapping Service, the Copernicus Risk and Recovery Service and Sentinel Asia.

14. Furthermore, in 2024, UN-SPIDER cooperated with the Committee on Earth Observation Satellites (CEOS) and private sector entities to launch a preparedness pilot project and a basic digital twin for Tonga during the Pacific Islands Forum Leaders Meeting in August, and launched its flagship publication entitled *Space Technologies for Early Warning Systems*, which showcases examples of the use of space technologies, products and services in early warning systems in the case of hydrometeorological, geological, environmental, extraterrestrial, coastal, biological and health hazards.

A. Technical advisory support

15. The activities carried out by UN-SPIDER in 2024 included institutional strengthening missions to Nepal, Morocco and Tonga, as well as the provision of virtual technical advisory support to the Dominican Republic, Malawi, Namibia, Somalia and Saint Vincent and the Grenadines.

Institutional strengthening mission to Morocco, 20–22 May 2024

16. UN-SPIDER carried out an institutional strengthening mission to Morocco from 20 to 22 May 2024 in order to inform decision makers about the use of space-based information in the case of disasters and for disaster risk management. The mission was carried out in coordination with the Royal Centre for Remote Sensing of Morocco (CRTS) and benefited from support provided by partners from the National Centre for Space Studies of France (CNES), the Regional Image Processing and Remote Sensing Service (SERTIT) and the Starion Group.

17. The mission included a one-day national workshop on the use of geospatial information in disaster risk management, followed by a two-day training course for project managers under the International Charter on Space and Major Disasters. The workshop allowed UN-SPIDER to inform decision makers about satellite applications in the risk management and disaster management phases, to discuss ways to improve access to satellite services for disaster management, to compile recommendations for the optimal use of geospatial information and to create a road map to enhance the use of geospatial information in disaster risk management. The national workshop was used to encourage government agencies to become authorized users of the International Charter.

18. On 21 and 22 May 2024, a two-day training workshop was organized by CRTS on its premises in Rabat with the support of experts from CNES, SERTIT and the Starion Group. The course focused on the use of the European Space Agency (ESA) Charter Mapper and on the operational procedures employed by project managers and value-added providers during activations. The course benefited nearly 30 participants from different government agencies in Morocco.

Institutional strengthening mission to Nepal and training, 12–15 February 2024

19. Jointly with the Asian and Pacific Training Centre for Information and Communication Technology for Development of the Economic and Social Commission for Asia and the Pacific and the National Disaster Risk Reduction and Management Authority of Nepal, and in collaboration with the Geoinformatics Centre of the Asian Institute of Technology and the Faculty of Geo-Information Science and Earth Observation of the University of Twente, UN-SPIDER organized a national training course on multi-hazard risk assessment for risk reduction planning. The course was aimed at strengthening the capacities of officials from the ministries and departments responsible for disaster risk management in Nepal to use multi-hazard risk assessment solutions and platforms in their work.

20. The Nepalese authorities deeply appreciated the timely training, which enabled them to understand the concepts of hazard assessment, elements-at-risk mapping, vulnerability assessment and risk assessment, to retrieve spatial data requirements for risk assessments, to generate an elements-at-risk database using geographic information systems (GIS), to formulate the requirements of hazard data and methods, to apply various methods for vulnerability assessment, to generate risk maps for risk-informed decision-making, to understand how risk changes when risk reduction alternatives are adopted and to gain insight into how risk assessment can be carried out considering future changes.

Institutional strengthening missions to Tonga, 26–29 June and 2–6 December 2024

21. UN-SPIDER organized two follow-up missions to Tonga for the implementation of the Tonga Disaster Preparedness Pilot Project, proposed by the CEOS Working Group on Disasters in 2023, in agreement with the Government of Tonga. The follow-up missions were prepared in consultation with the National Disaster Risk Management Office of Tonga, and the main objective was to enhance disaster preparedness and resilience in the country by equipping geospatial information system users from various ministries with advanced skills in remote sensing and GIS applications. Specific objectives included introducing the Tonga Disaster Preparedness Platform, demonstrating the use of Earth observation technologies and providing training in critical areas such as land subsidence analysis, drought monitoring and other topics requested by participants, such as the extraction of building footprints from imagery, land use and land cover classification and artificial intelligence-based object detection. The training was also aimed at fostering collaboration among stakeholders in order to strengthen disaster management capabilities.

