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Technical advisory support activities carried out in 2010 in the framework of the United Nations Platform for Space-based Information for Disaster Management and Emergency Response

Report of the Secretariat

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I. Introduction

1. In its resolution 61/110, the General Assembly decided to establish the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) as a programme to provide universal access to all countries and all relevant international and regional organizations to all types of space-based information and services relevant to disaster management to support the full disaster management cycle and agreed that the programme should be implemented as a programme of the Office for Outer Space Affairs of the Secretariat.

2. At its fiftieth session, the Committee on the Peaceful Uses of Outer Space agreed that progress reports on UN-SPIDER and its future workplans should be considered by the Scientific and Technical Subcommittee under a regular agenda item on space-system-based disaster management support and that the agenda item should be included in the list of issues to be considered by its Working Group of the Whole.

3. The present report provides a summary of the activities carried out under the UN-SPIDER programme in 2010, specifically in the areas of technical advisory support and support for emergency response as set out in the workplan for the biennium 2010-2011 (A/AC.105/937, annex).

II. Technical advisory support activities carried out in 2010

4. In 2010, the Office for Outer Space Affairs, through the UN-SPIDER programme, worked with Member States that had requested support in accessing and using space-based solutions for disaster risk management and emergency response, that support including, inter alia:

(a) Assessment of national capacity and evaluation of disaster and risk reduction activities, policies and plans with regard to the use of space-based technologies;

(b) Assistance in the design of risk reduction and disaster risk management plans and policies with regard to the use of space-based technologies;

(c) Development and customization of guidelines and templates for including space-based technologies in disaster risk reduction and emergency response activities;

(d) Facilitation of access of national institutions to space-based information in order to support disaster risk reduction and emergency response activities;

(e) Identification of training needs and facilitation of capacity-building activities;

(f) Support for the implementation of risk reduction and emergency response activities using space-based technologies.

5. Technical advisory support activities are closely linked to other programme components, namely the development and updating of country profiles and close coordination with designated national focal points.

6. Country profiles provide information to support the development of national, regional and thematic strategies, which in turn guide the technical advisory support provided to requesting Member States. The development of country profiles ensures the systematic compilation of information on the current and planned status of access to and use of space-based solutions and information to support risk and disaster risk management in each country.

7. A national focal point is a national institution nominated by the Government of the country concerned, representing the disaster management and space application communities in that country. The role of the national focal point is to work with UN-SPIDER staff to strengthen national disaster management planning and policies and implement specific national activities that incorporate space-based technology solutions in support of disaster risk management.

8. Technical advisory support is one of the primary activities of the UN-SPIDER programme at the national level. It serves to identify existing national capacity to use space-based information, analyse the current institutional framework for supporting disaster risk management through space-based information and identify constraints and gaps with regard to the use of space-based information for disaster risk management.

9. Technical advisory support includes: (a) technical advisory missions involving international teams of experts representing space and disaster management agencies and relevant international and regional organizations and institutions; (b) technical advice provided to national institutions by such means as meetings, teleconferences and videoconferences; and (c) facilitation of direct cooperation between national institutions and providers of space-based information and solutions.

10. Technical advisory missions are carried out in response to an official request made by the Member State concerned. They typically generate reports containing recommendations and suggestions for follow-up actions, guidelines and policies relating to disaster management issues, always on the basis of the use of space-based information at all stages of disaster management. The reports are shared with the requesting Member State and with the other institutions involved in the mission. The findings and recommendations contained in the reports of the technical advisory missions carried out in 2010 have been summarized in the annex to the present report.

11. During the biennium 2008-2009, UN-SPIDER provided technical advisory support to 13 countries, namely Afghanistan, Burkina Faso, Ecuador, Fiji, Ghana, Guatemala, Jamaica, Kenya, Maldives, Namibia, Samoa, the Philippines and Togo. In 2010, UN-SPIDER continued to provide support to Burkina Faso, Ecuador, Fiji, Guatemala, Jamaica, Maldives, Namibia, Samoa, the Philippines and Togo and also provided support to Chile, Colombia, the Dominican Republic, Haiti, India, Madagascar and Malawi for the first time.

A. Africa

12. Disaster management institutions in Africa are facing an increasing number of natural disasters in the form of floods and drought, a situation likely to be aggravated by the effects of global climate change. In the future, resulting outbreaks

of water-borne diseases and epidemics of weather- and climate-sensitive infectious diseases, including malaria, meningitis and cholera, may cause increasing disruption to societies and further burden national health systems.

13. The challenges in Africa are fourfold: (a) the need to raise awareness among decision makers and stakeholders; (b) the need to build sustainable partnerships between institutions that use space-based technologies for disaster management; (c) the need to provide technical advice and support in response to official requests from African Governments; and (d) the need to provide support for emergency response in the aftermath of disasters (response and relief activities).

14. In providing support to African countries, UN-SPIDER works closely with relevant coordination mechanisms and networks. In 2010, its coordination activities included the following:

(a) Participation in the Second African Ministerial Conference on Disaster Risk Reduction, which was held in Nairobi from 14 to 16 April 2010;

(b) Support for the implementation of the Africa Regional Strategy for Disaster Risk Reduction, which was developed by the New Partnership for Africa's Development and the African Union Commission with the support of the International Strategy for Disaster Reduction (ISDR) Secretariat;

(c) Promotion of the SPIDER Global Thematic Partnership in Africa as a forum where disaster managers and providers of space-based solutions can network and build joint initiatives;

(d) Contribution to leading African space policy forums, including the African Leadership Conference on Space Science and Technology for Sustainable Development.

