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ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT (CSTD)**

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Contribution by ESCAP

to the CSTD 2019-2020 priority theme on “Exploring space technologies for sustainable development and the benefits of international research collaboration in this context

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22nd annual session of the United Nations Commission on Science and Technology for Development (CSTD)

Inputs from ESCAP's Division for ICT and Disaster Risk Reduction (IDD)

Priority Theme 2: Exploring space technologies for sustainable development and the benefits of international research collaboration in this context

- 1. Can you give examples of projects/policies in your region aimed at using space technologies for sustainable development? What are the main challenges confronted while trying to implement these projects/policies in your region?**

ESCAP has implemented / is currently implementing the following projects focusing on application of space technologies for sustainable development:

No.	XB Projects	Durations
1	Strengthening institutional capacity on integrating geospatial and statistical data, with a focus on land accounts in Central Asia	1 May 19 - 30 Apr 21
2	Enhancing the capacity of countries in Central Asia on effective use of space applications for drought monitoring and early warning through the Regional Drought Mechanism	1 Jan 19 - 31 Dec 20
3	Building resilient agricultural practices in the lower Mekong Basin: integrating geospatial information in agricultural monitoring with an emphasis on rice	18 Feb 19 - 28 Feb 23
4	Improving the use and sharing of geospatial information for resilient and sustainable development in selected pilot countries	1 Mar 19 - 28 Feb 21
5	Enhancing the use of space applications through regional cooperation for achieving the SDGs (closed)	5 Jun 17 - 28 Feb 19
6	Enhancing regional cooperation and capacity of geographic information systems for disaster risk reduction in Central Asia (closed)	13 Apr 2017 - 31 Mar 2019
7	Strengthening multi-hazard risk assessment and early warning systems with applications of space and geographic information systems in Pacific islands countries (closed)	1 May 2016 - 1 Apr 2018

In October 2018 representatives of the space community came together in Bangkok for the third Ministerial Conference on Space Applications for Sustainable Development in Asia and the Pacific. Main outcome document adopted at this occasion was the Asia-Pacific Plan of Action on Space Applications for Sustainable Development (2018-2030), which represents a collective commitment to scale up the use of space technology and geospatial information applications in the region and will guide participating countries and organizations on policy actions and interventions to support the delivery of ESCAP's Regional Road Map for the Implementation of the 2030 Agenda. The document offers member States important guidance for the implementation of the 2030 Agenda but also identifies **the lack of appropriate and targeted financing, insufficient expertise and the lack of intergovernmental and domestic cooperation** as the main challenges:

- A lack of capacity and resources in terms of finance and expertise. Many developing countries, including small island developing States, do not have the capacity to utilize, analyse and interpret space-derived data (I.2)

- Given the breadth of thematic and sectoral areas covered, and the need for engagement across a broader set of line ministries and responsible authorities, beyond the traditional space applications sector, it is well-understood that actions are to be taken as appropriate and in line with national plans and in accordance with their respective needs, conditions and 7 capabilities as well as with their existing obligations (III.C)
- To support the actions set forth in the Plan of Action, appropriate and targeted financing will be needed (IV.C)

For complete document, please refer to:

<https://www.unescap.org/resources/asia-pacific-plan-action-space-applications-sustainable-development-2018-2030>

In addition, the Regional Committee of United Nations Global Geospatial Information Management for Asia and the Pacific (UN-GGIM-AP) is one of the five regional committees of the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM). ESCAP has taken over the secretariat of UN-GGIM-AP since November 2018, in order to strengthen the capacity of the member States in geospatial information management and to facilitate the dissemination of the outcomes and benefits of the activities of the Committee to the member States in the region.

In the Regional Committee Report of UN-GGIM-AP from June 2019 to UN-GGIM for the Ninth Session of UN-GGIM in August 2019, the following was being reported regarding challenges:

“Despite these advances, several challenges remain. A lack of capacity and resources in terms of finance and expertise, is a common problem. Many developing countries, including small island developing States, do not have the capacity to utilize, analyze and interpret space-derived data. In the region there is a disparity regarding the stage of geospatial infrastructure development and capacity on the usage. In the context of leaving no one behind, it is therefore important to provide best practice sharing, quality seminars and training programs to the member countries. Operational tools will be very important in the region for implementing the Integrated Geospatial Information Framework (IGIF), which makes the Implementation Guide of the IGIF a very important document.”

2. Can you provide examples of policies/projects/initiatives aimed at promoting international research collaboration in the area of space technologies for sustainable development? What are the main challenges confronted in implementing these projects?

- **Challenges:** Asia and the Pacific has become a hub of digital and science innovation that brings new and innovative solutions to pressing global problems. Faster and more versatile digital connectivity, satellite data, geographic information systems and spatial analysis have become increasingly accessible and available, generating more evidence-based data to support real-time decision-making. Geospatial information has also increasingly been incorporated into development planning, which has led to more accurate monitoring and evaluation of development interventions. As a result, geospatial information applications have come to play a more prominent role in the implementation and realization of the 2030 Agenda for Sustainable Development, with a particular focus on disaster risk reduction. Despite these advances, several challenges remain. A lack of capacity and resources in terms of finance and expertise, is a common problem. Many developing countries, including small island developing States, do not have the capacity to utilize, analyse and interpret space-derived data.
- **International research:** Building resilience to drought in Southeast Asia has become a pressing need with the increased frequency of droughts in region. Therefore, the need for national efforts have become important to be set within frameworks of regional cooperation. These include the ASEAN Declaration on Culture of Prevention, ASEAN Vision 2025 on Disaster Management, ASEAN-UN Joint Strategic Plan on Disaster Management, ASEAN

Agreement on Disaster Management and Emergency Response and ASEAN Disaster Risk Financing and Insurance. Drought resilience is also an integral part of the Agenda for Sustainable Development. Activities to build resilience contribute to the achievement of several Sustainable Development Goals (SDGs). Therefore, the ESCAP-ASEAN joint study on drought offers a clear analysis of this subject, assessing prospects for the decades ahead and highlighting the principal risks that the region has been facing or likely to face. The study shows that there will be many more dry years ahead, and the area affected by drought is likely to shift and expand. It further identifies actions that ASEAN member States can individually and collectively undertake to mitigate the impacts of drought by strengthening drought risk assessment and early warning services, for example, by sharing data from space-based technologies; fostering risk financing instruments that can insure communities against slow-onset droughts and lastly enhancing people's capacities to adapt to drought, thereby reducing the potential for conflict.

3. What are the actions that the international community, including the CSTD, can take to leverage the potential of space technologies for sustainable development, including through international research collaboration in this context? Can you give any success stories in this regard from your region?

ESCAP secretariat has developed compendium on space applications for SDGs (for 2015 and 2017), Asia-Pacific Disaster Reports (2015, 2017 and 2019). As requested by the member States through a resolution, ESCAP secretariat will launch the biennial report on geospatial information applications in Asia and the Pacific in late 2020.

4. Could you suggest some contact persons of the nodal agency responsible for projects/policies, related space technologies for sustainable development and international research collaboration in this context as well as any experts (from academia, private sector, civil society or government) dealing with projects in this area? We might contact them directly for further inputs or invite some of them as speakers for the CSTD inter-sessional panel and annual session.

Please see attached contact list of focal points for ESCAP's Regional Space Applications Programme for Sustainable Development (RESAP) as well as the lists of participants for recent relevant events.

5. Do you have any documentation, references, or reports on the specific examples on the priority theme in your region?

- Third Ministerial Conference on Space Applications for Sustainable Development in Asia and the Pacific, 10 October 2019, Bangkok, Thailand:
<https://www.unescap.org/intergovernmental-meetings/third-ministerial-conference-space-applications-sustainable-development>
- Inception workshop on 'Integrating cutting-edge geospatial information for agricultural crop monitoring in the Lower Mekong Basin', 20-22 March 2019, Bangkok, Thailand:
<https://www.unescap.org/events/inception-workshop-integrating-cutting-edge-geospatial-information-agricultural-crop>
- Team Building Meeting on effective use of space applications for drought monitoring in Central Asia, 18-19 March 2019, Bangkok, Thailand:
<https://www.unescap.org/events/team-building-meeting-effective-use-space-applications-drought-monitoring-central-asia>
- In November 2019 UN-GGIM-AP will convene its eighth plenary meeting in Canberra, Australia. For more information, please refer to: <http://www.un-ggim-ap.org/>



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Uses of Outer Space**
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Coordination of space-related activities within the United Nations system: directions and anticipated results for the period 2018–2019 — a United Nations that delivers

Report of the Secretary-General

I. Introduction

1. In its resolution [72/77](#), the General Assembly urged the Inter-Agency Meeting on Outer Space Activities (UN-Space), under the leadership of the Office for Outer Space Affairs of the Secretariat, to continue to examine how space science and technology and their applications could contribute to the 2030 Agenda for Sustainable Development, and encouraged entities of the United Nations system to participate, as appropriate, in UN-Space coordination efforts.
2. UN-Space is the focal point for coordination and cooperation in space-related activities. It was set up in the mid-1970s with the aim of promoting synergies and preventing duplication of efforts related to the use of space technology and applications in the work of United Nations entities.
3. At its thirty-seventh session, held in Geneva on 24 August 2017, UN-Space noted that the Committee on the Peaceful Uses of Outer Space, at its fifty-ninth session, in 2016, had welcomed with appreciation the report of the Secretary-General entitled “Coordination of space-related activities within the United Nations system: directions and anticipated results for the period 2016–2017 — meeting the 2030 Agenda for Sustainable Development” ([A/AC.105/1115](#)).
4. At the same session, UN-Space agreed that the reports of the Secretary-General on the coordination of space-related activities within the United Nations system served as a strategic tool for the United Nations to avoid duplication of efforts in the field of space science and technology, and that future reports should continue to highlight the efforts of the United Nations system entities in delivering as one in space-related activities to further the development agenda.
5. Also at that session, UN-Space reviewed its reporting structure and agreed that the reports of the Secretary-General on the coordination of space-related activities within the United Nations should continue to be issued on a biennial basis. UN-Space also agreed that the upcoming report of the Secretary-General on the coordination of space-related activities within the United Nations system: directions and anticipated results for the period 2018–2019, to be presented to the Committee on the Peaceful



Uses of Outer Space at its sixty-first session, in 2018, should focus on reinforcing synergies in efficiency measures in the use of space science, technology and applications within the United Nations system in supporting global development efforts.

6. The focus of the present report stems from the recognition by the Secretary-General, set out in his report entitled “Repositioning the United Nations development system to deliver on the 2030 Agenda: ensuring a better future for all”, that there was an urgent need for the United Nations development system to move beyond coherence and coordination towards greater leadership, integration and accountability for results on the ground (see [A/72/124–E/2018/3](#), para. 119).

7. To assist the Committee in its preparations for the fiftieth anniversary of the United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE+50), to be commemorated in 2018, the present report contains an overview of the efforts made by United Nations entities to contribute to the four main themes known as pillars, namely space economy (the development of space-derived economic benefits), space society (the evolution of society and societal benefits stemming from space-related activities), space accessibility (all communities using and benefiting from space technology) and space diplomacy (building partnerships and strengthening international cooperation in and governance of space activities). For more background on UNISPACE+50, see [A/AC.105/1137](#).

8. The present report, which is the thirty-eighth report of the Secretary-General on the coordination of space-related activities within the United Nations system, was prepared by the Office for Outer Space Affairs on the basis of submissions from the following United Nations entities: the Department of Field Support and the Department of Economic and Social Affairs of the Secretariat, the Economic Commission for Africa (ECA), the Economic and Social Commission for Asia and the Pacific (ESCAP), the Office for Disarmament Affairs of the Secretariat, the Office for Outer Space Affairs, the International Telecommunication Union (ITU), the World Health Organization (WHO) and the World Meteorological Organization (WMO).

9. The present report adds to the description of activities contained in the reports of the Secretary-General on the coordination of space-related activities within the United Nations system for the periods 2010–2011 ([A/AC.105/961](#)), 2012–2013 ([A/AC.105/1014](#)), 2014–2015 ([A/AC.105/1063](#)) and 2016–2017 ([A/AC.105/1115](#)) and reflects activities planned for the period 2018–2019. Additional information is available on the website dedicated to the coordination of outer space activities within the United Nations system (www.un-space.org).

II. Reinforcing synergies in efficiency measures in the use of space science, technology and applications within the United Nations system in support of global development efforts

A. Space economy

10. In the 2030 Agenda, Member States have established prosperity as one of their overarching aspirations, committing themselves to ensuring that all human beings can enjoy prosperous and fulfilling lives and that economic, social and technological progress occurs in harmony with nature. The same aspiration is reflected in the space economy pillar. Space science, technology and applications create value and benefits contributing to economic growth and serve as major drivers for a dynamic economy.