22. The workshop and training courses brought together about 30 GIS professionals from ministries covering agriculture, the environment, climate change, water, geology

and public services. Participants engaged in hands-on training in the use of satellite data for disaster risk reduction and environmental monitoring, drought monitoring, the Tonga Disaster Preparedness Platform, digital twin technology, synthetic aperture radar and artificial intelligence-powered analysis tools, with a strong focus on sea level rise simulations.

23. The National Disaster Risk Management Office and UN-SPIDER also discussed the expansion of the initial pilot project to cover additional populated islands.

Virtual support for the Dominican Republic

24. UN-SPIDER joined forces with other agencies of the United Nations in the Dominican Republic to contribute to the efforts of the National Emergency Commission to reinstall the inter-institutional Geospatial Information Team. A three-day workshop was organized in Santo Domingo to discuss the terms of reference of the Team with its new members, to agree on a workplan and to discuss how the Team will support other institutions, such as the National Emergency Operations Centre and other government agencies, with the generation of space-based information in applications related to disaster risk reduction, preparedness, response and recovery. UN-SPIDER also provided advisory support to the Commission regarding activations of the International Charter on Space and Major Disasters due to floods.

Virtual support for Malawi

25. Malawi, like other countries in Southern Africa, experienced severe droughts linked with the 2023/24 El Niño event. UN-SPIDER and the Centre for Remote Sensing of Land Surfaces (ZFL) of the University of Bonn (Germany) generated more than 500 standard vegetation index maps covering the period from March 2000 to September 2024. The maps were provided to the National Department of Disaster Management Affairs for subsequent use in response to the effects of the droughts.

Virtual support for Namibia

26. Like Malawi and other countries in Southern Africa, Namibia also experienced severe droughts linked with the 2023/24 El Niño event. UN-SPIDER provided advisory support to the Directorate of Disaster Risk Management in the Office of the Prime Minister regarding solutions developed by the space community and by the programme to address the challenges posed by natural hazards, and regarding how the Directorate could become an authorized user of the International Charter on Space and Major Disasters. In addition, UN-SPIDER and ZFL generated nearly 570 standard vegetation index maps covering the period from March 2000 to September 2024. The maps were provided to the Directorate for subsequent use in response to the effects of the droughts.

Virtual support for Somalia

27. UN-SPIDER provided advisory support to the National Emergency Operations Centre of the Somalia Disaster Management Agency regarding solutions developed by the space community and by the programme to address the challenges posed by natural hazards, and regarding how the Centre could become an authorized user of the International Charter on Space and Major Disasters.

Virtual support for Saint Vincent and the Grenadines

28. UN-SPIDER provided advisory support to the National Emergency Management Organization of Saint Vincent and the Grenadines so that it could become an authorized user of the International Charter on Space and Major Disasters. The Director of the Organization was invited to participate in the UN-SPIDER/ZFL international expert meeting on the topic “Confronting the challenges of natural hazards and climate change: solutions from the space community”.

B. Outreach and networking activities

29. The present section covers events organized or co-organized under the UN-SPIDER programme and contributions to events organized on the initiative of various partner organizations.

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

UN-SPIDER Bonn International Conference on Space-based Solutions for Disaster Management: “Early warnings for all”, 12–14 March 2024

30. UN-SPIDER, the German Aerospace Centre (DLR) and ZFL organized the UN-SPIDER Bonn International Conference on Spaced-based Solutions for Disaster Management: “Early warnings for all” at the United Nations campus in Bonn from 12 to 14 March 2024.

31. The Conference brought together 113 experts and participants from United Nations organizations, international organizations, national and government agencies, non-governmental organizations, academia, research centres and private companies. The experts and participants were from 34 Member States: Algeria, Austria, Belgium, Botswana, Brazil, Cabo Verde, China, Colombia, Czechia, Egypt, France, Gambia, Germany, Ghana, Greece, Indonesia, Iran (Islamic Republic of), Israel, Italy, Madagascar, Mauritius, Mexico, Morocco, Mozambique, Netherlands (Kingdom of the), Nigeria, Pakistan, South Africa, Spain, Sri Lanka, Switzerland, Thailand, United Kingdom of Great Britain and Northern Ireland and United States of America.

32. The Conference was aimed at presenting solutions developed by the space community to improve the routine operation of early warning systems targeting hydrometeorological, geological, environmental, extraterrestrial, coastal, biological and health hazards. The event was used as an opportunity to launch the UN-SPIDER flagship publication entitled *Space Technologies for Early Warning Systems* (see para. 90).