15. In the framework of the UN-SPIDER programme and in cooperation with the Economic Commission for Africa, a regional workshop for Africa was successfully conducted in Addis Ababa from 6 to 9 July 2010. More than 80 senior experts and decision makers from 27 countries and international organizations participated in the event. The workshop helped to define the elements of a plan of action to tailor the activities of the programme in Africa, identify strategies for bridging the gap between the space and disaster management communities and improve communication and coordination among existing initiatives in African countries with regard to access to and use of space-based technologies for disaster risk management, emergency response, climate change and health-related issues.

16. To date, UN-SPIDER staff have conducted official missions and consultations in Burkina Faso, Ghana, Kenya, Madagascar, Malawi, Namibia, Togo and Uganda, with the participation of international experts. Missions to Cameroon, Comoros, Mozambique, Nigeria and the Sudan are planned in 2011.

17. In 2010, activities in Namibia included closer collaboration between partners working to strengthen cost-effective and rapid access to international satellite resources in response to severe floods, such as those that affected northern Namibia in February 2009. Partners in that endeavour include the National Aeronautics and Space Administration (NASA) and the National Oceanic and Atmospheric Administration of the United States of America, the German Aerospace Center (DLR), the Joint Research Centre of the European Commission and the Space

Research Institute of Ukraine, which are jointly developing a project to develop a sensor web for Namibia.

18. Within the framework of the disaster preparedness programme of the Humanitarian Aid Department of the European Commission, UN-SPIDER is contributing to a project to provide technical support for disaster risk reduction programmes implemented by partners in the disaster preparedness programme in the South-East African and South-West Indian Ocean region (Malawi, Madagascar, Comoros and Mozambique) using geographic information systems.

19. In carrying out its work in Africa, UN-SPIDER works closely with and builds upon the expertise and capabilities of the regional support offices established in that region, namely the Algerian Space Agency, the National Space Research and Development Agency of Nigeria and the Regional Centre for Mapping of Resources for Development, which is based in Nairobi. It also works in close coordination with the Economic Commission for Africa, the United Nations Development Programme and the regional offices of the United Nations Office for the Coordination of Humanitarian Affairs in Africa.

B. Asia and the Pacific

20. The region Asia and the Pacific is more likely to be affected by natural disasters than Africa, Europe or North America, accounting for a staggering 85 per cent of deaths and 38 per cent of global economic losses caused by such disasters during the period 1980-2009.[1]

21. In providing support to countries in the region of Asia and the Pacific, UN-SPIDER works closely with relevant coordination mechanisms and networks. In 2010, its coordination activities in that region included the following: (a) participation in the Asian Partnership on Disaster Reduction (of ISDR), which coordinates the work of all relevant institutions working in the Asian region; (b) contribution to the Fourth Asian Ministerial Conference on Disaster Risk Reduction, held in Incheon, Republic of Korea, from 25 to 28 October 2010; (c) contribution to the Asian Conference on Disaster Reduction 2010, held in Kobe, Japan, from 17 to 19 January 2010; (d) promotion of the SPIDER Global Thematic Partnership in Asia and the Pacific as a forum where disaster managers and providers of space-based solutions can network and build joint initiatives; (e) participation in the Pacific Platform for Disaster Risk Management, coordinated by the South Pacific Applied Geoscience Commission; (f) contribution to the efforts of the Pacific Humanitarian Team led by the United Nations Office for the Coordination of Humanitarian Affairs, specifically in facilitating access to space-based information to support emergency response efforts; and (g) participation in leading Asian space policy forums, including the Asia-Pacific Regional Space Agency Forum and the Asia-Pacific Space Cooperation Organization.

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[1] United Nations, International Strategy for Disaster Reduction and Economic and Social Commission for Asia and the Pacific, *Protecting Development Gains: Reducing Disaster Vulnerability and Building Resilience in Asia and the Pacific — The Asia Pacific Disaster Report, 2010* (Bangkok, 2010). Available from www.unisdr.org/preventionweb/files/16132_asiapacificdisasterreport20101.pdf.

22. During the Fourth Asian Ministerial Conference on Disaster Risk Reduction, staff of the UN-SPIDER programme and the Asian Disaster Reduction Center jointly organized an expert meeting on the incorporation of space-based information and technology in disaster risk reduction and climate change adaptation, which brought together leading experts from the region.

23. UN-SPIDER also assisted in the organization of a workshop entitled "Space-based information for disaster preparedness and risk management", which was organized by the International Centre for Integrated Mountain Development and held in Kathmandu on 2 and 3 October 2010.

24. To date, UN-SPIDER staff have conducted official missions and consultations in Afghanistan, Fiji, India, Maldives, the Philippines and Samoa. Missions to Bangladesh, Sri Lanka and Tonga are planned in 2011.

25. A technical advisory workshop conducted in India from 11 to 13 January 2010 in collaboration with the National Institute of Disaster Management of India was effective in raising awareness among the disaster management authorities of that country with regard to the use of space-based information for disaster risk reduction in cooperation with the Karnataka State Remote Sensing Applications Centre. Experts from Bangladesh and Nepal also attended the workshop. A similar event will be organized in February 2011 with the participation of States members of the South Asian Association for Regional Cooperation.