11. Looking towards UNISPACE+50 in 2018, the Office for Outer Space Affairs launched a series of high-level forums under the umbrella of the United Nations on the theme “Space as a driver for socioeconomic sustainable development”, giving the space community an opportunity to address cross-sectoral matters by integrating the economic, environmental, social, policy and regulatory aspects of space activities in pursuit of global sustainable development, as well as to forge new partnerships and

set new frameworks for international cooperation. The first and second high-level forums on space as a driver for socioeconomic sustainable development were held in Dubai, United Arab Emirates, in 2016 and 2017, respectively, as part of the preparations for UNISPACE+50 with the aim of advancing the debate on the role of space science and technology in fostering global development. The third High-level Forum on space as a driver for socioeconomic sustainable development, to be held in Bonn, Germany, from 13 to 16 November 2018, is to continue to demonstrate the broad benefits of space as an area of innovation, inspiration, interconnectedness, integration and investment, and to strengthen unified efforts at all levels and among all relevant stakeholders in the space sector.

12. In its resolution [72/77](#), the General Assembly welcomed the adoption of the African Space Policy and Strategy by the Assembly of the African Union at its twenty-sixth ordinary session, held in Addis Ababa in January 2016, and noted that that achievement marked the first step towards the realization of an African outer space programme within the framework of the African Union Agenda 2063. More information on how United Nations entities can assist African countries is contained in a note by the Secretariat entitled “Space benefits for Africa: contribution of the United Nations” ([A/AC.105/941](#)).

13. ECA actively contributed to the preparation of the African Space Policy and Strategy through a working group of African Union member States guided by sectoral ministerial conferences. The Policy and Strategy contains ambitious goals to mobilize the continent to develop the institutions and capacities necessary to harness space technologies for socioeconomic benefits so as to improve the quality of life and create wealth for Africans.

14. **ESCAP** is currently developing a plan of action for the Asia-Pacific region on space applications for sustainable development (2018–2030) that is intended to guide the work of the regional space technology applications programme to implement the 2030 Agenda. The plan of action will contain strategies specific to the Asia-Pacific context that cover people, the environment and the economy while drawing from and contributing to global initiatives including the UNISPACE+50 process. The plan of action will also focus on the priorities outlined in the ESCAP publication “Regional roadmap for implementing the 2030 Agenda for Sustainable Development in Asia and the Pacific”, namely social development, disaster risk reduction and resilience, climate change, the management of natural resources, seamless connectivity for the 2030 Agenda and energy, to be pursued by strengthening regional mechanisms for the implementation of the Sendai Framework for Disaster Risk Reduction 2015–2030 and the Paris Agreement on climate change, among other things. The plan of action will set out ways of harnessing frontier technologies and their applications, as well as implementation and evaluation plans for several years that cover thematic areas of interest and are linked to global development frameworks and initiatives on the use of space data and space information.

15. The impact of extreme weather events and climate change on economic development, food security, health and migration continues to increase, as highlighted in the WMO publication “Statement on the state of the global climate in 2017”. With countries working to fulfil their commitment to the 2030 Agenda, the demand for accessible and accurate weather, climate, hydrological, marine and related environmental services will continue to grow in the years ahead. To meet this demand, WMO, through its Space Programme, conducts a wide range of activities and acts as a bridge between satellite operators and users with the overall objective of promoting the wide availability and utilization of satellite data and products for weather, climate, water and related applications by WMO members. Data acquired by environmental and meteorological satellites have contributed to improving weather and climate predictions. With the deployment of a growing number of operational satellite constellations, this development is expected to continue.

16. Two topics related to space will be considered during the ITU Plenipotentiary Conference to be held in Dubai, United Arab Emirates, from 29 October to

16 November 2018. The first is a decision whether ITU should become the supervisory authority of the international registration system under the Protocol to the Convention on International Interests in Mobile Equipment on Matters Specific to Space Assets. The second topic is the progress made since the Plenipotentiary Conference adopted, in Busan, Republic of Korea, in 2014, its resolution 186 on strengthening the role of ITU with regard to transparency and confidence-building measures in outer space activities. In Geneva, shortly after the Conference, namely from 3 to 7 December 2018, ITU will host its world radiocommunication seminar, a capacity-building event for spectrum regulators and the satellite industry, with in-depth presentations on the provisions of the ITU Radio Regulations applicable to satellite systems and training workshops to get hands-on experience with ITU notification procedures.

17. The end of 2018 and the beginning of 2019 will see the final preparations for the World Radiocommunication Conference 2019, to be held in Sharm-el-Sheikh, Egypt, from 28 October to 22 November 2019. The Conference will revise the Radio Regulations, the international rules governing the use of radio-frequency spectrum and satellite orbits. Multiple items related to satellite systems are on the agenda, such as: finding globally harmonized frequency bands for the telecommand and telemetry of satellites with short missions such as nanosatellites; defining a regulatory framework that will enable the use of Earth stations in motion to provide Internet connectivity on planes, ships, trains or other means of transportation; establishing regulatory provisions to allow non-geostationary mega-constellations to be deployed and operated at a steady pace commensurate with existing launch capabilities; and identifying frequencies for the space component of the Maritime Very High Frequency (VHF) Data Exchange System. The topic of suborbital flights will also be addressed, in particular the question whether radio stations used for such flights should be considered as belonging to the aeronautical or to the space domain.

18. The Office for Outer Space Affairs continues to discharge the obligations of the Secretary-General under the United Nations treaties and principles on outer space. Since the establishment of the Register of Objects Launched into Outer Space in 1961, more than 7,300 functional space objects (satellites, probes, landers, crewed spacecraft and space station flight elements) have been registered with the Secretary-General by more than 55 States and intergovernmental organizations. In 2017, the Office processed registration submissions for 489 functional space objects, the largest number in any single year. A further 64 non-functional space objects (rocket stages, inter-satellite structures and space debris) were registered. With the ever-increasing number of space object launches, the registration system plays an important role in ensuring the responsible conduct of space activities that have the potential of providing economic benefits for sustainable development on Earth.

19. The Office, through workshops and expert meetings organized under the United Nations Programme on Space Applications, brings together experts, decision makers and practitioners to share experience and knowledge among regions, with the aim of defining the actions and follow-up activities required to improve the use of space technology for the management of natural resources and for monitoring the environment. In 2018, the Office will conduct its activities in Argentina (on global navigation satellite systems), Austria (on space partnership for the Sustainable Development Goals), Brazil (on basic space technology), China (on the International Committee on Global Navigation Satellite Systems) and Germany (on innovation and infrastructure for development), and has already held one conference in Pakistan (on space technology for water resources management). In December 2017, the Office for Outer Space Affairs and the United Nations Development Programme joined forces by signing a memorandum of understanding to facilitate cooperation in the use of space science and technology to support and promote global sustainable development initiatives of the United Nations.

20. In order to maximize the benefits of the use and application of global navigation satellite systems (GNSS) to support sustainable development, the Office, consistent with its role as the executive secretariat for the International Committee on GNSS,

will continue to promote cooperation on issues related to GNSS compatibility, interoperability, performance and other space-based positioning, navigation and timing matters. China and India expressed their interest in hosting the meetings of the Committee in 2018 and 2019, respectively. The Office will continue to foster cooperation between the Committee and the regional centres for space science and technology education, affiliated to the United Nations, which also serve as information centres for the Committee, and will focus on capacity-building, in particular in relation to GNSS education.

B. Space society

21. The 2030 Agenda is universal and transformative, and people are at its core. In it, Member States have committed themselves to ensuring that all human beings can fulfil their potential in dignity and equality and in a healthy environment. The space society pillar fully accords with the people-centred nature of the 2030 Agenda and extends beyond UNISPACE+50. The value of space activities is increasingly recognized by United Nations entities. In their daily work they increasingly use space technology and applications and space-derived data and information for improving people's quality of life, including in the areas of public health, human security and welfare, disaster management and humanitarian assistance.

22. Under UNISPACE+50 thematic priority 7 (Capacity-building for the twenty-first century), the Office for Outer Space Affairs has been tasked with placing special emphasis on activities targeting the needs of women in developing countries. To pursue that objective, the Office has joined forces with the United Nations Entity for Gender Equality and the Empowerment of Women (UN-Women) to hold an expert meeting on space for women in New York in October 2017. The purpose of the expert meeting was to share ideas and expertise regarding space and women, enhance existing partnerships and forge new ones, strengthen and deliver targeted capacity-building and technical advisory activities, and promote efforts to encourage the participation of women and girls in science, technology, engineering and mathematics education, with a special focus on developing countries.

23. In the public and global health domains, space science, technology and applications, including Earth observation and remote sensing; telecommunication, positioning and tracking; and space-based research play a crucial role in supporting decision-making, improved care, education and early warning measures. More information on activities undertaken by various United Nations entities in the area of space and global health is contained in the special report by UN-Space on the use of space science and technology within the United Nations system for global health ([A/AC.105/1091](#)).

24. Key applications of satellite technology in this field include telemedicine, tele-health, disease surveillance systems and health mapping. Space technology offers appropriate and affordable tools to achieve universal health coverage, in particular in remote and rural areas. Universal health coverage is one of the six leadership priorities of the twelfth general programme of work of WHO, which covers the period 2014–2019.

25. WHO is exploring ways and means for improving and promoting the use of space technologies, space systems and space-derived information and data in the global health domain, subject to the availability of sufficient financial and human resources. In so doing, WHO focuses on the following aims: (a) to strengthen country health systems and the delivery of health services at national and subnational levels; (b) to assist in forecasting and raising the alert of public health epidemics at national and subnational levels; (c) to respond to health emergencies; and (d) to provide technical assistance to Member States in establishing a research agenda on the benefits of space science and technologies to public health. In particular, WHO is focusing its efforts on Earth observation data relevant to climate and climate change as a determinant of health; tele-health and epidemiology; water mapping, quality

assessment, sanitation and hygiene; big data analytics, pattern recognition and visualization; education, training and capacity-building; emergency medical response and routine health care; and healthy living and non-communicable diseases.

26. In the area of space technology applications and public health, WHO has held discussions with numerous national space agencies about using existing technological capabilities in the service of public health and jointly developing new capabilities, in particular in e-health and telemedicine, deployable and miniature laboratory technology, and environmental monitoring. In the area of research, applications and technology relating to human spaceflight, a number of health areas are being explored, including personalized medicine, nutrition, healthy living and exercise, health issues associated with ageing, and water treatment and sanitation. In the area of education and capacity-building, WHO is working with space agencies to promote healthy living and exercise among school children, and on programmes to train teachers on specific subjects such as climate change.

27. To foster a dialogue about improving the utilization of space-based technologies and data in support of global health, and to showcase selected global health initiatives and their various uses of space technologies, data access, data provision services and information-sharing, the United Nations/WHO/Switzerland Conference on Strengthening Space Cooperation for Global Health was held in Geneva in August 2017 (see [A/AC.105/1161](#)). To implement the Conference's recommendations, the Office for Outer Space Affairs and WHO are working on a memorandum of understanding to strengthen institutional arrangements for effective collaboration.

28. At its fifty-fifth session, held in January and February 2018, the Scientific and Technical Subcommittee, recognizing the importance of Sustainable Development Goal 3 (Ensure healthy lives and promote well-being for all at all ages) and of UNISPACE+50 thematic priority 5 (Strengthened space cooperation for global health), and taking note of the final report on thematic priority 5 ([A/AC.105/1172](#)) and of the progress report by the Co-Chairs of the Expert Group on Space and Global Health of the Scientific and Technical Subcommittee on the fourth meeting of the Expert Group ([A/AC.105/C.1/2018/CRP.17](#)), agreed to establish a new item entitled "Space and global health" on its agenda and a working group under that item, with Switzerland as Chair.

29. United Nations entities are working with space agencies to maximize the use of Earth observation data and products relevant to health that are readily available through existing mechanisms and portals, such as the Group on Earth Observations and Copernicus. Focus areas could include water mapping, linking geographical information system and health data, climate change and determinants of health, and disaster response. WMO works closely with WHO on health-related issues such as through the WHO/WMO joint office on health and climate and the global platform on air quality and health. Collaboration is ongoing with other United Nations bodies, agencies and international organizations, including the Statistical Commission, the Group on Earth Observations and the World Bank.

30. As part of efforts to deepen collaboration in the European region, WHO and the European Space Agency are expanding their efforts to achieve, at the national level, the health-related targets of the 2030 Agenda through an integrated approach and, in line with the WHO priority of universal health coverage, the achievement of Sustainable Development Goal 3 and the future WHO thirteenth general programme of work.

31. United Nations entities use space technology in their activities aimed at enhancing food security and sustainable food production. More information on this topic is contained in the special report of UN-Space on the use of space technology within the United Nations system for agriculture development and food security ([A/AC.105/1042](#)).

32. Through its Regional Drought Mechanism, **ESCAP** helps countries to utilize space-derived information available from spacefaring countries in the Asia-Pacific

region and service nodes in China, India and Thailand to ensure comprehensive real-time drought monitoring, manage an early warning system and seamlessly link long-term climate scenarios with seasonal climate outlooks. The Mechanism works to determine the most appropriate products and services obtained with frontier space technology, build capacity and disseminate information to people in need.

33. To further develop its Regional Drought Mechanism, **ESCAP** has established new partnerships with United Nations agencies and regional institutes with a view to offering a complementary range of information and knowledge products and services to support drought management, contribute to the future implementation of the regional plan of action on space applications for sustainable development for the period 2018–2030 and build capacity to use its information and services. The information and services are to be provided by various countries through regional cooperation. They will be twinned with drought-prone developing countries to support them in building resilience to drought.