33. The Conference allowed UN-SPIDER and ZFL to continue implementing the Space-based Earth Observation Applications for Emergency Response and Disaster Risk Reduction (SPEAR) project and allowed participants to take note of the contributions from the space community to improving early warning systems. Furthermore, it allowed UN-SPIDER and ZFL to strengthen their links with partners in Africa and to establish contact with representatives of government agencies in Egypt, the Gambia, Madagascar, Mauritius and Morocco.[1]

Fourteenth annual coordination meeting of UN-SPIDER regional support offices, 15 March 2024

34. The fourteenth annual meeting of UN-SPIDER regional support offices was attended by representatives of 16 offices. UN-SPIDER used the opportunity to brief the representatives on ongoing and upcoming activities. The meeting included presentations on relevant work conducted by all current regional support offices and candidate offices. The key takeaways from the meeting included strong encouragement for all participants to continue supporting the Early Warnings for All initiative, the continuation of outreach efforts, including new hazard-specific webinars, and a commitment to maintain advisory support while launching new initiatives in requesting countries.

35. The meeting facilitated the identification of joint activities to be organized in 2024 and beyond, as well as discussions on potential project proposals and other

[1] More information on the conference is available at https://un-spider.org/sites/default/files/report_un-spider_conference_bonn_2024.pdf.

resource mobilization efforts to be submitted to potential donors to continue implementing UN-SPIDER activities worldwide.[2]

2024 China-Latin American and Caribbean States Space Cooperation Forum, 24–26 April 2024

36. At the China-Latin American and Caribbean States Space Cooperation Forum, UN-SPIDER gave a presentation on space infrastructure for sustainable socioeconomic development, highlighting the significant contributions of China to UN-SPIDER in support of capacity-building and the Early Warnings for All initiative in the Asia-Pacific region.

Central European University summer workshop on "Geospatial technologies for monitoring the Sustainable Development Goals: early warnings for all", 22–26 July 2024

37. This capacity-strengthening workshop emphasized building community resilience to disasters and climate change, in line with the United Nations Early Warnings for All initiative. The workshop was organized by the Central European University and the American University of Central Asia in cooperation with the Office for Outer Space Affairs. The workshop was co-funded by the Open Society University Network.

38. The workshop was aimed at addressing the gap between the tremendous potential of geospatial and remote sensing technologies and the world of environmental decision makers and policymakers by providing in-service education and professional training for decision makers and practitioners with a view to assisting them in making better-informed, data-driven decisions. Furthermore, the workshop looked towards the future, engaging youth and future leaders in the current practices of evidence-based decision-making.

39. In addition, the workshop explored the use of geospatial technologies for building and improving the resilience of communities to disasters and climate change. Keynote speakers delivered theoretical presentations on best practices in the use of geospatial technologies, followed by practical sessions on their application.

40. The workshop was attended by more than 50 participants, including professionals from national agencies and international organizations, representatives of relevant non-governmental organizations and representatives of the academic world, including both students and faculty.

Series of activities during the fifty-third Pacific Islands Forum Leaders Meeting, Tonga, 23–31 August 2024

41. The theme of the fifty-third Pacific Islands Forum Leaders Meeting was "Transformative and resilient Pasifiki: build better now", which reaffirmed the importance of integrated resilience across all Pacific communities and sectors, including in the areas of climate change and environmental degradation, in building economies through collective solutions, in building the capacity of Pacific people through innovation and technology, and in addressing continued health and education challenges by working together. The Secretary-General of the United Nations and more than 1,500 delegates from some 40 countries attended the Leaders Meeting.

42. On 28 August 2024, UN-SPIDER co-organized a side event entitled "Tonga Disaster Preparedness Platform presentation: the value of satellite data" with the National Disaster Risk Management Office of Tonga, the Office for the Coordination of Humanitarian Affairs, the United Nations Office for Disaster Risk Reduction and the Tonga Red Cross Society.

[2] More information on the meeting is available at www.un-spider.org/news-and-events/news/un-spider-regional-support-offices-meeting-2024.

43. The side event provided an opportunity for the Office for Outer Space Affairs, UN-SPIDER and its partner agencies to highlight space-based technology applications in the field of disaster management in Pacific Islands countries, with a particular focus on preparedness aspects, such as risk identification and early warning systems. The Tonga Disaster Preparedness Pilot Project was introduced, and a video briefing on the project was presented. Concurrently, the Tonga Disaster Preparedness Platform, a culmination of the efforts undertaken in the Pilot Project, was officially launched.