26. At the request of the Government of the Republic of Maldives, UN-SPIDER carried out a technical advisory mission to that country from 18 to 22 April 2010. The mission team brought together experts of UN-SPIDER, ESCAP, the United Nations Office for the Coordination of Humanitarian Affairs, the Disaster Management Centre of the South Asian Association for Regional Cooperation and ISDR. The key objectives of the mission were to assess national capacity, evaluate disaster and risk reduction activities, policies and plans with regard to the use of space-based technologies and facilitate access by national institutions to space-based information to support the full disaster management cycle. A report on the mission's findings and recommendations was delivered to the Government and a summary of the findings is included in the annex to the present report.

27. UN-SPIDER staff met with officials of the National Disaster Risk Reduction and Management Council of the Philippines in Manila on 9 July 2010 to review and strengthen the support provided to the Philippines under the UN-SPIDER programme, particularly in addressing the immediate consequences of disasters, as in the case of Typhoon Ketsana in 2009. The close coordination achieved on that occasion facilitated the provision by UN-SPIDER of support for emergency response activities when Typhoon Megi struck the Philippines in October 2010.

28. UN-SPIDER contributed to the ESCAP Regional Workshop on ICT Applications for Disaster Risk Reduction and Sustainable Economic Development held in Astana in September 2010. The discussions held with representatives of Afghanistan, Azerbaijan, Kazakhstan and Kyrgyzstan at the workshop served as the groundwork for preparations for a regional expert meeting for the Central Asian countries to be held in 2011.

29. In carrying out its work in the region of Asia and the Pacific, UN-SPIDER works closely with and builds upon the expertise and capabilities of the regional

support offices established in that region, namely the Iranian Space Agency, the Pakistan Space and Upper Atmosphere Research Commission and the Asian Disaster Reduction Center.

C. Latin America and the Caribbean

30. The major disasters that struck Latin America and the Caribbean in 2010 dictated the extent of the support provided by UN-SPIDER to the region. In addition to the missions initially planned for 2010, UN-SPIDER staff had to ensure additional support for activities carried out in response to the disasters that struck Chile, Guatemala and Haiti.

31. In the Latin American and Caribbean region, UN-SPIDER has been working with the national agencies of Chile, Colombia, the Dominican Republic, Ecuador, Guatemala, Haiti and Jamaica responsible for disaster risk management and emergency response.

32. Following a technical advisory mission to Jamaica in December 2009, the report on the mission and its recommendations were discussed and follow-up activities defined with staff of the Spatial Data Management Division of the Office of the Prime Minister, the Planning Institute of Jamaica and the Office for Disaster Preparedness and Emergency Management. As an additional follow-up to the mission, UN-SPIDER supported a staff member of the latter office in attending a training event conducted by DLR in March 2010 and entitled “Rapid mapping and communication support within disaster management”.

33. In January 2010, UN-SPIDER conducted a technical advisory mission to the Dominican Republic. The goal of the mission was to assess the capacity of national institutions to obtain and use space-based information for disaster risk management and emergency response and to identify institutional needs. The mission team met with representatives of 13 institutions, held a joint meeting with representatives of the institutions that constitute the National Emergency Council and visited the National Emergency Operations Centre. An official report was submitted to the Government of the Dominican Republic containing several recommendations relating to policies, strategies and actions. A follow-up plan of action to strengthen capacities is currently being elaborated.

34. When a devastating earthquake struck Haiti in January 2010, UN-SPIDER provided immediate support for emergency response activities through its SpaceAid framework by ensuring that existing space-based information was made available to the response community in a timely manner. As a follow-up activity, UN-SPIDER conducted a technical advisory mission to Haiti to assess how space-based information was obtained and used during the immediate response phase to support recovery activities. During the mission, UN-SPIDER facilitated cooperation between the Civil Protection Agency, the National Centre for Geospatial Information, the United Nations Stabilization Mission in Haiti (MINUSTAH) and the Information Management Unit of the United Nations Office for the Coordination of Humanitarian Affairs with a view to ensuring that technical assistance could be provided in the event of a future disaster.

35. Similarly, UN-SPIDER provided immediate emergency response support to Chile when an earthquake of magnitude 8.8 struck that country in February 2010. In March 2010, UN-SPIDER visited Chile at the request of its Government to follow up on the support that the programme had been providing for the response efforts. UN-SPIDER staff met the inter-institutional team that had been using space-based information made available with UN-SPIDER support. The staff also met the Minister of National Property, who oversees the National System for the Coordination of Territorial Information. Recommendations for follow-up activities were prepared and shared with the relevant institutions.

36. A mission to Colombia was conducted in April 2010 with the aim of visiting several Government agencies, including the Risk Management Secretariat, the Colombian Space Commission, the Agustín Codazzi Geographical Institute, the Ministry of Environment and Natural Resources, the seismological and volcanological observatory and the branch of the Colombian Civil Defence force for the District of Santa Fé, Bogota. The mission enabled UN-SPIDER to hold discussions with the Colombian Space Commission on the establishment of a regional support office in Colombia and to establish better links with the Risk Management Secretariat.

37. In view of the high degree of vulnerability of Guatemala to natural disasters, a technical advisory mission to that country was conducted at the request of the Secretariat for Planning and Programmes from 22 to 26 November 2010 to raise awareness in Guatemala of developments in the use of space-based information for disaster-risk management and emergency response and to verify existing limitations with regard to the use of such solutions. The mission included visits to several Government ministries and international agencies, including the National Coordinating Agency for Disaster Reduction, the Coordination Centre for the Prevention of Natural Disasters in Central America and the Office of the United Nations Resident Coordinator.