34. **ESCAP** and the Association of Southeast Asian Nations (ASEAN) are preparing a joint study on drought in which they will propose to capitalize on knowledge-based innovations by promoting risk-sensitive policies and interventions based on in-season and long-term drought monitoring and assessment. The study contains strong scientific evidence that the drought risk in ASEAN countries is growing, especially since the 2015/2016 El Niño event, which triggered large-scale drought, floods and landslides and severely affected agriculture. The study will further show that the incidence of the El Niño phenomenon is likely to increase in the future.

35. WMO provides climate services to farmers, herders and fishermen in order to promote sustainable agricultural development, increase agricultural productivity and contribute to food security through its Agricultural Meteorology Programme. Other contributing programmes of WMO are the Hydrology and Water Resources Programme and the Integrated Drought Management Programme, which are informed by satellite-derived products. WMO is also strengthening its collaboration with the Food and Agriculture Organization of the United Nations to deepen cooperation and respond to climate variability and climate change and to strengthen agro-meteorological services.

36. The effectiveness of response and relief operations during and after natural disasters and in complex humanitarian emergencies is highly dependent on space technology. Space technology facilitates data collection and transmission, smooth and expedient communications, and tracking and tracing efforts during such devastating events. The United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) promotes the use of space-based information in disaster management, disaster risk reduction and emergency response operations with a view to closing the gap between the information's potential and the actual use currently made of it. UN-SPIDER raises awareness of the benefits of space technologies for disaster management and is aimed at building the capacities of Member States to use those benefits effectively.

37. Combining regional and global approaches, UN-SPIDER will continue to organize technical advisory missions, conferences, workshops, discovery days and thematic expert meetings. Such events enable Member States to exchange knowledge and experiences and learn about innovative methods, best practices and opportunities to access satellite-derived resources. In 2018, technical advisory services and training sessions will be held in Bangladesh, Benin, Cambodia, Cameroon, Ghana, Namibia, Nepal, Nigeria, Sierra Leone, Sri Lanka, Viet Nam and Zimbabwe. International workshops will be held in China, Germany, India and Mongolia to promote and foster the use of Earth observation in the full cycle of disaster management and support implementation of the Sendai Framework for Disaster Risk Reduction.

38. UN-SPIDER serves as the secretariat of the Global Partnership using Space-based Technology Applications for Disaster Risk Reduction (GP-STAR), a multi-stakeholder, voluntary partnership launched at the Third World Conference on Disaster Risk Reduction, held in Sendai in 2015. GP-STAR supports the

implementation of the Sendai Framework by, inter alia, giving advice to governments, organizations and projects on the use of space technologies and applications in disaster risk reduction efforts, and through the provision of relevant publications. In its function as secretariat, the UN-SPIDER programme organized and conducted monthly videoconferences to ensure the implementation of the workplan, published a brochure giving an overview of GP-STAR, and prepared and conducted a side event during the 2017 Global Platform for Disaster Risk Reduction, held in Cancún, Mexico.

39. The Office for Outer Space Affairs will continue to support the International Working Group on Satellite-based Emergency Mapping. The Working Group was formed in the aftermath of the largely uncoordinated emergency mapping efforts during the Haiti earthquake of 2010, to improve coordination and work-sharing among the entities involved.

40. The WMO Disaster Risk Reduction Programme is aligned with the Sendai Framework. Its activities are integrated and coordinated with other international, regional and national organizations. To support disaster risk reduction efforts, WMO is preparing to operate a global multi-hazard early warning system. The system will provide WMO members, United Nations agencies, humanitarian organizations, Governments and other relevant stakeholders with aggregated and standardized authoritative multi-hazard alerts and warnings based on the Common Alerting Protocol. The alerts and warnings will be issued by members' national meteorological and hydrological services and other officially registered alerting authorities. The Climate Risk and Early Warning Systems initiative is aimed at mobilizing the funds required to strengthen risk information and early warning systems in vulnerable countries. The WMO Space Programme is supporting those efforts.

41. The **ESCAP** publication *Leave No One Behind: Disaster Resilience for Sustainable Development — Asia-Pacific Disaster Report 2017* shows that those countries in the region that have the least capacity to prepare for or respond to disasters suffer the greatest impact. It also shows that future natural disasters may be more destructive. ESCAP research indicates that, beyond the human cost, 40 per cent of global economic losses from disasters between 2015 and 2030 will occur in the Asia and the Pacific, a region that accounts for around 36 per cent of global gross domestic product. ESCAP suggests that measures for disaster risk reduction should take account of the shifting risks associated with climate change, especially in risk hotspots where a greater likelihood of change coincides with a higher concentration of poor, vulnerable or marginalized people.

42. **ESCAP**, in close collaboration with partners in the United Nations system and with ASEAN, has developed a series of handbooks offering guidance in harnessing innovative space applications to cope with disaster risk in the region. The titles in the series include *Sharing Space-based Information: Procedural Guidelines for Disaster Emergency Response in ASEAN Countries* (developed in collaboration with UN-SPIDER and the Operational Satellite applications Programme of the United Nations Institute for Training and Research), *Specific Hazards: Handbook on Geospatial Decision Support in ASEAN Countries* and *Innovations in Disaster Rapid Assessment: A Framework for Early Recovery in ASEAN Countries*. The series promotes the development of institutional capacity for countries that wish to include innovative space-based information in their disaster risk management processes, and to address the needs of geospatial information providers and decision makers.

43. **ESCAP** has been working with Pacific countries and regional institutes to strengthen multi-hazard early warning systems in the Pacific region. Work has focused on the development of knowledge and the capacity to use space technology and geographical information systems applications as crucial elements in efforts to attain universal access to disaster early warning information. ESCAP and its regional partners have conducted a series of intensive training courses to build capacity. They have also completed pilot projects in Fiji, the Federated States of Micronesia, Papua New Guinea, Solomon Islands and Tonga which included technical service, tailored toolboxes and model development for weather research forecasting, ocean wave

monitoring and drought early warning. The project also contributed to South-South cooperation through the sharing of expertise available in institutes in Thailand and Indonesia.

44. WMO is the co-custodian for Sustainable Development Goal 13 (Take urgent action to combat climate change and its impacts) and leads the work on the Global Climate Observing System (GCOS). GCOS is an integrated, long-term endeavour to systematically observe the Earth's changing climate and to identify the measurements required to support adaptation measures and the way in which they could support observations at the local and regional levels. Many observation products do not yet exist and specific action is required to develop guidance for the provision of high-resolution global or regional data sets obtained from satellite products or by downscaling model results. More specifically, there is a GCOS implementation plan that is based on a set of essential climate variables that have been identified. In the near future, measurements of anthropogenic greenhouse gas fluxes made on board space-borne platforms will be available to augment the bottom-up approaches recommended in the guidelines of the Intergovernmental Panel on Climate Change and to improve integrated estimates of emissions in line with the Paris Agreement on climate change for a global stocktaking exercise once every five years. The first global round of stocktaking, to be held in 2023, will benefit from prototype systems. Those prototypes are expected to be developed into a more operational system at a later date.

45. GCOS activities are closely coordinated with those space agencies that are developing and operating relevant space-borne platforms, including the Committee on Earth Observation Satellites (CEOS) and the Coordination Group for Meteorological Satellites (CGMS). In 2010, CEOS and CGMS together established the Working Group on Climate, which coordinates and encourages collaborative activities between the world's major space agencies in the area of climate monitoring. The overarching goal is to improve the systematic availability of climate data records through the coordinated implementation and further development of a global architecture for climate monitoring from space.

46. More information is contained in the special report of UN-Space on the use of space technology within the United Nations system to address climate change issues ([A/AC.105/991](#)).

C. Space accessibility

47. The 2030 Agenda will be implemented by all countries and stakeholders, acting in collaborative partnership and with the determination to take the bold and transformative steps that are urgently needed to shift the world onto a path towards sustainability and resilience. Space-derived information is a key decision-making tool for the efficient management of assets, environments and communities. Nonetheless, bottlenecks and gaps exist with respect to access to space-derived information and its interpretation, analysis and usage, because, at present, it is provided mainly by the private sector, Governments and specialized agencies. Efforts are being made within the United Nations system to increase and streamline the use of data and information derived from space-based platforms.

48. Promoting and facilitating the visibility, free accessibility and ease of utilization of space science data, in particular astronomical data, collected by space- and ground-based facilities is the objective of the Open Universe initiative of the Office for Outer Space Affairs, conducted in partnership with Italy. The initiative, recommended for establishment at the United Nations/Italy Workshop on the Open Universe Initiative held in Vienna in November 2017, is aimed at enhancing and completing the online availability and visibility of astronomical and space science data following internationally agreed standards; and promoting the development of software applications and educational and outreach environments for astronomy and space science to further the progress of society in terms of culture and knowledge, in

particular among young people and women, irrespective of the level of development of a country.

49. The United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) is the top intergovernmental global geospatial policymaking body. It fosters a geospatial approach to attaining the Sustainable Development Goals and has been successful in building a global architecture as well as regional geospatial committee architectures in Asia and the Pacific, the Americas, the Arab States, Europe and Africa. UN-GGIM has entered the second five-year phase of its work programme, in which its focus is on strengthening the national capabilities, capacities and institutional arrangements of geospatial information in Member States. The various work programmes put a strong emphasis on integrating national information systems for measuring and monitoring the progress towards Sustainable Development Goals, capacity-building and national-level implementation. The Department of Economic and Social Affairs and the Department of Field Support continue to provide UN-GGIM with Secretariat support.

50. UN-GGIM has asked the Secretariat for an overview of existing geospatial information resources, activities and governance arrangements within the United Nations system. During the seventh session of UN-GGIM, held in August 2017, the Secretariat reported that, as many coordination activities were being carried out on a “best efforts” basis by geospatial practitioners within and across the United Nations system and that the current informal collaborative mechanisms required attention from senior management of the United Nations and UN-GGIM so as to improve the coordination and coherence. As a direct outcome of its seventh session, UN-GGIM agreed to establish a United Nations system network under the umbrella of UN-GGIM. While the terms of reference, modalities and mechanisms of the new network are yet to be determined, the Secretariat is contacting actors interested in preparing its establishment within the United Nations system, to be endorsed by UN-GGIM at its eighth session, in August 2018.

51. At its fifth session, in August 2015, UN-GGIM created the working group on geospatial information and services for disasters to develop a strategic framework in which all stakeholders and partners involved in disaster risk reduction and/or emergency management could ensure that geospatial information and services are of high quality and can be accessed in a coordinated way to support decision-making and operations before, during and after disasters. At its seventh session, in August 2017, UN-GGIM adopted a strategic framework on geospatial information and services for disasters and endorsed the consideration of drafting a resolution to be presented for adoption by the Economic and Social Council. The draft resolution is currently being prepared by Member States for consideration by the Council in July 2018.

52. The United Nations Geographic Information Working Group held no plenary meeting in 2017. The Office for Outer Space Affairs voluntarily continued to act as Chair of the Working Group until another entity would volunteer to do so. At the same time, the Office hosted and managed, with support from the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization, the web server and mailing lists of the Working Group, thereby ensuring that communication and information-sharing within the United Nations system continued on all aspects of geospatial information management and data-sharing. It is still envisaged to convene a plenary meeting in late 2018 or early 2019 to address developments and cooperation requirements, to ensure the Working Group’s continuity and to review future plans to adjust efforts to the current and future priorities of the United Nations system, including the Sustainable Development Goals. The Working Group and its members could possibly be re-engaged in the context of the newly proposed United Nations system network in the context of UN-GGIM.

53. The Regional Committee of United Nations Global Geospatial Information Management for Africa was established under the leadership of ECA. Through the work of the Regional Committee, Member States have agreed on a basic set of

concepts, practices, standards and guidelines for the development and management of geospatial information in Africa. The African Regional Spatial Data Infrastructure supports regional initiatives, such as the production of a seamless mosaic of digital elevation model data and the launch of a study to develop guidelines of best practices for geospatial data sets. In collaboration with the Department of Economic and Social Affairs and the Department of Field Support, ECA continues to follow up the validation process of the Second Administrative Level Boundaries data set project in Africa.

54. Through the international steering committee of the African Geodetic Reference Frame project, ECA has continued to develop a unified geodetic reference frame to contribute to the harmonization of geographic data and statistics in Africa. In 2018, 2019 and beyond, ECA will continue to champion the development and implementation of spatial data infrastructures in African countries, focusing on articulating policies, strategies and guidelines to develop and enhance the effective use of geospatial products and resources. Expert advice and technical support will be provided to member States and subregional and regional institutions to strengthen their geospatial information policies and resources.

55. Since 2016, ESCAP has provided around 320 satellite imagery and tailored tools and products to its member States for early warning, response and damage assessment relating to earthquakes, floods, drought, typhoons, cyclones and landslides. All of these space-based data, products and services were provided free of charge by ESCAP member States through the Regional Space Applications Programme for Sustainable Development network and the partnership with other United Nations agencies and international/regional initiatives. Their value was equivalent to approximately \$1.4 million.