44. A diverse audience of more than 100 participants attended, ranging from upper secondary- and tertiary-level students to representatives of government ministries, bilateral partners and community leaders. The event provided them with an opportunity to ask questions directly to partner agencies of the National Disaster Risk Management Office on the basis of past disaster experience and to hear about new and innovative ideas in disaster management.

45. Accompanying the Secretary-General, staff from the Office for Outer Space Affairs/UN-SPIDER visited the Tonga Broadcasting Commission, which serves as the primary communications centre in the event of a natural disaster. The broadcasting facility is also one of the evacuation centres for the eastern side of the capital. There, a new Tonga weather radar system – which, after the system in Fiji, was the second to be established in the Pacific region – was officially put into operation, with a view to enhancing severe weather forecasting and early warnings through the Weather Ready Pacific initiative.

46. Continuing with the Secretary-General's engagements, the Office for Outer Space Affairs/UN-SPIDER team visited the Hakake sea wall and heard members of the coastal communities there describe how their livelihoods were threatened by sea level rise and how people endured the impacts of the climate crisis on a regular basis. The sea wall was recently built by the Government of Tonga and its partners, including the United Nations Development Programme, in order to mitigate the negative effects of sea level rise. The Hunga Tonga-Hunga Ha'apai volcanic eruption in 2022 and the resulting tsunami destroyed significant parts of the sea wall and displaced the communities and families living in the area.

47. As part of the official side events, on 27 August 2024 UN-SPIDER organized a meeting with experts interested in geospatial and satellite imagery, data access and commercial satellite data to discuss various needs and existing resources for which the United Nations could provide assistance in terms of access to geospatial and satellite imagery data.

48. UN-SPIDER also held consultations with the Office for the Coordination of Humanitarian Affairs Regional Office for the Pacific, with a focus on raising awareness of the utilization of space technology in disaster management. Participants in the discussions also delved into the potential applications and prospects of deploying small, cost-effective weather stations and explored opportunities for future collaboration, especially under the Early Warnings for All initiative, within the Pacific region. A bilateral meeting with INSIGHT of New Caledonia was held to assess the viability of a possible technical advisory mission to New Caledonia and of further collaborative efforts in disaster management across the Pacific region.

High-level seminar on disaster management for African countries, 19–28 September 2024

49. The seminar was held in Beijing, hosted by the Ministry of Emergency Management of China and jointly organized by the National Disaster Reduction Center of China and a Chinese magazine on disaster reduction, with support from UN-SPIDER, the representative office of the United Nations Population Fund in China and the office of the United Nations Children's Fund in China.

50. The purpose of the seminar was to provide theoretical and practical training for director-level emergency managers from African countries through thematic

presentations, panel discussions, technical field visits and hands-on instruction. The seminar covered the progress and challenges in the implementation of the 2030 Agenda for Sustainable Development, the Sendai Framework for Disaster Risk Reduction 2015–2030, the Global Security Initiative and the Global Civilization Initiative. In addition, participants from China shared their experience in disaster management, including strategic planning, risk monitoring and early warning, emergency response, recovery and reconstruction, with a view to exploring the application of innovative technologies, such as space technology and uncrewed aerial vehicles, in disaster prevention, mitigation and relief.

51. Twenty-two representatives from the disaster management and public safety and security departments of nine African countries, namely Algeria, Cameroon, the Comoros, Egypt, Ethiopia, Kenya, Malawi, Mozambique and Senegal, participated in the seminar.

Summit of the Future (22–24 September 2024) and Fourth Committee meetings in October 2024

52. The Space Tech Seminar was co-organized as an official side event of the Summit of the Future by the Office of Information and Communications Technology and the Office for Outer Space Affairs and focused on recent advances in space-related technologies and their impact on global sustainability. At the Seminar, UN-SPIDER made a case for providing access to space data, in particular very high-resolution data, for all. The event underscored the growing relevance of space technology in addressing global challenges such as climate change, disaster preparedness and sustainable development, highlighting the importance of international cooperation and public engagement in those fields.

53. On 21 September 2024, the Office for Outer Space Affairs/UN-SPIDER hosted a high-profile side event entitled “A night at the museum: exploring Earth – space for sustainable development” at the Hayden Planetarium, part of the American Museum of Natural History in New York. The event was highly praised and successful, bringing together more than 200 international leaders, policymakers, industry experts, astronauts and space enthusiasts to explore the pivotal role of space technology in advancing progress towards the Sustainable Development Goals. Very high-resolution data from commercial providers and from innovative new night-time light imaging satellites such as the one operated by Wuhan University (China) were also presented.