38. In the context of disaster risk reduction, UN-SPIDER staff organized and conducted a special event during the second Hemispheric Encounter on National Mechanisms and Networks for Disaster Risk Reduction, held in Santa Marta, Colombia, in April 2010, to promote the SPIDER Global Thematic Partnership in Latin America and the Caribbean. UN-SPIDER also contributed to the Sixth Space Conference of the Americas, held in Mexico in November 2010.

39. Support was also given to the Regional Centre for Space Science and Technology Education for Latin America and the Caribbean, affiliated to the United Nations, and to the National Commission on Space Activities of Argentina in the conduct of a meeting entitled “Spring School on Natural Disasters and Spatial Solutions for Disaster Management: Drought and Desertification”, held in Rosario, Argentina, in April 2010.

40. In carrying out its work in Latin America and the Caribbean, UN-SPIDER works closely with and builds upon the expertise and capabilities of the regional support offices established in that region, namely the Water Center for the Humid Tropics of Latin America and the Caribbean and the University of the West Indies, and has benefited from the support of the National Commission on Space Activities of Argentina (CONAE) and the Regional Centre for Space Science and Technology Education for Latin America and the Caribbean.

D. West Asia

41. In 2010, UN-SPIDER initiated efforts to contact national institutions in West Asia with the aim of identifying opportunities to provide technical advisory support to countries in that region. UN-SPIDER staff took advantage of the United Nations/Turkey/European Space Agency Workshop on Space Technology Applications for Socio-Economic Benefits, held in Istanbul, Turkey, in September 2010, to meet with representatives of West Asian countries to define a plan of action for the region.

42. The first activity planned for April 2011 will be the organization of a regional cooperation meeting on the use of space-based information for disaster management and emergency response, to be held in Antalya, Turkey. The meeting is being organized by Turkish satellite operator Turksat and Akdeniz University with the support of UN-SPIDER and is aimed at bringing together providers of space-based solutions and disaster managers to strengthen regional cooperation.

43. Turksat is playing a major role in supporting the UN-SPIDER programme in the region, having provided two senior experts to work at the UN-SPIDER office in Bonn and having organized the first UN-SPIDER meeting in West Asia.

III. Support for emergency response

A. Introduction

44. When an emergency happens impacts and needs must be assessed as soon as possible. Space-based technologies provide innovative ways to generate information to support such assessments and also to support response teams in carrying out their work.

45. A number of mechanisms and initiatives are available to help countries to receive relevant information and access space-based technologies in order to support response efforts, such as 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 on Space and Major Disasters), Sentinel Asia and Télécoms Sans Frontières.

46. In 2009, the UN-SPIDER programme initiated the SpaceAid framework to help countries and international and regional organizations to benefit from existing mechanisms and initiatives, specifically with a view to: (a) ensuring that all end-users could access those mechanisms and initiatives at all times and that they had the capacity to use all space-based information made available to support emergency response activities; (b) providing guidance to existing mechanisms and initiatives with regard to the specific needs of end-users and as to how they could improve and extend their support; (c) establishing additional opportunities beyond those currently available within existing mechanisms; and (d) providing information to those interested in providing support (space-based information and expertise) as to how and to whom they could channel that support.

B. Building upon existing mechanisms and initiatives

47. The UN-SPIDER programme has in place agreements and arrangements with several leading global and regional initiatives, including the International Charter on Space and Major Disasters (the Office for Outer Space Affairs has been a cooperating body of the Charter since 2003), Sentinel Asia (the Office is a member of the Sentinel Asia Joint Project Team) and the Services and Applications for Emergency Response (SAFER) project of the Global Monitoring for Environment and Security (GMES) initiative. UN-SPIDER also ensures cooperation with the GMES project "GMES Services for Management of Operations, Situation Awareness and Intelligence for Regional Crises" and works closely in promoting and leveraging the opportunities provided by the regional nodes of the Mesoamerican Regional Visualization and Monitoring System in Latin America and Africa.

48. The UN-SPIDER programme works closely with the above-mentioned projects and initiatives, promoting them among end-users and ensuring that those end-users establish direct working relationships with such mechanisms. In addition, the programme provides guidance to those mechanisms and projects as to how they can improve and extend their support to meet the needs of end-users.

49. In providing support to Member States, the UN-SPIDER programme takes advantage of the opportunities made available by Governments, non-governmental organizations and the private sector and ensures the involvement of the UN-SPIDER regional support offices and other centres of excellence in supporting the analysis of space-based data.

C. Support provided in 2010

50. In 2010, emergency response activities were supported through the SpaceAid framework in a total of 29 emergency situations (compared with 20 emergency situations in 2009). Support was provided in the following countries: Benin, Burkina Faso, Chile, China, Cook Islands, Guatemala, Haiti, Indonesia, Kazakhstan, Kenya, Madagascar, Moldova, Myanmar, Pakistan, Panama, Philippines, Senegal, Solomon Islands, Sri Lanka, Sudan, Tajikistan, Thailand, Tonga, Turkey, Uganda and Ukraine.