56. The Geospatial Information Section of the Department of Field Support continued to coordinate the provision of selected products and services to the Secretariat to support the management of operations, situational awareness and geospatial intelligence for crisis response operations. The volume of analytical products and services based on satellite imagery that has been provided to the Security Council and its subsidiary organs and to the United Nations Operations and Crisis Centre have increased at a rapid pace. This trend reflects the growing interest of senior management of the United Nations system to leverage evidence-based data and information in its decision-making process.

57. In early 2016, new contracts were concluded with vendors for the provision of a wide range of medium- and high-resolution, optical and radar satellite imagery. Those contracts include services and products with added value that are based on data derived from satellite imagery, such as change detection or geospatial intelligence used for crisis response operations. Another contract was concluded for the provision of advanced geospatial services that include feature extraction, to produce large-scale topographic data and maps, and image analysis.

58. The Office for Outer Space Affairs is availing itself of the memorandum of understanding with the China National Space Administration for the provision of imagery for disaster management, monitoring the effects of climate change and supporting efforts to attain the Sustainable Development Goals. The satellite images were offered during emergencies and plans are being made to offer images for use in specific projects in developing countries.

59. The Office is also availing itself of the memorandum of understanding with DigitalGlobe to increase awareness of new, very high-resolution space-based data and services within the United Nations, and to promote the availability of and access to such data and the provision of open data to the United Nations system during disasters. In the spirit of the memorandum of understanding, DigitalGlobe will continue to provide archived and contemporary imagery freely accessible to the international community to support emergency response operations. Also in the spirit of the memorandum, DigitalGlobe, through its Open Data programme, will continue to

provide archived and newly collected, after-the-event imagery freely accessible to the international community to support responses to major disasters globally.

60. Under the WMO Space Programme, several databases are maintained that contribute to space accessibility. They include the Observing Systems Capability Analysis and Review Tool, a database of Earth observation payloads and missions and observation requirements to support Earth observation applications, gap-analysis studies and global coordination, the Satellite User Readiness Navigator portal, which is intended to help Members prepare for the next generation of meteorological satellites, databases on data products¹ and processing tools.²

61. CGMS ensures the global end-to-end coordination of meteorological satellite systems between satellite operators and user communities such as WMO and the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization. CGMS encourages complementarity, compatibility and mutual backup in the event of system failure, and does so through cooperative mission planning, compatible meteorological data products and services, and the coordination of space- and data-related activities, thus complementing the work of other international satellite coordinating mechanisms.

62. The WMO/CGMS Virtual Laboratory for Training and Education in Satellite Meteorology is a global network of specialized training centres and meteorological satellite operators working together to improve the utilization of data and products from meteorological and environmental satellites. It was established by WMO, through its Space Programme, and CGMS to support capacity-building.

63. The Office for Outer Space Affairs continues to participate actively in the working groups of CEOS, acting, by virtue of its mandate, as a liaison between the United Nations and the CEOS community. The Office will continue to contribute to and support capacity-building activities related to the provision of and access to space-based data within the CEOS Working Group on Disasters and the CEOS Working Group on Capacity-building and Data Democracy by organizing joint training workshops for developing countries. In 2017, the Office supported a training course held in Gabon that was coordinated by the Working Group on Capacity-building and Data Democracy. Its topic was the use of synthetic aperture radar satellite imagery.

64. The UN-SPIDER knowledge portal contains databases made up of freely available satellite data, derived products and software, and compilations of all relevant maps and resources for selected major disasters. The Office for Outer Space Affairs is strengthening the UN-SPIDER network of regional support offices, which currently has 21 members, to ensure that recommended practices and other references, tools and services are shared more widely.

D. Space diplomacy

65. The scale and ambition of the 2030 Agenda, underpinned by the United Nations values of peace, dialogue and international cooperation, require revitalized international partnership to ensure its implementation. Through the 2030 Agenda, world leaders have envisaged a world in which good governance and an enabling environment at the national and international levels are essential for sustainable development, including sustained and inclusive economic growth, social development, environmental protection and the eradication of poverty and hunger, all of which would benefit from stronger space governance and supporting structures at all levels, including improved space-based data and space infrastructure.

66. The Office for Outer Space Affairs continues to support the Committee on the Peaceful Uses of Outer Space and its subsidiary bodies in promoting international

¹ See <https://www.wmo-sat.info/product-access-guide/>.

² See http://www.wmo.int/pages/prog/sat/processingtools_en.php.

cooperation in space activities for peaceful purposes, including in preparation for UNISPACE+50, which offers a unique opportunity for Member States to reflect on more than 50 years of achievement in space exploration and to look towards the future. The UNISPACE+50 high-level segment process, to be held on 20 and 21 June 2018 and open to all States Members of the United Nations, is expected to culminate in a resolution to be considered at the seventy-third session of the General Assembly. In accordance with its resolution [72/79](#), the Assembly will consider in plenary meeting at its seventy-third session an agenda item entitled “Space as a driver of sustainable development” in the context of UNISPACE+50.

67. The General Assembly, in accordance with its resolution [71/90](#), convened a joint half-day panel discussion of its Disarmament and International Security Committee (First Committee) and Special Political and Decolonization Committee (Fourth Committee) to consider possible challenges to space security and sustainability. The panel was organized jointly by the Office for Outer Space Affairs and the Office for Disarmament Affairs and held in New York on 12 October 2017. The programme, a summary of the debate and the presentations are available on the website of the Office for Outer Space Affairs.

68. Pursuant to requests by the General Assembly, the Office for Disarmament Affairs undertook various efforts to support States in the implementation of the recommendations of the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities (see [A/68/189](#)). The Office for Disarmament Affairs also continued to support the discussion on the implementation of transparency and confidence-building measures in various disarmament forums, including the Conference on Disarmament, the United Nations Disarmament Commission and the First Committee.

69. In accordance with General Assembly resolution [71/82](#), the Disarmament Commission held an informal discussion on the practical implementation of transparency and confidence-building measures in outer space activities with the goal of preventing an arms race in outer space at its 2017 session. On 21 February 2018, the Disarmament Commission decided that the second of two substantive items for its 2018–2020 cycle would bear the title “In accordance with the recommendations contained in the report of the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities ([A/68/189](#)), preparation of recommendations to promote the practical implementation of transparency and confidence-building measures in outer space activities with the goal of preventing an arms race in outer space”.

70. In its resolution [72/250](#) on further practical measures for the prevention of an arms race in outer space, the General Assembly requested the Secretary-General to establish a new group of governmental experts to consider and make recommendations on substantial elements of an international legally binding instrument on the prevention of an arms race in outer space, including on the prevention of the placement of weapons in outer space. The group will meet in 2018 and 2019.

71. In February 2018, the Conference on Disarmament decided to establish five subsidiary bodies, including one on its agenda item on preventing an arms race in outer space. The subsidiary bodies have been tasked with seeking to reach an understanding on common areas, deepening technical discussions, and considering effective measures, including legal instruments, for negotiations.

72. More information on relevant activities undertaken by various United Nations entities is contained in the special report by UN-Space on the role of United Nations entities in supporting Member States in the implementation of transparency and confidence-building measures in outer space activities ([A/AC.105/1116](#)).

73. Building on the success of the series of ten United Nations workshops on space law, the Office for Outer Space Affairs will hold the first United Nations Conference on Space Law and Policy in Moscow from 11 to 13 September 2018. The Conference

is being organized jointly with the Government of the Russian Federation and the State Space Corporation “Roscosmos”. Participants will be given an overview of the legal regime governing the peaceful uses of outer space and will examine the broader perspective of space security, including transparency and confidence-building measures in outer space activities. Discussions will be held on ways and means of maintaining outer space for peaceful purposes, challenges to the long-term sustainability of outer space activities, legal aspects of space debris mitigation and remediation, space traffic management and the exploration, exploitation and utilization of space resources. The Conference will also study trends in and challenges to the progressive development of space law and assess further needs for capacity-building, assistance and outreach in space law and policy.

74. Given the growing number of benefits derived from space science and technology applications, space activities by all the main players continue to expand rapidly. This not only increases interaction between the aviation and space communities, both commercial and private, but also makes the need more pressing to explore existing regulatory mechanisms and operational practices in the fields of aviation and space transportation. To address that need, the International Civil Aviation Organization (ICAO) and the Office for Outer Space Affairs hosted a series of aerospace symposiums held in Montreal, Canada, in March 2015, in Abu Dhabi in March 2016 and in Vienna in August 2017 (see [A/AC.105/1155](#)).

75. Participants in the series of symposiums have made efforts to strengthen the dialogue between the aviation and space communities. Participants expressed the view that the unique, coordinated inter-agency effort should be reflected in the second phase of cooperation and in the work of ICAO and the Office for Outer Space Affairs. In view of the rapid development of commercial space transportation and the inherently different international regimes for aviation, space flight and space activities, participants observed a need for better intergovernmental coordination with the involvement of the Office for Outer Space Affairs, ICAO, ITU and the International Maritime Organization in areas of concern with respect to the launching of space vehicles from maritime areas.

76. The seventeenth World Meteorological Congress, held in May 2015, tasked WMO with ensuring the international coordination of operational monitoring and forecasting of space weather with a view to supporting the protection of life, property and critical infrastructure and the economic activities affected by space weather. In June 2016, the WMO Executive Council approved a four-year plan for WMO activities related to space weather for the period 2016–2019. The four-year plan is aimed at enabling States members of WMO to establish fully operational space weather services, share observation data, products and best practices and ensure interoperability and standardization, as appropriate, to efficiently respond to global challenges related to space weather.

77. The Executive Council further agreed to replace the WMO expert team on space weather, named Inter-Programme Coordination Team on Space Weather, which had been established in May 2010 with the newly established Inter-Programme Team on Space Weather Information, Systems and Services and to task the new Inter-Programme Team with coordinating the space weather activities conducted under various WMO programmes and by partner organizations, and to provide guidance to WMO members. The Inter-Programme Team commenced its work in early 2017 and at present includes experts from 23 member States and six international organizations.

78. The eighteenth World Meteorological Congress, to be held in June 2019, is expected to adopt a strategic plan for the period 2020–2023. The new strategic plan will allow WMO to remain fit for purpose and to become even more nimble and cost-effective.

79. The World Radiocommunication Conference 2019 will prepare the agenda of the next Conference, planned for 2023. One item that may be included concerns the

radio spectrum needs of space weather sensors and the means to protect them from interference.

80. The Committee on the Peaceful Uses of Outer Space first started considering issues related to space weather decades ago as part of its general discussions. It continues to do so under dedicated items on the agenda of the Scientific and Technical Subcommittee, such as the single issue/item for discussion on solar terrestrial physics (in 2004), the item on support to proclaim the year 2007 International Geophysical and Heliophysical Year (in 2005), the items under the multi-year workplans relating to the International Heliophysical Year 2007 (since 2006) and the International Space Weather Initiative (since 2010), and under a regular item on space weather (since 2010).

81. Expert group C on space weather was established under the Working Group on the Long-term Sustainability of Outer Space Activities of the Scientific and Technical Subcommittee, under the Subcommittee's agenda item on long-term sustainability of outer space activities. Expert group C was co-chaired by Canada and Japan. In 2014, it produced a working report (A/AC.105/C.1/2014/CRP.15) that served as input to the agreed guidelines for the long-term sustainability of outer space activities, in particular guideline 16 (Share operational space weather data and forecasts) and guideline 17 (Develop space weather models and tools and collect established practices on the mitigation of space weather effects).

82. In 2014, under its agenda item on space weather, the Scientific and Technical Subcommittee established the Expert Group on Space Weather. That Expert Group was mandated to promote awareness, provide guidance and enable communication and cooperation in space weather-related activities among States members of the Committee on the Peaceful Uses of Outer Space and related national and international organizations. At its fifty-fifth session, in 2018, the Subcommittee recommended that the Expert Group continue its work, in accordance with the recommendations contained in the Expert Group's progress report (A/AC.105/C.1/2018/CRP.14).

83. At its fifty-ninth session, in 2016, the Committee on the Peaceful Uses of Outer Space endorsed seven UNISPACE+50 thematic priorities. The objectives under thematic priority 4 (International framework for space weather services) were to strengthen the reliability of space systems and their ability to respond to the impact of adverse space weather; to develop a space weather road map for international coordination and information exchange on space weather events and their mitigation, through risk analysis and assessment of user needs; to recognize space weather as a global challenge and the need to address the vulnerability of society as a whole; increase awareness through developed communication, capacity-building and outreach; and to identify governance and cooperation mechanisms to support this objective. For further information, see the report on thematic priority 4 (A/AC.105/1171).

84. As a flagship event under the thematic priority, the Office for Outer Space Affairs held the United Nations/United States of America Workshop on the International Space Weather Initiative in Boston, United States, from 31 July to 4 August 2017 (see A/AC.105/1160). The event was dedicated to the progress achieved in the ten years since the International Heliophysical Year 2007 and gave participants an opportunity to discuss strategies and future activities.