54. Given the high praise and strong interest in the side event, which by far exceeded capacity, a similar event was organized at the same location, again with the American Museum of Natural History, during the meetings of the Fourth Committee in New York in October, bringing together more than 250 delegates, staff of permanent missions and United Nations staff, and further highlighting the importance of space data for the global development, climate and disaster risk reduction agendas.

Twenty-second meeting of the Committee on Earth Observation Satellites Working Group on Disasters, 30 September–4 October 2024

55. The CEOS Working Group on Disasters ensures the sustained coordination of disaster-related activities undertaken by CEOS agencies and acts as an interface between CEOS and the community of stakeholders and users involved in risk management and disaster risk reduction. The Working Group is currently chaired by the National Commission on Space Activities of Argentina, with the Office for Outer Space Affairs/UN-SPIDER acting as Vice-Chair, and has some 24 regular members representing space agencies interested in the use of satellite imagery for disaster risk reduction, response and recovery. The objectives of the Working Group are to support the efforts of disaster risk management authorities in protecting lives and safeguarding property by means of satellite-based Earth observation and science-based analyses, to foster the increased use of Earth observation in support of disaster risk management and to support the implementation of the Sendai Framework for Disaster Risk Reduction.

56. The twenty-second meeting of the Working Group was held in Budapest and hosted by a UN-SPIDER regional support office. The Working Group reviewed progress on current pilot projects, demonstrators and other ongoing disaster-related activities, including the Geohazard Supersites initiative, the Seismic Demonstrator activity, the Tonga Disaster Preparedness Pilot Project, the Wildfire Pilot Project, the GEO/LEO/SAR Flood Pilot and the Global Volcano Early Warning and Eruption Response System (G-VEWERS).

UN-SPIDER/Airbus/ZFL workshop on improving radar-based flood mapping with digital elevation models, 8–10 October 2024

57. UN-SPIDER, Airbus Defence and Space and ZFL joined forces to organize a joint technical workshop on improving radar-based flood mapping with digital elevation models. The workshop brought together experts from Airbus Defence and Space, the Joint Research Centre of the European Commission, the Luxembourg Institute of Science and Technology, the Federal University of Santa Maria (Brazil), the Federal Institute of Hydrology of Germany, experts from the space agencies of Algeria, Nigeria, South Africa and from other government agencies in Chile, Colombia, Germany and Morocco, and researchers from Brazil, Germany and the United Kingdom.

58. The workshop served as a starting point for a project in which experts will collaborate in developing a UN-SPIDER recommended practice on the combined use of flood detection using radar imagery and digital terrain models to enhance the identification of potentially flooded areas.[3]

Pacific Islands GIS and Remote Sensing User Conference, 25–29 November 2024

59. At the 2024 Pacific Islands GIS and Remote Sensing User Conference, held at the University of the South Pacific in Suva, UN-SPIDER presented recent activities in conjunction with awareness-raising and capacity-strengthening efforts in the Pacific islands. The focus was on advancing disaster management applications in the Pacific islands, in particular in Tonga, with innovative solutions such as digital twin technology and space-based platforms. The Conference provided an opportunity to engage with various stakeholders and explore collaborative opportunities for enhancing disaster preparedness and resilience in the Pacific region.

60. Over 150 participants from 50 organizations participated in five days of plenary sessions, technical presentations and interactive workshops. The Conference covered various topics in geospatial technology, with a special focus on disaster management, climate resilience and sustainable development.

United Arab Emirates regional workshop on combating disaster and climate change in arid regions using geospatial intelligence and collaboration, 25–27 November 2024

61. UN-SPIDER collaborated with the Arab Union for Astronomy and Space Sciences, the University of Sharjah, Sharjah Academy of Astronomy, Space Sciences and Technology (United Arab Emirates) and Delta State University (United States) to organize a regional workshop at the University of Sharjah campus.

62. The purpose of the workshop was to develop capacity for the use of space-based and geospatial technologies to address climate change, crises and disasters in the Middle East and North Africa region, to develop long-standing leadership and partnerships within the region that address the risk and consequences of climate change, crises and disasters, and to enable collaboration and the sharing of expertise in support of disaster, climate change and crisis management in the Middle East and North Africa region.

[3] More information on this workshop is available at www.un-spider.org/news-and-events/news/un-spider-zfl-airbus-workshop-improving-radar-based-flood-mapping-dems.