51. UN-SPIDER took a leading role in providing support in the aftermath of the major earthquakes that struck Haiti and Chile, inter alia, by ensuring immediate activation of existing response mechanisms and delivery of satellite imagery and maps of the areas affected. Intense coordination and information-sharing were ensured in subsequent weeks.

52. For every event, a web page containing relevant information is created in the UN-SPIDER knowledge portal in order to support response efforts, and facilitate the sharing of vital information with end-users and providers of space-based information.

53. UN-SPIDER ensured the effective coordination of information-sharing during the various disaster events, inter alia, by making imagery and data available electronically and sharing geospatial information with United Nations staff and

emergency response personnel deployed to the disaster areas. Data-sharing was also facilitated through use of the storage capacity and functionality of the UN-SPIDER applications server infrastructure linked to the knowledge portal, and UN-SPIDER experts were in frequent communication both with disaster response experts at the national level and with United Nations staff involved in the international response effort.

Annex

Technical advisory missions carried out in 2010 in the framework of the United Nations Platform for Space-based Information for Disaster Management and Emergency Response

1. In 2010, technical advisory missions were carried out in the framework of the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) in the following countries: Chile, Guatemala, Haiti, Madagascar, Malawi, Maldives and Philippines.

A. Chile

2. The earthquake that struck Chile in 2010 occurred off the coast of the country's Maule region on 27 February 2010, at 0334 hours local time (0634 hours UTC), registering 8.8 on the moment magnitude scale and lasting 90 seconds. It was felt strongly in six regions of Chile (from Valparaíso in the north to Araucanía in the south) that together account for 80 per cent of the country's population. The earthquake triggered a tsunami which devastated several coastal towns in southern and central Chile.

3. UN-SPIDER activated the International Charter "Space and Major Disasters" and made requests to several satellite operators at 1323 UTC in coordination with other United Nations agencies and the National Commission on Space Activities of Argentina. On the basis of those initial requests, several satellite operators made imagery available to the Government of Chile. In particular, RapidEye (a German company which owns a five-satellite constellation producing imagery at a resolution of 5 metres) covered the area affected by the tsunami within hours of the event. The imagery was subsequently sent to the National Emergency Office of Chile through UN-SPIDER and was the basis of the initial impact assessment carried out.

4. At the request of the Government of Chile, UN-SPIDER staff carried out a technical advisory mission to that country from 15 to 20 March 2010, meeting with representatives of various Chilean institutions and conducting a field visit to the provinces of Talca and Concepción. The mission enabled UN-SPIDER to meet official of the leading institutions involved in the response efforts, including the Chilean Space Agency, the National Emergency Office and the National System for the Coordination of Territorial Information, and to put forward recommendations for possible follow-up activities, which included ensuring that all available imagery had been received by the Chilean institutions and that that imagery was being made widely available through an image server using the "Geoportal" of the National System for the Coordination of Territorial Information; implementation of a mapping tool at the National Emergency Office to support the work of that Office, and; work with regional and municipal administrations to build capacity to use existing data and technologies.

B. Dominican Republic

5. A technical advisory mission to the Dominican Republic was conducted from 26 to 29 January 2010 in coordination with the National Commission for Emergencies and the Secretariat of State for Foreign Affairs of the Dominican Republic. The mission team comprised experts from the Water Center for the Humid Tropics of Latin America and the Caribbean, the Bolivarian Agency for Space Activities (ABAE) of the Bolivarian Republic of Venezuela and the UN-SPIDER programme.

6. The objective of the mission was to conduct an assessment of strengths and weaknesses with regard to access to and use of space-based information to support efforts conducted during all phases of the disaster management cycle. The assessment resulted in the identification of areas in which space-based information could be used and the proposal of recommendations as to ways to institutionalize the use of space-based information in governmental agencies in the Dominican Republic. The assessment included a thorough review of institutional policies, strategies and activities as a basis for elaborating the recommendations.

Results

7. The mission team took note of recent advances in the institutionalization of disaster risk management and the coordination of emergency response activities in the Dominican Republic. Overall responsibility for those processes lies with the National Council for Disaster Prevention, Mitigation and Response. The executive branch of the Council is the National Commission for Emergencies.

8. The National Emergency Operations Committee, one of four agencies constituting the National Commission for Emergencies, has overall responsibility for the coordination of disaster response activities, while the Emergency Operations Centre, also part of the same Commission, coordinates inter-institutional efforts in a timely and effective manner with the support of the civil defence force. The Centre is equipped with a geographic information system and its staff are aware of the benefits of using space-based information to respond to emergencies and of mechanisms such as the International Charter on Space and Major Disasters.

9. Space-based information is used systematically by the department of meteorology, while the Ministry of Environment and Natural Resources and the National Institute of Hydrological Resources have used space-based data and other information for a variety of purposes. However, other agencies tend to use such information on a more ad hoc basis, usually in the context of specific projects or activities such as monitoring of forest fires. Those agencies include the Military Cartographic Institute and the National Statistics Office.

10. With regards to disaster prevention and management, legislation in force in the Dominican Republic provides for the establishment of a national information system and studies to assess risks. The information system enter into operation once the national disaster risk management plan is implemented.

11. In the area of capacity-building, the mission team took note of the work of such institutions as the University of Santo Domingo and the Technological Institute of the Americas, which have conducted courses on the use of geographic

information systems and have the capacity to train the staff of various institutions in remote sensing.