85. More information on activities undertaken by various United Nations entities in this context is contained in the special report by UN-Space on space weather (A/AC.105/1146).



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Coordination of space-related activities within the United Nations system: directions and anticipated results for the period 2016-2017 — meeting the 2030 Agenda for Sustainable Development

Report of the Secretary-General

I. Introduction

1. The 2030 Agenda for Sustainable Development, a universal framework for all countries to help eradicate poverty and achieve sustainable development by 2030, requires bold and transformative steps and innovative tools to support its implementation. Among those tools are the ones offered by space science and technology, which could act as important enablers of economic, social and cultural development and contributors to poverty eradication, and which have the potential — as yet unfulfilled — to catalyse efforts by both developed and developing countries to achieve the internationally agreed development goals and targets.
2. The 2030 Agenda argues for stronger space governance and supporting structures at all levels, including improved space-based data and space infrastructure, and calls for strengthened space cooperation and coordination mechanisms at the international, regional, interregional and national levels. Advancing international cooperation in the peaceful uses of outer space is at the core of international efforts for harnessing the benefits of outer space for global sustainable development.
3. The Inter-Agency Meeting on Outer Space Activities (UN-Space) has served as the focal point for inter-agency coordination and cooperation in space-related activities since 1975, with the aim of promoting synergies and preventing duplication of effort related to the use of space technology and applications in the work of United Nations entities.

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4. The General Assembly, in its resolution 70/82, urged UN-Space, under the leadership of the Office for Outer Space Affairs, to continue to examine how space science and technology and their applications could contribute to the 2030 Agenda, and encouraged entities of the United Nations system to participate, as appropriate, in UN-Space coordination efforts.

5. In that resolution, the General Assembly noted with satisfaction that the Committee on the Peaceful Uses of Outer Space, at its fifty-eighth session, had endorsed the plan of work of the thematic cycle relating to the Fiftieth anniversary of the United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE+50) in 2018. In particular, the Committee welcomed the proposals contained in the note by the Secretariat entitled “Fiftieth anniversary of the United Nations Conference on the Exploration and Peaceful Uses of Outer Space: theme of the sessions of the Committee on the Peaceful Uses of Outer Space, its Scientific and Technical Subcommittee and its Legal Subcommittee in 2018” (A/AC.105/L.297).

6. At its fifty-eighth session the Committee session also welcomed the agreement of UN-Space that the focus of the report of the Secretary-General on the coordination of space-related activities within the United Nations system for the period 2016-2017 should be on assisting the Committee in its preparations for UNISPACE+50, which would be a major element of the sessions of the Committee and its subsidiary bodies in 2018, and on providing an overview of efforts by United Nations entities aimed at contributing to the main pillars of UNISPACE+50 and at promoting international cooperation in the peaceful uses of outer space (A/70/20, para. 319).

7. The present report, which is the thirty-seventh report of the Secretary-General on the coordination of space-related activities within the United Nations system, was prepared by the Office for Outer Space Affairs on the basis of submissions from the following United Nations entities: the Department of Field Support, the Department of Economic and Social Affairs and the Department of Peacekeeping Operations of the Secretariat, the Economic Commission for Africa (ECA), the Economic and Social Commission for Asia and the Pacific (ESCAP), the Economic and Social Commission for Western Asia (ESCWA), the Office for Disarmament Affairs and the Office for Outer Space Affairs of the Secretariat, the Food and Agriculture Organization of the United Nations (FAO), the secretariat of the United Nations Framework Convention on Climate Change, the United Nations Institute for Disarmament Research, the International Civil Aviation Organization (ICAO), the International Maritime Organization (IMO), the International Telecommunication Union (ITU) and the World Meteorological Organization (WMO).

8. The present report adds to the description of activities contained in the reports of the Secretary-General on the coordination of space-related activities within the United Nations system for the periods 2010-2011 (A/AC.105/961), 2012-2013 (A/AC.105/1014) and 2014-2015 (A/AC.105/1063) and reflects activities planned for the period 2016-2017. Additional information is available on the website dedicated to the coordination of outer space activities within the United Nations system (www.un-space.org).

II. Strengthening global space governance and meeting the 2030 Agenda for Sustainable Development

9. Addressing challenges to humanity and sustainable development, protecting the space environment and securing the long-term sustainability of outer space activities all require further attention. Moreover, building resilient societies through better coordination and the forging of global partnerships is one of the key challenges in the twenty-first century and an integral part of meeting the commitments set by the three key United Nations global frameworks: the Sendai Framework for Disaster Risk Reduction 2015-2030, the 2030 Agenda for Sustainable Development and the Paris Agreement on climate change.

10. The formulation of the 2030 Agenda dates back to the first report of the United Nations System Task Team on the Post-2015 United Nations Development Agenda, which was established by the Secretary-General in 2011. In that report, entitled “Realizing the future we want for all”, it was recommended, *inter alia*, that an agenda format based on concrete end goals and targets, which was one of the key strengths of the Millennium Development Goals framework, should be retained but reorganized along four key dimensions, following a more holistic approach: (a) inclusive social development; (b) inclusive economic development; (c) environmental sustainability; and (d) peace and security. This focused approach was consistent with the principles of the United Nations Millennium Declaration, which set out a vision of freedom from want and fear for present and future generations and built on the three pillars of sustainable development.

11. With a view to reinforcing the role of space science, technology and applications in advancing the 2030 Agenda in areas of critical importance for humanity, namely, people, planet, prosperity, peace and partnership, and the role of space-derived information in measuring and monitoring the goals and targets of the Agenda, United Nations entities actively participated in the process leading to the formulation of the Sustainable Development Goals through involvement in the inter-agency technical support team for the Open Working Group of the General Assembly on Sustainable Development Goals. During the post-2015 intergovernmental negotiations, a side event was organized in April 2015 to emphasize and demonstrate the importance of Earth observations and geospatial information in measuring and monitoring the implementation of the Sustainable Development Goals. In parallel, the importance of geospatial information was brought to the attention of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators.

12. In accordance with the mandate of the 2030 Agenda, a technology facilitation mechanism to support the Sustainable Development Goals was launched in September 2015. The mechanism comprises the United Nations inter-agency task team on science, technology and innovation for the Sustainable Development Goals, a collaborative annual multi-stakeholder forum on science, technology and innovation for the Sustainable Development Goals and an online platform serving as a gateway for information on existing initiatives, mechanisms and programmes relating to science, technology and innovation. The inter-agency task team will work with the 10-Member Group, which comprises 10 representatives of civil society, the private sector and the scientific community, to prepare the meetings of the multi-stakeholder forum and to develop and operationalize the online platform.

13. While the new 2030 Agenda redefines how the international community will work together on a global commitment to put the world on a path towards sustainable development, UNISPACE+50 aspires to delineate, through its thematic priorities, effective avenues for utilizing space science, technology and applications to boost national development efforts towards achieving sustainable economic growth, promoting social development and ensuring environmental protection. In that regard, there is a strong emphasis on global space governance. The United Nations system will continue to assist Member States in developing capacities for improved decision-making, enhanced policy formulation and wider use of appropriate knowledge to attain the objectives of the 2030 Agenda and UNISPACE+50.

14. UN-Space will continue to develop synergies with other inter-agency mechanisms and promote, through United Nations entities, the enhanced practical use of space science and technology for sustainable development.

A. People

15. The 2030 Agenda seeks, inter alia, to end poverty and hunger, in all their forms and dimensions, and to ensure that all human beings can fulfil their potential in dignity and equality and in a healthy environment. It recognizes that eradicating poverty in all its forms and dimensions, including extreme poverty, is the greatest global challenge and an indispensable requirement for sustainable development. United Nations entities are increasingly using information generated from space-derived technology for a vast range of activities related to social development, including in the areas of public health, human security and welfare, disaster management and humanitarian assistance.

16. Public health is a prime example of a sector in which the use of satellite communications and remote sensing is vital. Satellite communications are an integral part of the overall health information infrastructure. Key applications of satellite technology in this field include telemedicine, tele-health, disease surveillance systems and health mapping. Space technology offers appropriate and affordable tools that are needed to achieve universal health coverage, one of the six leadership priorities of the twelfth general programme of work of the World Health Organization (WHO) for the period 2014-2019,¹ especially in remote and rural areas. Further information on space applications for public health is set out in document A/AC.105/1091.

17. The Office for Outer Space Affairs and WHO held a meeting on the applications of space science and technology for public health in Geneva in June 2015. The meeting brought together representatives from the public health and space communities to: (a) assess the status of space-technology-related contributions to addressing health issues; (b) identify relevant technologies and applications that are not yet being used by the health sector; (c) identify barriers and potential solutions for implementing space-technology-related health applications; and (d) consider opportunities for aligning relevant space-related activities, such as research activities on the International Space Station and ongoing activities within

¹ See http://apps.who.int/iris/bitstream/10665/112792/1/GPW_2014-2019_eng.pdf.

the Group on Earth Observations and other frameworks relevant to the priorities of WHO. The full report is contained in document A/AC.105/1099.

18. FAO continues to create and update a number of geospatial products for monitoring the status of food security trends in relation to health, such as the updated geospatial database on chronic malnutrition among children under 5 years of age (stunting index). These products are used to formulate policy and interventions targeted at issues related to food security.

19. In agriculture, the use by FAO of a number of ancillary data, including remotely sensed data, is a key component in the effective monitoring of agricultural production. FAO implements its mandate to assist and empower countries with knowledge, tools and methodology to enable them to undertake reliable assessments by fostering the use of medium- and high-resolution Earth observation data, combined with in situ observations, to provide reliable information to support decision-making in agriculture. In that regard, the Global Agro-Ecological Zones data portal² and the integrated Land Resources Information Management System are used in key FAO activities.

20. FAO, together with other agriculture and development agencies, is a member of the Global Agricultural Monitoring initiative of the Group on Earth Observations, the aim of which is to strengthen global agricultural monitoring by improving the use of remote sensing tools for crop production projections and weather forecasting. The initiative is engaged in enhancing agricultural monitoring capabilities facilitated by Earth observation, through programmes such as the Stimulating Innovation for Global Monitoring of Agriculture project and the Global Strategy to Improve Agricultural and Rural Statistics. FAO co-leads the capacity development pillar of the initiative.

21. As part of the Stimulating Innovation for Global Monitoring of Agriculture project, the Global Agro-Ecological Stratification was developed, providing a global map of agro-environmental strata with improved zonation based on both agro-ecological and socioeconomic factors. The Stratification will benefit countries and international organizations by providing an extensive database to support decision makers in the fields of agriculture, natural resource management and food security.

22. FAO continues to monitor food supply and demand and food security using the Global Information and Early Warning System to ensure timely interventions in countries or regions affected by natural or man-made disasters. To mitigate the impact of agricultural drought, FAO developed the Agricultural Stress Index System for detecting agricultural areas with a high likelihood of water stress on a global scale.

23. ESCAP, through the Regional Cooperative Mechanism for Drought Monitoring and Early Warning, which is a flagship programme of the Regional Space Applications Programme for Sustainable Development, mobilizes regional resources in space technology and geographic information systems (GIS) applications and enhances capacities for integrated analysis of space and in-season ground data and information to build resilience in agrarian communities perennially affected by drought.

² See www.fao.org/nr/gaez.

24. To date, eight pilot countries (Afghanistan, Bangladesh, Cambodia, Kyrgyzstan, Mongolia, Myanmar, Nepal and Sri Lanka) have joined the Mechanism, reflecting a variety of climate and socioeconomic circumstances. The Mechanism is supported by three regional service nodes that are located in China, India and Thailand and provide space-based data and products and capacity-building assistance to the national team of the pilot countries for effective drought monitoring and early warning.

25. The Mechanism is increasingly expanding its work to move beyond monitoring and early warning and incorporate crop monitoring, seasonal forecasts, longer-term risk analysis, impact assessment and other tools for managing and adapting to drought. ESCAP will collaborate with various initiatives, such as the Global Agricultural Monitoring and Asia-RiCE initiatives, on extending drought early warning to crop monitoring to satisfy the needs of countries in addressing food security.

26. Combining regional and global approaches, the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) will continue to organize conferences, workshops, discovery days and thematic expert meetings that serve as platforms for the exchange of knowledge and experience. These events allow member States to learn about innovative new methods, best practices and possibilities for accessing satellite-derived resources. In 2016, an international conference will be held in the Dominican Republic on drought early warning and drought monitoring, and training sessions will be organized in China, the Dominican Republic, Thailand and Viet Nam. Additional events will be held in China and Germany and will be aimed at promoting and fostering the use of Earth observation in the full cycle of disaster management. The year 2016 also marks the tenth anniversary of UN-SPIDER, which will be an opportunity to review its goals and partnerships and consider how it can better support member States with the implementation of the 2030 Agenda for Sustainable Development. A workshop will be held with partners and donors in June 2016 in Vienna.

27. In fisheries, the application of GIS and remote sensing methods is required for supporting effective marine spatial planning and/or ecosystem approaches to both fisheries and aquaculture in addressing aquatic problems. Under a project funded by the European Union, FAO and its partners have implemented the iMarine³ initiative to establish data infrastructure to support an ecosystem approach to fisheries management and the conservation of marine living resources. The iMarine data infrastructure offers services for seamless access to a wide spectrum of data and provides an e-infrastructure that facilitates open access to and the sharing of a multitude of data, collaborative analysis, processing and mining processing, and the publication and dissemination of newly generated knowledge.