UN-SPIDER/ZFL expert meeting on solutions from the space community for the challenges of natural hazards and climate change, 2 December 2024

63. UN-SPIDER and ZFL also joined forces to organize an expert meeting on the theme “Confronting the challenges of natural hazards and climate change: solutions from the space community”. The expert meeting was held at the United Nations campus in Bonn on 2 December 2024. It brought together nearly 35 experts from the United Nations University Institute for Environment and Human Security, DLR, the space agencies of Egypt and Nigeria, the disaster management agencies of Namibia and Somalia, government agencies of Ecuador, Morocco and Peru, and other experts from the United States and Japan.

64. The expert meeting included presentations by experts from DLR, the Institute for Environment and Human Security, the National Space Research and Development Agency of Nigeria and Space Data, a research and development company in Japan. The meeting was used to raise awareness regarding novel solutions developed by the space and the academic communities to contribute to confronting the challenges posed by natural hazards and climate change.[4]

World Space Forum, 3–5 December 2024

65. UN-SPIDER contributed to the organization of the World Space Forum, which was held at the United Nations campus in Bonn from 3 to 5 December 2024. The Forum was organized by the United Nations in collaboration with Germany, the United Arab Emirates and Peru. It brought together nearly 400 high-ranking officials, staff members of international and regional organizations, as well as experts, policymakers and professionals from government agencies, private companies, non-governmental organizations and academia.

66. The objective of the Forum was to strengthen partnerships and advance the ongoing dialogue among the global community on a wide range of space issues to facilitate sustainable socioeconomic development. The Forum promoted the implementation of the “Space2030” Agenda and its implementation plan, adopted by the General Assembly in its resolution 76/3, through the broad involvement of all relevant space actors. Furthermore, the Forum specifically addressed the theme of the Summit of the Future and its objectives of enhancing cooperation on critical challenges and addressing gaps in global governance.

2. Organization of training courses

67. In 2024, UN-SPIDER organized or supported several international training courses and contributed to the organization of additional training courses with partner institutions.

Building climate resilience through digital information and technology masterclass, 29–31 January 2024

68. The meetings of the Asia-Pacific Advanced Network bring together network infrastructure experts, technical providers, users and application communities in the Asia-Pacific region through different working groups and national research education networks. The fifty-seventh meeting, on the theme “Empowering global network alliance for climate resilience”, included a joint event entitled “Building climate resilience through digital information and technology masterclass”. The event was organized in cooperation with the Network’s working groups on disaster mitigation, open and sharing data, and agriculture, and was held in Bangkok with the support of UN-SPIDER.

69. A series of lectures on real-world operational systems, fundamentals and case studies was delivered. Innovative methods using high-performance computing, cloud

[4] More information on the expert meeting is available at www.un-spider.org/news-and-events/news/un-spider-zfl-expert-meeting-confronting-challenges-natural-hazards-and.

technologies, numerical simulations, big data, open science, artificial intelligence and high-speed networks were the focus of the masterclass and the meetings held for further discussion.

UN-SPIDER/DLR/International Charter on Space and Major Disasters/ZFL training course in Rabat, 21 and 22 May 2024

70. Together with CRTS and the International Charter on Space and Major Disasters, and with the support of ESA, CNES, SERTIT and the Starion Group, UN-SPIDER organized a training course on the use of space-based information in the case of disasters. The training course targeted nearly 30 participants from CRTS and other government agencies and universities in Morocco. The course focused on the International Charter, its activation procedures and the Charter Mapper. Experts from CRTS introduced remote sensing applications in disaster management and shared examples of maps created for floods, earthquakes and other events. Experts from SERTIT explained the activation procedures for the International Charter and the roles of authorized users and project managers, and introduced the Charter Operating System (COS-2), as well as links to the Copernicus Emergency Management Service. The expert from the Starion Group presented the Charter Mapper, demonstrating its features and tools for processing satellite imagery during various hazards.

71. The training course supported the efforts of the Ministry of the Interior, CRTS and other Moroccan government agencies in their efforts to become authorized users of the International Charter on Space and Major Disasters.[5]

72. In the weeks and months that followed the training course, some of the participants made use of the Charter Mapper in an activation of the International Charter in response to severe floods in the southern region of Morocco.

UN-SPIDER/Institute for Environment and Human Security training course on GIS and mapping using Quantum GIS and Google Earth Engine, Bonn, 17 April–31 May 2024

73. As in previous years, UN-SPIDER contributed to the organization of the training course on GIS and mapping using Quantum GIS and Google Earth Engine. The course was held on the premises of the United Nations University Institute for Environment and Human Security at the United Nations campus in Bonn from 17 April to 31 May 2024. It was designed to provide students with an introduction to the use of GIS and Google Earth Engine and analytical methods for analysis and remote sensing in applications focusing on disaster management.