Policy-related recommendations

12. In view of emerging legislation on disaster risk management, it is essential to institutionalize the use of space-based information in assessing the risks associated with various hazards. In addition, and taking into consideration the fact that substantial information is already available with respect to hazards, complementary efforts should target vulnerability.

Strategy-related recommendations

13. The mission team made the following recommendations with regard to strategies:

(a) In view of the fact that several agencies have already developed information systems, a strategy should be implemented to facilitate the interoperability of those systems through the development of national database infrastructure for geospatial data;

(b) The skills and knowledge of staff of Government institutions involved in all phases of the disaster management cycle should be strengthened by providing training in accessing and using space-based information;

(c) A national information system should be established as a means of generating, systematizing and promoting the use of information relating to hazards, vulnerabilities and risks.

Actions

14. The following recommendations were put forward:

(a) The production of hazard, vulnerability and risk maps should be systematized by applying standards to facilitate the identification of measures to be implemented, particularly in regions requiring capacity to respond to multiple hazards;

(b) The Secretariat of State for Foreign Affairs, the National Commission for Emergencies and the Emergency Operations Centre should reach agreement on how to make official requests for space-based data and information during disasters;

(c) Links should be established with the National Aeronautics and Space Administration (NASA) of the United States of America, the Canadian Space Agency and the Dartmouth Flood Observatory of Dartmouth College, United States, with a view to the implementation of joint projects on the use of satellite data for flood forecasting and mapping of flood hazards;

(d) Training activities should be conducted to strengthen skills in the area of remote sensing and the use of radar-based imagery in the event of floods.

C. Guatemala

15. In recent years, Guatemala has faced droughts and resulting food insecurity. It has experienced hurricanes and tropical storms such as Tropical Storm Agatha, which in June 2010 destroyed critical infrastructure in many regions of the country. In May 2010, Guatemala suffered the effects of the eruption of the Pacaya volcano. In response to a request made by Guatemalan authorities, UN-SPIDER activated its SpaceAid framework to provide assistance both in the case of the Pacaya eruption and in the case of Tropical Storm Agatha. As a result, satellite imagery was provided by Argentina, China and Germany to the National Coordinating Agency for Disaster Reduction and to the Secretariat for Planning and Programmes for use in mapping the effects of both phenomena in various regions of Guatemala. CONAE of Argentina was also requested to assist in the activation of the International Charter on Space and Major Disasters.

16. In order to address food insecurity, arrangements were made with CONAE of Argentina, the National Coordinating Agency for Disaster Reduction and other agencies to support the implementation by Guatemalan researchers of an applied research project to include the use of satellite imagery to assess the impact of droughts and climate variability on subsistence crops such as corn and beans. UN-SPIDER and CONAE are to provide technical advisory support to those researchers. The National Council of Science and Technology of Guatemala has been requested to provide funding for the project.

17. In view of the high degree of vulnerability of Guatemala to natural disasters, a technical advisory mission to that country was conducted at the request of the Secretariat for Planning and Programmes. The mission team included experts from CONAE, CONAE of Argentina, the Regional Centre for Space Science and Technology Education in Latin America and the Caribbean, the Organization of American States and the Water Center for the Humid Tropics of Latin America and the Caribbean. The mission included visits to nine Government ministries and international agencies, including the National Coordinating Agency for Disaster Reduction, the Office of the United Nations Resident Coordinator and the Coordination Centre for the Prevention of Natural Disasters in Central America. The objective of the mission was to conduct an assessment of capacities to access and use space-based information in activities carried out during all phases of the disaster management cycle.

Results

18. The mission team took note of recent advances in the institutionalization of disaster risk management and the coordination of emergency response activities in Guatemala, in particular, the establishment of an ad hoc inter-institutional group that assisted the National Coordinating Agency for Disaster Reduction and the Secretariat for Planning and Programmes in processing satellite imagery provided by Argentina, China, Germany and the United States through UN-SPIDER during Tropical Storm Agatha.

19. The mission team also noted that several agencies, including the National Coordinating Agency for Disaster Reduction, the Secretariat for Planning and Programmes and the Ministry of Agriculture, had begun to use geographic

information systems systematically and to contribute to emergency response activities. In order to ensure preparedness for major disasters, the Secretariat for Planning and Programmes coordinates activities conducted on behalf of the Economic Commission for Latin America and the Caribbean, the World Bank, the Inter-American Development Bank and other donors for the purpose of assessing impacts. However, the use of Earth observation imagery has not been institutionalized in Guatemala, although such imagery has been used in such activities as the monitoring of deforestation caused in recent decades by the advance of the agricultural frontier.

Policy-related recommendations

20. The main recommendation is to institutionalize the use of space-based information in order to assess risks associated with various hazards and to ensure the use of such information in the event of a disaster.

Strategy-related recommendations

21. The mission team made the following recommendations with regard to strategies:

(a) In view of the fact that several agencies have already developed information systems, the Secretariat for Planning and Programmes should continue its efforts to establish national spatial data infrastructure and to promote the use of the national territorial information system as a gateway for information for development purposes at all levels (national, regional, municipal and local);

(b) A repository of satellite imagery should be established at the National Geographical Institute of Guatemala, which should design and conduct a training programme on the use of space applications to generate information pertinent to all phases of the disaster management cycle;

(c) The ad hoc inter-institutional group should, on the basis of an inter-agency agreement, support the Emergency Operations Centre at the National Coordinating Agency for Disaster Reduction and other Government agencies by generating useful information from space-based data.