B. Planet

28. At the United Nations summit for the adoption of the post-2015 development agenda, heads of State and Government and high representatives expressed their

³ See www.i-marine.eu/Pages/Home.aspx.

commitment to protecting the planet from degradation, including through sustainable consumption and production, sustainable management of its natural resources and urgent action on climate change, so that it can support the needs of the present and future generations.

29. The twenty-first session of the Conference of the Parties to the United Nations Framework Convention on Climate Change, held in Paris in December 2015, concluded with the launch of the new Paris Agreement on climate change. The Paris Agreement acknowledges the view that climate change is a common concern of humankind and calls on Member States and stakeholders to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change.

30. The Paris Agreement makes reference to the need to carry out efforts in the areas of mitigation, adaptation and loss and damage as a way to cope with the adverse effects of climate change, including extreme weather and slow onset events. The agreement calls for cooperation as a way to strengthen scientific knowledge on climate, including through research, systematic observation of the climate system and the use of early warning systems, in a manner that informs climate services and supports decision-making.

31. During the Conference, the Subsidiary Body for Scientific and Technological Advice took note of the report submitted by the Global Climate Observing System entitled “Status of the Global Climate Observing System” and of the joint report prepared by the Committee on Earth Observation Satellites and the Coordination Group for Meteorological Satellites, on behalf of space agencies, regarding global observations. The Subsidiary Body for Scientific and Technological Advice requested all parties to cooperate in order to address the priorities and gaps identified in the Global Climate Observing System report. Further information on United Nations coordination of Earth observation through the Global Climate Observing System, the Global Terrestrial Observing System and the Global Ocean Observing System is set out in the report of the Secretary-General (A/AC.105/1014, paras. 10-17).

32. The Office for Outer Space Affairs continues its active participation in the working groups of the Committee on Earth Observation Satellites, acting also as a liaison between the United Nations and the community of the Committee, by virtue of its mandate. The Office will continue to contribute to and support capacity-building activities related to space-based data provision and access within the Working Group on Disasters and the Working Group on Capacity-building and Data Democracy of the Committee, by organizing joint training workshops for developing countries.

33. The United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD) supports the use of remote sensing in national forest monitoring systems for climate change reporting and forest management. As part of international efforts to address climate change through the United Nations Framework Convention on Climate Change, developing countries are encouraged by the Cancun Agreements to implement the enhanced Programme (REDD+). As part of this initiative, FAO and

Norway are collaborating on the System for Earth Observation Data Access, Processing and Analysis for Land Monitoring, a cloud computing platform for geographical data processing.

34. The Deltas, Vulnerability and Climate Change: Migration and Adaptation initiative of FAO examined the effects of climate change and other environmental drivers across contrasting deltas in Africa and Asia, and analysed migration processes using surveys, participatory research and economic methods. Through that initiative, a technical workshop was organized by FAO to provide national experts in GIS and remote sensing with the knowledge to conduct mapping of land cover and land cover change, and to maintain and disseminate the databases through national GeoNetwork nodes.

35. In April 2016, the German Aerospace Centre organized a conference with the support of the Office for Outer Space Affairs to investigate the considerable challenges in atmospheric climate research, to consider how space and atmospheric research can support the requirements of climate protection and to identify tools and methods for a continuous monitoring process to ensure adherence to climate change agreements.

36. The Office, under the United Nations Programme on Space Applications and the United Nations Basic Space Science Initiative, organized the United Nations/Japan Workshop on Space Weather in March 2015, in Fukuoka, Japan (see A/AC.105/1096), and continues to assist Member States in intergovernmental work related to space weather through its support to the Expert group on space weather, established by the Scientific and Technical Subcommittee in 2015. On the margins of the Subcommittee session in 2016 and in addition to the meeting of the Expert group, a space weather workshop was organized that enabled the Expert group to assess the role of those organizations in the global space weather effort, with the aim of promoting coordination and communication among them. Furthermore, the steering committee of the International Space Weather Initiative held its annual meeting on 19 February 2016 to address data policy and usage for the benefit of the international community.

37. The seventeenth World Meteorological Congress, held in May 2015, decided that WMO should undertake international coordination of operational space weather monitoring and forecasting with a view to support the protection of life, property and critical infrastructures and the impacted economic activities. A four-year plan for space weather coordination has been developed and is aimed at enabling Member States to establish fully operational space weather services and share observation data, products and best practices, and at ensuring interoperability and standardization, as appropriate, to efficiently respond to these global challenges.

38. WMO and the Committee on Space Research joined forces in 2012 to organize capacity-building workshops in the areas of Earth observation research and applications and space weather. A capacity-building event on the impact of space weather on Earth is planned to be held by the Committee and WMO in Paratunka, Russian Federation, in August 2016.

39. In the context of disasters triggered by natural hazards, the Sendai Framework makes explicit reference to the use of space and in situ information and space-based technologies to contribute to disaster risk reduction efforts worldwide. It promotes the use and expansion of thematic platforms of cooperation, such as global

technology pools and global systems, to share know-how, innovation and research, and to ensure access to technology and information in disaster risk reduction.

40. To respond to this call for thematic platforms, the Office for Outer Space Affairs and 17 international, regional and national partners launched a global Earth observation partnership to facilitate dialogue among stakeholders in Earth observation and satellite-based technologies and the global community of disaster risk reduction experts and policymakers; to serve as a collective source and repository of information on efforts carried out worldwide by the Earth observation and satellite-based technology communities; and to generate policy-relevant advice to contribute to the integration of Earth observation and satellite-based technologies into development processes and public policies relevant to disaster risk reduction.

41. In the Asia-Pacific region, the achievement of the Sendai Framework and the Sustainable Development Goals by 2030 will depend critically on building much greater resilience to disasters. Given that Asia-Pacific is the world's most disaster-prone region, States of the region recognized this fact and, in particular, the value of space applications in that regard, decades before the agreements were made. In this context, the fourth session of the Committee on Disaster Risk Reduction requested that ESCAP hold a space leaders' forum to enhance regional cooperation in space technology applications towards the implementation of the Sendai Framework and the Sustainable Development Goals. It is expected to renew and extend the work of the Regional Space Applications Programme for Sustainable Development, its long-standing regional cooperation mechanism, in this new development landscape to ensure the greatest benefit to the Asia-Pacific region in the decades to come, to align with the goals and targets of the Sendai Framework and the Sustainable Development Goals.

42. The Regional Space Applications Programme for Sustainable Development would consider modalities for closer collaboration with end-users, such as disaster management authorities and early warning agencies. It would also attempt to deepen and extend its operational support to priority areas, such as multi-hazard risk assessment, early warning systems, hazards with transboundary origins, regional land cover mapping for geospatial baseline databases, disaster monitoring, damage and loss assessment, and education and training networks.

43. In 2015 ESCAP, through the Regional Space Applications Programme for Sustainable Development, provided almost 300 satellite images and damage maps to Fiji, Malaysia, Myanmar, Nepal, Pakistan, the Philippines, Solomon Islands, Vanuatu and Viet Nam for early warning, response and damage assessment of floods, typhoons, cyclones and landslides. This included more than 90 scenes and 12 damage maps for Fiji in the aftermath of Cyclone Winston, provided by the United Nations Institute for Training and Research (UNITAR) Operational Satellite Applications Programme (UNOSAT) and members of the Regional Space Applications Programme for Sustainable Development.

44. The Asia-Pacific Disaster Report 2015, *Disasters without Borders: Regional Resilience for Sustainable Development*, provides an overview of the state of disaster resilience and places disaster risk reduction at the heart of sustainable development. It identifies emerging new risks and neglected areas of disaster risk reduction, and focuses on cross-border disasters, such as earthquakes, droughts,

tropical cyclones and floods. The report highlights the value of cooperation, early warning systems and political will for increased resilience to disasters.

45. In collaboration with the Association of Southeast Asian Nations (ASEAN) Coordinating Centre for Humanitarian Assistance on Disaster Management and in partnership with UNITAR/UNOSAT and UN-SPIDER, ESCAP is developing procedural guidelines for national disaster management authorities in ASEAN countries for sharing space-based information during emergency response. These procedural guidelines support effective decision-making when integrating Earth observation data and geospatial information into disaster response, in order to provide a more evidence-based approach. They form the basis for developing or modifying standard operating procedures at the national level and were used for simulation training and emergency exercise drills for ASEAN countries in Bogor, Indonesia, in April 2016. The procedural guidelines, which require ongoing field testing, will remain a dynamic working document that can be adapted for other subregions and will evolve over time and with technological changes.

46. The Office for Outer Space Affairs, through workshops and expert meetings organized under the United Nations Programme on Space Applications, provides opportunities to bring together experts, decision makers and practitioners to share experience and knowledge among regions, with the aim of defining the actions and follow-up activities that are required to improve the use of space technology for natural resources management and environmental monitoring. In 2016, the Office will conduct its activities in Costa Rica (human space technology), India (disaster management and risk reduction) and the Islamic Republic of Iran (dust storm and drought monitoring). In September 2016, the Office will hold the United Nations/Austria Symposium on Integrated Space Technology Applications for Climate Change in collaboration with the Government of Austria and the European Space Agency.

47. In June 2016, the Office, in cooperation with the Government of Kenya and the United Nations Environment Programme (UNEP), will organize the United Nations/Kenya Conference on Space Technology and Applications for Wildlife Management and Protecting Biodiversity, to be hosted by UNEP in Nairobi. The Conference will address the growing demand for space-based information and space technologies, such as Earth observation or satellite positioning, for biodiversity monitoring and wildlife management.

48. Amplifying regional efforts that are instrumental for undertaking a nuanced approach to addressing regional specificities, the Office, under the UN-SPIDER programme, promotes the application of space-based information to disaster management, disaster risk reduction and emergency response in order to bridge the gap between the potential of such data and information and their actual use. In this context, UN-SPIDER raises awareness of the benefits of space technologies for disaster management and is aimed at building the capacities of Member States to effectively make use of these resources. Through its tailored advisory support and its knowledge portal, UN-SPIDER serves as a unique gateway to accessing and using the necessary data, tools and software. In the biennium 2016-2017, UN-SPIDER will continue to provide this support to countries in Africa, the Asia-Pacific region and Latin America and the Caribbean, and to further improve the content of its knowledge portal in several official languages of the United

Nations. In 2016, technical advisory missions to Benin, Costa Rica and Nepal have been scheduled; requests for support have been received for 2017.

49. The Office will chair, until May 2016, the International Working Group on Satellite based Emergency Mapping. The Working Group was formed in the aftermath of the largely uncoordinated emergency mapping during the Haiti earthquake in 2010, to improve coordination and work-sharing among the involved entities.

50. The World Radiocommunication Conference 2015 revised its resolution 647, which covers spectrum management guidelines for early warning, disaster prediction, detection and mitigation, and relief operations relating to emergencies and disasters. In the context of that resolution, ITU has established and maintains a database containing the contact information of administrations, available frequency bands and other information relevant to emergency situations.

51. Within the framework of the United Nations Committee of Experts on Global Geospatial Information Management,⁴ Member States have established a Working Group on Geospatial Information and Services for Disasters to develop a strategic framework that brings together all stakeholders and partners involved in disaster risk reduction and/or emergency management to ensure that the necessary geospatial information and services are of a high quality and can be accessed in a coordinated way for decision-making and operations before, during and after disasters.

52. The Committee of Experts was established by the Economic and Social Council as the leading intergovernmental mechanism for making joint decisions and setting directions with regard to the production and use of geospatial information within national and global policy frameworks. The secretariat of the Committee of Experts is shared by the United Nations Statistics Division of the Department of Economic and Social Affairs and the Geospatial Information Section of the Department of Field Support.

53. Two important aspects of the work of ECA on natural resources are the enhancement of the knowledge base needed to strengthen human and institutional capacities and broaden stakeholder participation, and the conduct of policy-oriented research aimed at supporting the policy, legal and regulatory frameworks for the proper management of natural resources in Africa. As part of harvesting spatially-enabled data, information products and services in support of evidence-based policy analysis for sustainable natural resources management in Africa, ECA has developed some guiding principles on how to capture and analyse citizen-generated data to supplement and improve the coverage of national mapping in African countries.

54. Land cover is an important source of information for evaluating natural resources, land potentiality and vulnerability. FAO developed the Land Cover Meta Language as an ISO standard (ISO 19144-2:2012), expressed as a unified modelling language metamodel that allows different land cover classification systems to be described based on the physiognomic aspects. Standardized databases created using the interpretation of remote sensing imagery combined with in situ data serve as the bases for assessing the percentage of cultivation and are used for the preparation of improved sample allocation for area frame analysis.

⁴ See <http://ggim.un.org>.

55. FAO uses satellite imagery for forestry and forest monitoring in its Global Forest Resources Assessment, which is produced every five years. Through initiatives such as Open Foris, FAO supports Member States in developing their own forest monitoring systems, in which the use of remote sensing and GIS are important components. The Open Foris Geospatial Toolkit performs powerful image processing, is completely customizable and functions similarly in the cloud or on the desktop.