74. The training course was prepared for students enrolled in the master of science programme in the geography of environmental risks and human security offered jointly by the Institute for Environment and Human Security and the Faculty of Geography of the University of Bonn.

C. Knowledge management

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

[5] More information on the training course is available at www.un-spider.org/news-and-events/news/crts-un-spider-international-training-course-morocco.

Knowledge portal

76. The UN-SPIDER knowledge portal (www.un-spider.org) continues to be one of the cornerstones of the programme, as it hosts information on all activities carried out by the programme and by the disaster management, emergency response and space communities. By the end of 2024, the total number of content items had increased to approximately 9,700. The sections of the knowledge portal with the highest growth rates included the news, events (including training events), data sources and disaster management sections.

77. The average number of monthly visits to the knowledge portal decreased from an average of 36,000 users per month in 2023 to around 29,000 users per month in 2024. The largest numbers of portal visitors were from the Philippines, the United States, India, Nigeria, Kenya, Mexico and Germany (in descending order by number of visitors).

78. In 2024, efforts were made to incorporate additional content into the Spanish and French versions of the knowledge portal. As a result, the number of visits to the Spanish version of the portal continued to increase compared with previous years.

79. In order to facilitate the discovery of relevant content in the knowledge portal and encourage users to explore related pages, the website's information architecture has been further improved by linking content that covers the same natural hazards, space technologies and UN-SPIDER activities.

80. UN-SPIDER has also improved the links on the knowledge portal to the activities of the regional support offices and the hazards addressed by those activities.

Use of cloud-based solutions

81. UN-SPIDER continued to promote the use of cloud-based GIS solutions. Examples include the use of online data analytics platforms and systems such as Google Earth Engine in recommended practices, and the promotion of web-based systems and applications such as the cloud-based Charter Mapper tool of the International Charter on Space and Major Disasters.

D. Support in case of emergencies

82. As part of its activities, UN-SPIDER facilitated the activation of the International Charter on Space and Major Disasters on four occasions:

(a) On behalf of the Executive Secretariat of the National Coordinating Agency for Disaster Reduction of Guatemala at the end of February 2024. The request was submitted due to forest fires in the foothills of Agua Volcano. An expert from the Agustin Codazzi Geographic Institute of Colombia, a UN-SPIDER regional support office, served as project manager in the activation;

(b) On behalf of the National Emergency System of Uruguay in mid-May 2024. The request was submitted owing to the severe floods triggered by heavy rainfall in Brazil and the northern region of Uruguay. An expert from the National Disaster Prevention Centre of Mexico served as project manager for the activation, and other experts from institutions in Brazil, Mexico and Venezuela (Bolivarian Republic of) contributed as value-added providers;

(c) On behalf of CRTS in response to severe floods affecting the southern region of the country in September 2024. The expert from the Agustin Codazzi Geographic Institute served as project manager in the activation. Experts from the ESA Earth Observation Platform and Phi Lab Engineering Support Service, the United Arab Emirates Space Agency and CRTS contributed as value-added providers;

(d) Advisory support for the National Emergency Commission of the Dominican Republic during the activation of the International Charter due to floods

triggered by Hurricane Beryl. The expert from the Agustin Codazzi Geographic Institute served as project manager in the activation.

83. In several other significant but not major disaster events in 2024, and at the request of local disaster management authorities or UN-SPIDER regional support offices, other data provider partners and mechanisms were also activated directly by UN-SPIDER to provide affected countries with rapid access to very high-resolution satellite imagery (mostly synthetic aperture radar images, but also optical images), including from agile new private sector satellite operators in China.

84. China-based commercial radar satellite imaging companies voluntarily provided very high-resolution synthetic aperture radar images valued at over $135,000 directly to the affected countries, with requests relayed by the UN-SPIDER office in Beijing, mainly for disaster response efforts related to storms in the Cook Islands and in French Polynesia, and related to snow impact in Mongolia.

85. Cooperation and access to data from China-based providers is seen as very important and highly significant in future responses to smaller disasters, as many such events did not benefit from any satellite imagery data support in the past. The Beijing office will continue to build on those efforts and improve workflows while building new partnerships with China-based public and private sector satellite data providers willing to support the mandate of UN-SPIDER.