Actions

22. The following actions were recommended:

(a) The production of hazard vulnerability and risk maps should be systematized by applying standards to facilitate the identification of measures to be implemented, particularly in regions requiring capacity to respond to multiple hazards;

(b) Links should be established with the Chilean Space Agency and the National Emergency Office of Chile so that Guatemala can benefit from the successful experience of Chile in establishing a similar inter-institutional group;

(c) Training activities should be conducted to strengthen skills in the area of remote sensing and the use of radar-based imagery in the event of floods.

D. Haiti

23. In a response to the earthquake that devastated Haiti on 12 January 2010, UN-SPIDER mobilized a variety of partners to generate information and delivered more than 50 gigabytes of data and other information to the United Nations Office for the Coordination of Humanitarian Affairs in Haiti. Subsequently, a technical advisory mission was conducted from 14 to 20 March 2010 to assess how best to support ongoing response efforts conducted by the National Civil Protection Agency, the National Geospatial Information Centre and United Nations agencies such as the Office for the Coordination of Humanitarian Affairs, the World Food Programme, the International Strategy for Disaster Reduction (ISDR) and the United Nations Stabilization Mission in Haiti (MINUSTAH). The mission was coordinated by the Office of the Special Representative of the Secretary-General for Haiti and the geographic information system unit of MINUSTAH.

24. The mission enabled UN-SPIDER staff to assess the impact of the catastrophe in light of the reduced capacity of the National Civil Protection Agency and the National Geospatial Information Centre to generate and use information, particularly maps, as a result of the destruction of infrastructure and the loss of key senior officials. Owing to those major setbacks, United Nations agencies established an emergency operations centre within the United Nations' compound to coordinate emergency response activities. Those activities were coordinated primarily by the Office for the Coordination of Humanitarian Affairs, which set up clusters to deal with specific tasks, including a cluster devoted to information management. The Office also set up a small information technology unit whose staff managed satellite imagery for such purposes as monitoring temporary shelters set up throughout Port-au-Prince as part of the relief effort. The mission team was made aware of response efforts and projects conducted by the National Civil Protection Agency, particularly activities carried out with the support of international donors to provide early warning of floods.

25. In view of the weak Internet access of both the National Geospatial Information Centre and the National Civil Protection Agency and the approaching hurricane season, direct links were established by UN-SPIDER between the National Civil Protection Agency, the National Geospatial Information Centre and staff of MINUSTAH and the Office for the Coordination of Humanitarian Affairs so that the two national institutions could access space-based information via the Internet during the hurricane season.

26. Subsequently, UN-SPIDER conducted a follow-up mission to Washington, D.C., to meet representatives of the World Bank and the Office of United States Foreign Disaster Assistance to discuss assistance in rebuilding the capacities of the National Geospatial Information Centre. UN-SPIDER staff also met representatives of Thermopylae Sciences and Technology, a private company which had developed a Web-based geospatial and visual information-sharing application to facilitate the gathering and viewing of information generated by a variety of governmental, international and non-governmental organizations. At the request of UN-SPIDER staff, representatives of that company conducted a mission to Haiti in May 2010 to meet staff of the National Geospatial Information Centre, the National Civil Protection Agency, MINUSTAH, the Office for the Coordination of Humanitarian Affairs and other agencies to demonstrate the usefulness of the tool.

27. The UN-SPIDER mission team made the following recommendations:

(a) UN-SPIDER should continue its efforts to serve as a bridge between the space community and the National Civil Protection Agency and the National Geospatial Information Centre and maintain its links with the Office for the Coordination of Humanitarian Affairs and MINUSTAH so that, in the event of a natural disaster, the latter two agencies facilitate access by the National Geospatial Information Centre and the National Civil Protection Agency to space-based information;

(b) Technical advisory support should be provided in three essential areas: infrastructure, training and the institutionalization of access to and use of space-based information;

(c) The National Civil Protection Agency and the National Geospatial Information Centre should participate in the Caribbean Flood Pilot Project coordinated by NASA and the Canadian Space Agency.

E. Madagascar and Malawi

28. Within the framework of the disaster preparedness programme of the Humanitarian Aid Department of the European Commission, UN-SPIDER is contributing to a project to provide technical support for disaster risk reduction programmes implemented by partners in the disaster preparedness programme in the South-East African and South-West Indian Ocean region (Malawi, Madagascar, Comoros and Mozambique) using geographic information systems.

29. The project includes regional seminars in which participants are provided with an overview of and general introduction to geographic information system and space-based information for risk and disaster management and emergency response, informed about the role of UN-SPIDER and introduced to international mechanisms such as 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 on Space and Major Disasters) and the Services and Applications for Emergency Response (SAFER) Project of the Global Monitoring for Environment and Security (GMES) initiative. The seminars are followed by technical training with the participation of stakeholders in the various regions. The first national seminar was held on 12 November in Antananarivo, bringing together delegations from the Comoros Islands and Madagascar. The second seminar was held in Lilongwe on 16 November.

Technical advisory mission to Madagascar

30. In Antananarivo, UN-SPIDER co-organized a technical advisory meeting as part of the first national seminar on the disaster preparedness programme bringing together delegations representing the Comoros Islands and Madagascar. A group of 54 representatives of the following organizations attended: National Office for Risk and Disaster Management, Unit for the Prevention and Management of Emergencies, Centre for Rescue and Civil Protection Operations, National Geographical and Hydrographical Institute, Meteorologie Madagascar, European

Union, German Agency for Technical Cooperation (GTZ). Several representatives of United Nations agencies and non-governmental organizations also attended.