C. Prosperity

56. Ensuring that all human beings can enjoy prosperous and fulfilling lives and that economic, social and technological progress occurs in harmony with nature are among the five key priorities of the 2030 Agenda. Space science, technology and applications provide tools for informed decision-making and enhance the capacities of Member States to employ complex engines of economic growth in national policies.

57. In 2016, the Office for Outer Space Affairs launched a series of high-level forums to take place in 2016-2018 on the theme “Space as a driver for socioeconomic sustainable development”, aimed at creating a platform for the international community to further explore the contributions of space science and technology to global development. These forums will also provide an opportunity to forge new partnerships and set new frameworks of international cooperation in the lead-up to UNISPACE+50 in 2018.

58. With an African Union member-States-based working group guided by sectorial ministerial conferences, ECA actively contributed to the preparation of the African Space Policy and Strategy that outlines the ambitious high-level goals to mobilize the continent to develop the necessary institutions and capacities to harness space technologies for socioeconomic benefits that improve the quality of life and create wealth for Africans. The Heads of State and Government of the African Union, during their twenty-sixth Ordinary Session, held in Addis Ababa in January 2016, adopted the African Space Policy and Strategy as the first of the concrete steps towards developing an African outer space programme as one of the flagship programmes of the African Union Agenda 2063.

59. In 2016-2017 and beyond, ECA will continue to champion the development and implementation of spatial data infrastructures in African countries, focusing on articulating policies, strategies and guidelines to develop and enhance the effective use of geospatial products and resources. Expert advice and technical support will be provided to member States and subregional and regional institutions to strengthen their geospatial information policies and resources.

60. Recognizing the important role played by space and satellite technologies for economic, social and environmental development, ESCWA acknowledges that a long-term vision and a clear strategy are necessary to maximize the benefits that the Arab region can derive from space technology and its applications. There has been a paradigm shift in the region, with member States starting to build and launch their own satellites with the aim of having dedicated rather than shared space services. ESCWA is working on regional integration or, at least, coordination of such efforts.

61. Through its Technology for Development Division, ESCWA is also seeking to determine the needs, opportunities and priorities of the Arab region with regard to the peaceful uses of outer space. For that purpose, ESCWA conducted a study to survey and report on the effectiveness of various space and satellite technology applications that are in use or on offer by the private sector, and to establish if such applications are locally produced or imported. The study identified linkages between space and satellite technology and knowledge-based economies. It specified guidelines to help policymakers create policies and strategies for managing and governing the space-related sector, encouraging local research and promoting enabling environments.

62. Another study aimed to identify various space and satellite technology applications that are currently in use in the Arab region, and to profile and classify public administration institutions, national and regional organizations, private sector entities and higher learning institutions that are involved in the application of those technologies. ESCWA is endeavouring to capitalize on those two studies by seeking partners who have an interest in further exploratory work that would identify innovative ways to take advantage of the opportunities that space and satellite technology can bring to the Arab region.

63. In the Pacific region, ESCAP has initiated a project funded by Japan, with a key focus on strengthening multi-hazard risk assessment and early warning systems by using GIS, in Fiji, Kiribati, the Marshall Islands, Micronesia, Nauru, Niue, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu and the Cook Islands. The project will enhance the awareness, preparedness and response of multi-hazard risk assessment and early warning systems of Pacific islands through access to socioeconomic data and the operation of national geo-referenced information for disaster risk management portals, and will strengthen the operation of those systems for extreme-weather-related disasters.

64. In order to maximize the benefits of the use and application of global navigation satellite systems (GNSS) to support sustainable development, the Office for Outer Space Affairs, consistent with its role as the executive secretariat for the International Committee on GNSS, will continue to promote cooperation on issues related to GNSS compatibility, interoperability, performance and other space-based positioning, navigation and timing matters. The eleventh meeting of the Committee will be hosted by the Russian Federation in Sochi in November 2016. Interest was expressed by Japan in hosting the twelfth meeting of the Committee in 2017, by China in hosting the thirteenth meeting in 2018 and by India in hosting the fourteenth meeting in 2019. The Office will continue to foster cooperation between the Committee and the regional centres for space science and technology education affiliated to the United Nations, which also serve as information centres for the Committee, and will focus on capacity-building, in particular in relation to GNSS education.

65. Recognizing the investments of Member States in developing satellite missions for positioning and remote sensing of the Earth, supporting a range of scientific endeavours that improve our understanding of the “Earth system” and underpin decision-making, and recognizing that the full societal benefits of these investments are realized only if they are referenced to a common global geodetic reference frame at the national, regional and global levels, the General Assembly adopted resolution 69/266, on a global geodetic reference frame for sustainable

development. Under the guidance of the United Nations Initiative on Global Geospatial Information Management, the global geospatial community is now developing a road map to operationalize the vision set out in the resolution.

66. Through the international steering committee of the African Geodetic Reference Frame project, ECA has continued the effort to develop a unified geodetic reference frame in the continent. The activities undertaken include: (a) deployment of 10 new GNSS reference stations in Burundi, Chad, Côte d'Ivoire, the Democratic Republic of the Congo, Ghana, Kenya, Namibia, Sierra Leone, Zambia and Zimbabwe; (b) installation of the Continuously Operating Reference Stations with the assistance of Trimble; (c) organization of an expert group meeting to review the critical technicalities of computing a common new reference frame for the African Geodetic Reference Frame; (d) validation of the standard processing strategy for the official computations of an African reference frame and adoption of the first official static coordinates for the African Geodetic Reference Frame; and (e) revamping of the programme management structure to account for both the political side and the operational and technical components. The implementation of the African Geodetic Reference Frame programme contributes to having harmonized geographic data and statistics in Africa.

67. The IMO Global Maritime Distress and Safety System, long-range identification and tracking of ships system and Ship Security Alert System contain satellite components. GNSS provide vital information for the safe and efficient movement of ships and vital position information in distress situations. Certain services provided by these systems are recognized as safety-of-life services. Satellite systems recognized by IMO include: International Maritime Satellite Organization, International Satellite System for Search and Rescue, Global Positioning System, Global Navigation Satellite System and BeiDou Navigation Satellite System; other systems may be recognized in the future. IMO completed a review of the Global Maritime Distress and Safety System in March 2016; its modernization plan for the System is expected to be completed in 2018.

68. In civil aviation, the rise of the commercial space transportation industry, including the increased frequency of suborbital launches, in which a payload or a vehicle is launched on a trajectory that briefly enters space but returns to Earth without entering orbit, has brought civil aviation authorities to the forefront of commercial space launch licensing and safety certification. Thus, the possibility of a suborbital Earth-to-Earth transportation market emerging in the near future has led to a growing interest in an integrated regulatory framework for aviation and space flight, which is jointly followed by ICAO and the Office for Outer Space Affairs.

69. In 2013, the ICAO Council received a briefing from industry representatives and regulators on developments in this sector. A joint aerospace symposium on the theme "Emerging space activities and civil aviation: challenges and opportunities" was organized by ICAO and the Office for Outer Space Affairs in Montreal, Canada, in March 2015, as part of a series of three symposiums. The second symposium was held in the United Arab Emirates in March 2016. ICAO, the Office and other stakeholders are actively working to identify and address the legal and technical issues associated with the integration of commercial aerospace transportation and traditional aviation operations and their respective regulatory schemes. This work will continue in 2017 with the third symposium, which will be held in Vienna and

aimed at presenting a set of observations, conclusions and recommendations of this series of symposiums for the attention of UNISPACE+50 in 2018.

70. The World Radiocommunication Conference 2015 held in Geneva in November 2015 made new primary allocations for a total of 600 MHz for Earth exploration satellite services. This decision will enable the development of modern broadband sensing technologies and space-borne radars on active sensing satellites. Scientific and geo-information applications will provide high quality measurements in all weather conditions with enhanced applications for disaster relief and humanitarian aid, land use and large-area coastal surveillance.

71. The Conference, in its resolution 763 entitled “Stations on board suborbital vehicles”, instructed ITU Radiocommunication Sector (ITU-R) study groups to conduct studies to identify any required technical and operational measures in relation to stations on board suborbital vehicles that could assist in avoiding harmful interference between radiocommunication services, and to conduct studies to determine spectrum requirements and, based on the outcome of those studies, to consider a possible future agenda item for the Conference in 2023.

72. Resolution 185 of the ITU Plenipotentiary Conference held in Busan, Republic of Korea, in 2014 instructed the World Radiocommunication Conference 2015 to include in its agenda, as a matter of urgency, the consideration of global flight tracking, taking into account ITU-R studies. Following these instructions, the World Radiocommunication Conference 2015 made a primary allocation to enable satellite reception of Automatic Dependent Surveillance-Broadcast (ADS-B) messages. This extends the reception of currently transmitted ADS-B signals beyond terrestrial line-of-sight to facilitate reporting of the position of aircraft equipped with ADS-B anywhere in the world, including oceanic, polar and other remote areas.

D. Peace

73. The 2030 Agenda recognized that there could be no sustainable development without peace and no peace without sustainable development. Through the 2030 Agenda, world leaders declared their determination to foster peaceful, just and inclusive societies that are free from fear and violence.

74. The Office for Outer Space Affairs continues to support the Committee on the Peaceful Uses of Outer Space and its subsidiary bodies in promoting international cooperation in space activities for peaceful purposes. In line with the request of the Committee at its fifty-eighth session, the Office is issuing a special report by UN-Space (A/AC.105/1116), for consideration by the Committee at its fifty-ninth session, on the implementation of the report of the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities (A/68/189), as pertaining to the United Nations system. It coordinated the preparation of that report with the Office for Disarmament Affairs, with contributions by other relevant United Nations entities.

75. The General Assembly, in accordance with its resolution 69/38, convened a joint ad hoc meeting of the Disarmament and International Security Committee (First Committee) and the Special Political and Decolonization Committee (Fourth Committee) on the afternoon of 22 October 2015, under the chairmanship of

the presidents of the First and Fourth Committees, to address possible challenges to space security and sustainability. The joint ad hoc meeting comprised a general debate and a panel discussion with the participation of the Chair of the Group of Governmental Experts, the High Representative for Disarmament Affairs and the Director of the Office for Outer Space Affairs.

76. In accordance with General Assembly resolution 68/50, the Office for Disarmament Affairs circulated to all relevant entities and organizations of the United Nations system the report of the Group of Governmental Experts. In its resolutions 69/38 and 70/53, the Assembly requested those entities to assist in effectively implementing the conclusions and recommendations contained in the Group's report and encouraged them to coordinate, as appropriate, on matters related to the recommendations contained in the report.⁵

77. Pursuant to the requests of the General Assembly, the Office for Disarmament Affairs undertook various efforts to support States in the implementation of the recommendations of the Group. The Office for Disarmament Affairs also continued to support the discussion of implementation of transparency and confidence-building measures in various disarmament forums, including the Conference on Disarmament, the United Nations Disarmament Commission and the First Committee.

78. The Office for Disarmament Affairs provided assistance to the European Union in relation to its efforts to pursue political commitments to encourage responsible action in and the peaceful uses of outer space. In this connection, the European Union convened multilateral negotiations on an international code of conduct for outer space activities from 27 to 31 July 2015 at United Nations Headquarters in New York. At the conclusion of the meeting, the Chair determined that, based on the discussions and considering the importance afforded to the principles of transparency and inclusiveness, the most supported way forward would be the pursuit of negotiations within the framework of the United Nations through a mandate of the General Assembly.

79. The Office for Outer Space Affairs will organize its tenth United Nations Workshop on Space Law in September 2016 to address the contribution of space law and policy to global space governance and space security. The Workshop will provide an overview of the legal regime governing the peaceful uses of outer space and study its role in global space governance; examine various aspects of the broader perspective of space security, including transparency and confidence-building measures in outer space activities; and address space law and policy in the context of UNISPACE+50, in particular in the areas of space economy, space society, space accessibility and space diplomacy. The Workshop will also study trends and challenges to the progressive development of space law and assess further needs for capacity-building, assistance and outreach in space law and policy.

80. The annual Outer Space Security Conference Series, organized by the United Nations Institute for Disarmament Research, together with the Secure World

⁵ In accordance with General Assembly resolution 70/53, the Secretary-General will submit a report to the Assembly at its seventy-second session with an annex containing submissions from Member States giving their views on transparency and confidence-building measures in outer space activities.

Foundation and the Simons Foundation, represent a key part of the space security activities of the Institute. In 2014, the Conference considered how to take pragmatic steps towards a more stable and predictable outer space environment and how to support the existing space security regime. In 2015, the specific aim of the Conference was to highlight the foundational underpinnings of space security, including both the security in space of space assets and security on Earth as affected by space assets. The 2016 Conference focused on the current status of issues and processes that are critical to maintaining space as a peaceful domain and on follow-up to the 2015 joint session of the First and Fourth Committees of the General Assembly.