Training courses and other activities co-organized with the International Charter on Space and Major Disasters

86. As described in section II.B.2 above, UN-SPIDER joined forces with the International Charter on Space and Major Disasters to organize a training course for project managers and value-added providers on the use of the Charter Mapper. The course was held in Rabat and was co-organized with the International Charter and CRTS.

Raising awareness of the Copernicus Emergency Mapping Service

87. In addition to the International Charter on Space and Major Disasters, the Copernicus Emergency Mapping Service was also highlighted and described in detail in statements and presentations at international events and missions during the reporting period, with a view to increasing the familiarity of disaster managers worldwide with all the mechanisms at their disposal.

88. Staff of the National Disaster Management Organization of Saint Vincent and the Grenadines, CRTS, the National Emergency Operations Centre of the Somalia Disaster Management Agency and the Directorate of Disaster Risk Management in the Office of the Prime Minister of Namibia were briefed on the International Charter and were advised to apply to become authorized users of the Charter.

Broadening data access channels to more commercial satellite operators

89. Through the UN-SPIDER programme, the Japan-based Space Data company provided Tonga with a basic digital twin of the island to contribute to disaster risk reduction and preparedness efforts.

E. Publications

90. As part of its activities, UN-SPIDER launched its flagship publication, *Space Technologies* for *Early Warning Systems*, which includes 81 case studies on the use of space technologies, products and services in a variety of early warning systems, and provides examples of such uses in the case of hydrometeorological, geological, environmental, extraterrestrial, coastal, biological and health hazards. The

publication was officially launched during the UN-SPIDER Bonn International Conference in March 2024.[6]

III. Voluntary contributions

91. In its resolution 78/72, the General Assembly once again encouraged Member States to provide UN-SPIDER, on a voluntary basis, with the additional resources necessary – in addition to the small United Nations regular budget allocation – to address the increasing demand for support successfully and in a timely manner. Since its establishment, the programme has benefited from voluntary contributions (cash and in-kind) from the following Governments: Austria, China, Croatia, Czechia, France, Germany, Indonesia, Mexico, Republic of Korea, Spain, Switzerland and Türkiye.

92. The successful implementation of activities in 2024 benefited from the support and voluntary contributions received from the following Governments and entities:

(a) The Government of China contributed $165,792 towards the implementation of activities by the UN-SPIDER office in Beijing between January and December 2024. That office carried out institutional strengthening missions and provided training and advisory support to countries in the Asia-Pacific region, in addition to supporting capacity-strengthening for African and Latin American experts;

(b) The University of Bonn contributed €101,474 towards the implementation of activities by the UN-SPIDER office in Bonn between July 2023 and June 2024. Within the scope of the cooperation agreement with the University of Bonn, the UN-SPIDER office in Bonn carried out institutional strengthening missions and provided advisory support to countries in Africa, organized several events in Bonn and managed the routine operation of the UN-SPIDER knowledge portal. ZFL also provided in-kind support through the generation of a variety of standard vegetation index maps that were provided to representatives of the disaster management agencies of several countries in Africa and Latin America;

(c) The Government of Germany contributed the services of an associate expert as a junior professional officer for a period of six additional months;

(d) Airbus Defence and Space provided in-kind support towards the organization of the UN-SPIDER/Airbus/ZFL workshop.

93. In-kind contributions made by members of the network of regional support offices have been acknowledged in the present report.

IV. Conclusions

94. UN-SPIDER is systematically working to achieve its mission by being a gateway to space information for disaster management support, serving as a bridge between the disaster management, risk management and space communities and being a facilitator of capacity-building and institutional strengthening, in particular for low- and middle-income countries.

95. Throughout the year, the UN-SPIDER team continued to reach out to and work together with other expert bodies and entities to facilitate knowledge-sharing and access to data, as well as to develop new cooperative ideas in the delivery of its mandates. The team participated in the disaster-related work of the Committee of Experts on Global Geospatial Information Management, in the work of the relevant working groups of the Committee on Earth Observation Satellites and in the efforts of the Group on Earth Observations, and cooperated or liaised with private sector entities on both the data collection and provision front (Maxar Technologies, Airbus

[6] The publication is available at www.un-spider.org/news-and-events/news/new-unoosaun-spider-publication-space-technologies-early-warning-systems.

Defence and Space, Planet Labs, BlackSky Technology, SatelliteVu, Space Data, various China-based satellite imaging companies and others) and on the data processing and analysis front (Esri, Space42 of the United Arab Emirates, and others). Efforts are ongoing and will continue into 2025 to mobilize additional resources necessary through collaborative partnerships.