Technical advisory mission to Malawi

31. In Lilongwe, UN-SPIDER co-organized a technical advisory meeting as part of the second national seminar on the disaster preparedness programme. The participants in this meeting were asked to provide information on the technical capacity available in Malawi. UN-SPIDER presented a programme of presentations and lectures in order to help to identify areas in which space-based technology and information could play a greater role and to propose recommendations as to how to improve access to and use of such technology and information. A total of 55 representatives of the following organizations attended the event: Department of Disaster Management Affairs, Technical Secretariat for the Ministry of Agriculture, Geological Survey Department, Meteorological Department, National Statistics Office, the European Union, GTZ. Several representatives of United Nations agencies and non-governmental organizations also attended.

Outcomes

32. The meetings provided an opportunity to discuss ways to improve the communication, coordination and dissemination of space-based information for disaster risk management and emergency response in Malawi and to gain a better understanding of data, technology and training needs. The participants expressed their willingness to cooperate at both the national and the international level.

33. A report on the outcomes of the technical advisory meetings held, once finalized, will be submitted to the relevant organizations in Madagascar and Malawi.

F. Maldives

34. At the invitation of the Government of Maldives, UN-SPIDER carried out a technical advisory mission to that country from 18 to 22 April 2010. The mission team comprised experts from the UN-SPIDER programme, the Economic and Social Commission for Asia and the Pacific (ESCAP), the United Nations Office for the Coordination of Humanitarian Affairs, the Disaster Management Centre of the South Asian Association for Regional Cooperation (SAARC) and the secretariat of the International Strategy for Disaster Reduction. The key objectives were to assess national capacity, evaluate disaster and risk reduction activities, policies and plans with regard to the use of space-based technologies and facilitate access by national institutions to space-based information in order to support the full disaster management cycle.

35. Meetings were held with key stakeholders within the Government and United Nations offices. In addition, the Office for Outer Space Affairs of the Secretariat and the National Disaster Management Centre organized a one-day workshop bringing together 25 representatives of various governmental and United Nations agencies to discuss cross-cutting issues relating to the use of geographic and space-based information for disaster risk reduction and emergency response. The following recommendations were put forward:

(a) The national geographic information system should be consolidated and implemented and a coordination working group should be established, bringing together experts representing key stakeholders so as to ensure the sharing and use of geospatial information within the various ministries;

(b) Policies enabling the National Disaster Management Centre to gain access to information held by Government departments, including baseline data (common operational data sets), should be implemented;

(c) Consideration should be given to the decentralization of disaster management activities, inter alia, through the promotion of community-based disaster risk reduction activities;

(d) In view of the fact that land-use planning is central to disaster risk reduction, existing studies and data sets relating to such areas as land-use and environmental planning, coastal management and monitoring of biodiversity and environmental change should be used to support vulnerability analysis and risk reduction activities;

(e) Capacity-building is vital to ensuring the successful use of space-based information in support of disaster management and should include the strengthening of skills and knowledge, institutions and infrastructure;

(f) Training opportunities should be made available through the SAARC Disaster Management Centre of ESCAP, the Office for Outer Space Affairs and the UN-SPIDER programme. The National Disaster Management Centre should identify training needs, focusing on in-house project-based training (on-the-job training) and the preparation of a human resource development strategy;

(g) The capacity of the National Disaster Management Centre and the Department of Meteorology should be strengthened and the National Disaster Management Centre should be consolidated once the future Disaster Management Act is adopted. Efforts should be made to ensure that institutional arrangements are in place to facilitate closer coordination among the National Disaster Management Centre, the Department of Meteorology and other government agencies and relevant regional and international organizations.

36. A report has been submitted to the National Disaster Management Centre in order to support the development of a national action plan and to help to secure dedicated resources (human resources and infrastructure) for applications of geospatial information in the development of disaster management plans. The National Disaster Management Centre is also considering ways in which to invest in the development of institutional capacity.

G. Philippines

37. UN-SPIDER staff organized a technical advisory meeting with officials of the National Disaster Risk Reduction and Management Council of the Philippines and its member agencies in Manila on 9 July 2010 to review and strengthen the support provided to the Philippines under the UN-SPIDER programme.

38. The meeting provided an opportunity for discussions regarding the availability of space-based information during tropical cyclones and for the preparation of recommendations on how to strengthen collaboration with the National Disaster Risk Reduction and Management Council in order to ensure the effective use of such information. The representation of the Philippine Atmospheric, Geophysical and Astronomical Services Administration briefed all participants on satellite facilities, the various satellite applications used in meteorology and satellite applications used during Tropical Cyclone Ketsana. The representative presented maps that the Administration had obtained through the UN-SPIDER programme and forwarded to emergency response units and to the National Disaster Risk Reduction and Management Council during the disaster of 2009. Participants learned about international mechanisms (the International Charter on Space and Major Disasters, Sentinel Asia and the SAFER project) that had been developed to assist emergency response efforts.

39. Several observations and recommendations for action were drafted on the basis of the discussions and will be shared by the National Disaster Risk Reduction and Management Council with its member agencies. The recommendations include actions to ensure access to and the effective use of space-based information in the event of future disasters.