81. Recognizing that the security of outer space assets is critical to a broad range of human activity and concerns, from protecting biodiversity, tracking and mapping disease, assessing freshwater resources and monitoring and reporting suspected human rights abuses, to the functioning of banks and financial markets, the United Nations Institute for Disarmament Research continues to support Member States, especially emerging space actors, in building capacity and understanding in relation to international-peace- and security-related space issues to allow for more effective participation of all space stakeholders in multilateral processes and dialogue on the development of a stable and sustainable space security regime.

82. More information on relevant activities undertaken by various United Nations entities is contained in the special report by UN-Space (A/AC.105/1116).

E. Partnership

83. The 2030 Agenda will be implemented by all countries and stakeholders, acting in collaborative partnership and with the determination to take the bold and transformative steps that are urgently needed to shift the world on to a sustainable and resilient path. Space-derived information is a key decision-making tool for the efficient management of assets, environments and communities, but bottlenecks and gaps exist with respect to access to, and the interpretation, analysis and usage of, such data, because they are, at present, provided mainly by the private sector, governments and specialized agencies. Nevertheless, within the United Nations system, efforts are being made to increase and streamline the use of data and information derived from space-based platforms.

84. In the field of geospatial information services and platforms, the United Nations Initiative on Global Geospatial Information Management addresses global challenges regarding the use of geospatial information in the development agenda, serves as a guide for global policymaking and fosters a geographic approach to the Sustainable Development Goals. Encompassing issues at the national, regional and global levels, the Initiative architecture integrates five regional committees of the Initiative for Asia and the Pacific, the Americas, the Arab States, Europe and Africa, with each playing a vital role in advocacy efforts, serving as a strong mechanism for promoting, discussing and enhancing coordination among Member States within the regions.

85. ECA led the establishment of the Regional Committee of United Nations Global Geospatial Information Management for Africa. Through the work of the Regional Committee, Member States have agreed on a basic set of concepts,

practices, standards and guidelines for the development and management of geospatial information in Africa. The African Regional Spatial Data Infrastructure supports regional initiatives, such as the production of a seamless mosaic of digital elevation model data and the launch of a study to develop guidelines of best practices for geospatial datasets. In collaboration with the Department of Economic and Social Affairs and the Department of Field Support, ECA continues to follow up the validation process of the Second Administrative Level Boundaries data set project in Africa.

86. The fifteenth plenary meeting of the United Nations Geographic Information Working Group, co-chaired by the Office for Outer Space Affairs and the Department of Safety and Security of the Secretariat, was held in New York in August 2015. The meeting was scheduled, in agreement with the secretariat of the United Nations Initiative on Global Geospatial Information Management, just before the annual session of the Committee of Experts on Global Geospatial Information Management to maximize attendance and use resources efficiently. In its concluding discussions, the meeting addressed, inter alia, the way the Working Group could best evolve and adjust to the current and future priorities of the United Nations system, including the Sustainable Development Goals, the agreements on climate change and the Sendai Framework. The sixteenth plenary meeting of the Working Group is tentatively scheduled for August 2016 in conjunction with the Free and Open Source Software for Geospatial Conference in Bonn, Germany.

87. The Geospatial Information Section, together with GIS offices in the field missions of the Department of Peacekeeping Operations, the Department of Field Support and the Department of Political Affairs have been active users of space-derived geospatial data and have been involved in establishing contracts with the commercial sector since 2004. The current system contracts of the United Nations are established with the commercial sector for the provision of a wide range of medium- and high-resolution optical and radar satellite imagery.

88. In early 2016, new contracts were established with commercial vendors for the provision of a wide range of raw and processed, medium- and high-resolution, optical and radar satellite imagery. These contracts also include value added products based on satellite imagery, such as change detection or geospatial intelligence used for crisis response. Another contract is currently being developed for the provision of advanced geospatial services based on satellite images, such as feature extraction, to produce large-scale topographic data and maps. It is expected to be finalized by the end of 2016.

89. The field missions of the Department of Peacekeeping Operations, based on space-derived geospatial data purchased against the system contracts, have produced maps relating to vegetation, floods and topography using medium-resolution images. Large-scale city maps (for example, on the scale of 1:2,500) of the area of operation using high-resolution space-based imagery and space-derived geospatial data, have also been produced. One application that is increasingly being developed in the peacekeeping context is for ground and surface water assessment aimed at guiding efficient and targeted field geophysical surveys.

90. In the context of partnerships, the Department of Field Support, the Department of Peacekeeping Operations and the Department of Political Affairs have also taken advantage of space-derived geospatial data provided by certain

Member States and the European Union Satellite Centre to support crisis management in places such as the Central African Republic, Mali, Somalia, South Sudan and the Syrian Arab Republic. The United Nations Secretariat is also benefiting from the sharing of space-derived geospatial data in the context of international boundary issues. Through partnerships in the context of Copernicus, the European Earth observation programme (see www.copernicus.eu), the Geospatial Information Section coordinated the provision of selected products and services to the United Nations Secretariat to support the management of operations, situational awareness and geospatial intelligence for crisis response.

91. The Office for Outer Space Affairs has, on behalf of the United Nations, entered into a memorandum of understanding with DigitalGlobe to increase awareness of new, very high-resolution space-based data and services within the United Nations, and to promote the availability of and access to such data and the provision of open data during disaster situations to the United Nations system. In the spirit of this agreement, DigitalGlobe made archived and contemporary imagery freely accessible to the international community to support the response to the worst earthquake in decades in Ecuador in April 2016.

92. The Office has signed a memorandum of understanding with the China National Space Administration for the provision of imagery for disaster management, monitoring the effects of climate change and supporting the Sustainable Development Goals. Similar partnerships with other national space agencies and the private sector are under development.

93. Over the last decade, FAO advances in remote sensing and GIS technology have led to a dramatic expansion in the geographic information available, from satellite imagery and spatial databases to interactive maps; yet, access to this information remains limited. To help put this information in the hands of those who need it, FAO has developed GeoNetwork, a spatial information management system that provides access via the Internet to a wide range of geographically referenced data from a variety of sources to support decision-makers in agriculture, forestry, fisheries and food security.

94. Processed data and information are shared among United Nations entities and made available through websites such as ReliefWeb, a global hub for time-critical humanitarian information on complex emergencies and natural disasters (www.reliefweb.int), the Global Disaster Alert and Coordination System (www.gdacs.org), UNITAR/UNOSAT (www.unitar.org/unosat), the Inter-Agency Standing Committee's Common and Fundamental Operational Datasets Registry (cod.humanitarianresponse.info) and the UN-SPIDER knowledge portal (www.un-spider.org). The UN-SPIDER knowledge portal also provides databases on freely available satellite data, derived products and software, as well as compilations of all relevant maps and resources for selected major disasters. The Office for Outer Space Affairs is also strengthening the UN-SPIDER network of regional support offices, which currently has 20 members, to enable better sharing of recommended practices and other references, tools and services.

Regional Space Application Programme for Sustainable Development in Asia and the Pacific

Providing satellite-derived data and images to support evidence-based approaches for better informed and timely decision-making

Challenge

Space technology applications and geospatial data have played a growing role in supporting the implementation of the 2030 Agenda for Sustainable Development, the Sendai Framework for Disaster Risk Reduction 2015-2030 and the Paris Agreement on Climate Change. Asia-Pacific regional cooperation platforms and networks related to space technology applications and disaster risk management, including the Regional Space Applications Programme for Sustainable Development (RESAP), have extended their spheres to address global sustainable development challenges beyond disaster risk reduction. Despite the available benefits of space applications, many developing countries still do not have sufficient access to such innovative technologies, infrastructure or the human capacity to effectively utilize and apply these tools, which remains a challenge.

Towards a Solution

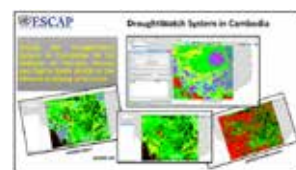
Space applications can provide far-reaching solutions to some of the most pressing issues facing humanity, ranging from food security to social development, natural resource management, climate change, disaster risk reduction and resilience building. They provide satellite-derived data and images that can support evidence-based approaches for better-informed and timelier decision-making, both critical for the setting up of early warning systems for disaster risk reduction and saving lives in the aftermath of a disaster. The application of this information for medium-term development planning and more accurate monitoring and evaluation of development interventions are equally important.

With rapid advances in space technology and increasing access to space-based information that provides several opportunities to disaster managers on the use of space technology for disaster management, RESAP has made concerted efforts to promote geospatial services to support disaster risk reduction and inclusive and sustainable development.

As part of the cross-country transfer of good practices and knowledge, the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) through its RESAP network promptly responds to requests for support from disaster-affected member States by mobilizing satellite-derived products and services. For example, in 2017–2018, more than 400 satellite images and products for drought, cyclone, earthquake and flood were provided to disaster-affected countries as a 24/7 service with free data and support from RESAP member countries. These data and services are worth over USD 1 million. Access to earth observation data for member States not only addresses technical gaps and challenges in accessibility, but also copyright and transboundary issues with regard to sharing.

Specifically, drought monitoring from space has been prioritized. It is believed that the impacts of climate change will be particularly felt through periodic weather events, considered climate risk fault lines, such as the monsoon rainfall and El Niño/La Niña events, causing widespread heatwaves, sand and dust storms, floods, cyclones and

13 CLIMATE ACTION



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droughts. ESCAP's Regional Cooperative Mechanism for Drought Monitoring and Early Warning (Regional Drought Mechanism), which serves as an operational programme of RESAP, is a good example of South-South and triangular cooperation. It brings together developed and emerging countries, with advanced experience in using innovative space applications with high disaster-risk countries that could use the information and tools but lack the knowledge or capacity to do so. High disaster-risk countries typically are least-developed countries and SIDS. The Mechanism has created a toolbox of products, information and services to support drought-prone developing countries in enhancing their resilience, which can be replicated and adapted to different country contexts.

As examples of such cross-country transfer of good practices, **through its technical service nodes in China, India and Thailand, the Mechanism has been providing technical support in Cambodia and Myanmar through training, validation and installation of drought monitoring systems.** The recent operationalization of the drought monitoring system in Myanmar with technical support from India has significantly improved the former's monitoring capability. The system provides agricultural drought information in terms of prevalence, severity and persistence using moderate resolution data, multiple indices for drought assessment and augmentation of ground data bases.

The Mechanism has provided cutting-edge technology in the form of tools and services to enhance drought risk management and build resilience. With the existing platform, tools, technologies and space-based data, the Mechanism can facilitate the replication of best practices for countries based on demand by developing tailored systems and the building of the institutional capacity through its service nodes in China, India and Thailand. This aims to ensure that governments are continuously using the systems for effective drought risk management. However, replicating these best

practices will also depend on ground in-situ data and on the government's commitment to operationalizing the system to improve the lives of vulnerable communities. To this end, the Mechanism has provided continued support in capacity-building Member States through various thematic training sessions, as well as providing policymakers with information that will enable them to make evidence-based decisions on how and when to prepare for drought. The Mechanism has both strengthened institutional coordination and policies at the country level and has built a strong support network of regional and South-South cooperation.

As a unique regional mechanism, RESAP pulls together regional resources in the form of satellite-derived data, knowledge products, tailored tools, timely service and training network to address sustainable development in a multi-dimensional way. Information/service providers and end users are well connected through the regional cooperation platform to ensure the sustainability of the programme. Under the Regional Drought Mechanism, three regional service nodes, in China, India and Thailand, provided continuous support to drought-prone countries in forging strong institutional partnerships between line ministries through capacity building, knowledge and information sharing. This has helped to integrate drought risk reduction into policy, planning and implementation, thereby strengthening institutional capacities. For example, Myanmar has prioritized drought risk management for improving disaster and climate resilience in the agriculture sector by mainstreaming disaster risk reduction for resilient development¹. The National Action Plan for Disaster Risk Reduction (NAP-DRR) 2014–2018 in Cambodia also highlighted the need to enhance drought early warning capabilities with a focus on improved technologies and community-based dissemination mechanisms.

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Project name: Regional Space Application Programme for Sustainable Development in Asia and the Pacific (RESAP)

Countries/Regions: Cambodia, Mongolia, Myanmar, Sri Lanka

Nominated by: United Nations Economic and Social Commission for Asia and the Pacific- Information and Communications Technology and Disaster Risk Reduction Division (ESCAP-IDD)

Sustainable Development Goal target(s): 1.1, 1.5, 1.a, 1.b, 2.3, 2.4, 11.3, 11.5, 11.b, 13.1, 13.2, 13.3, 13.b, 15.1, 15.3, 15.9

Supported by: China, Fiji, India, Indonesia, Japan, Malaysia, Mongolia, the Republic of Korea, Russian Federation, Sri Lanka, Thailand, Vanuatu, etc. (a total of 25 RESAP member countries)

Implementing entities: ESCAP, Institute of Remote Sensing and Digital Earth (RADI) of Chinese Academy of Sciences; National Remote Sensing Centre (NRSC) of Indian Space Research Organization; Geoinformatics and Space Technology Development Agency of Thailand (GISTDA)

Project status: Ongoing

Project period: 2017–2019

URL of the practice: goo.gl/gn88CX; goo.gl/2MERFN