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Committee on the Peaceful Uses of Outer Space

International cooperation in the peaceful uses of outer space: activities of Member States

Note by the Secretariat

Contents

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I. Introduction

1. At its fifty-fifth session in 2018, the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space recommended that the Secretariat continue to invite Member States to submit annual reports on their space activities (A/AC.105/1167, para. 44).

2. In a note verbale dated 29 August 2018, the Office for Outer Space Affairs of the Secretariat invited Member States to submit their reports by 5 November 2018. The present note was prepared by the Secretariat on the basis of replies received in response to that invitation.

II. Replies received from Member States

Brazil

[Original: English]
[22 November 2018]

Contributions of the National Institute for Space Research

Regarding current cooperation, the present note highlights the actions related to cooperation with China for the development, launch and operation of the CBERS-4A satellite; cooperation with the European Commission in the Copernicus programme; and the signing of annex 3 to the Memorandum of Understanding on Cooperation in Earth Observation with the National Oceanic and Atmospheric Administration (NOAA) of the United States of America, for cooperation on the GEONETCast-Americas services.

In July, 2018, the National Institute for Space Research (INPE) of Brazil commemorated 30 years of the collaboration between Brazil and China through the China–Brazil Earth Resources Satellite (CBERS) programme. The ceremony commemorating the anniversary of that collaboration was held at INPE in August. On the same occasion, the 6th Working Group Meeting of China–Brazil 10-Year Space Cooperation Plan was held at INPE, at which both sides reviewed the implementation of the 2013–2022 Space Cooperation Plan and discussed cooperation on future joint projects. The CBERS4-A satellite is being assembled at the INPE Laboratory of Integration and Testing. The launch service contract for a Long March 4B launcher has been signed with China Great Wall Industry Corporation, and the satellite is scheduled to be launched in the second half of 2019 from the Taiyuan Satellite Launch Center.

The cooperative agreement signed between the Ministry of Science, Technology, Innovation and Communications of Brazil and the European Commission, with INPE as the implementing institution, opens the way for Brazil, through INPE, to participate in the European Copernicus programme and to have access to data from the Sentinel Earth observation satellites. In the second phase, technical arrangements are being negotiated and will be signed with (a) the European Space Agency and the Brazilian Space Agency, and (b) the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT).

The signing of annex 3 of the Memorandum of Understanding in Earth Observation between NOAA and INPE established the terms and conditions for the management of the GNC-A data distribution system, making INPE a partner of the GEONETCast-Americas initiative. The cooperation proposal for the joint operation of the GNC-A data distribution system is an innovative initiative with a high scientific and technological impact, and the GEONETCast Americas project, which is the Western Hemisphere component of GEONETCast, is a near-real time network of low-cost satellite information dissemination systems, designed to distribute observed data of the surface, metadata and products for various types of users, which can serve as a

basis for informed decision-making in a number of areas including public health, energy, agriculture, weather, water, climate, natural disasters and ecosystems.

INPE is member of the International Charter on Space and Major Disasters, an initiative aimed at providing satellite data to those affected by natural or man-made disasters through registered organizations, for use in monitoring and response activities. In 2018, images from CBERS-2B and CBERS-4 were processed into value-added products (maps and reports) and delivered to the end users and cooperating bodies as appropriate. The latest contribution of CBERS data to the Charter was for the activation of the Charter during the severe flooding in the Bolivarian Republic of Venezuela, in July and August of 2018 (see https://disasterscharter.org/image/journal/article.jpg?img_id=1036417&t=1535957620756).

INPE also participates in the AmeriGEOSS, the regional initiative of the Group on Earth Observations (GEO) for the Americas. In 2018, the AmeriGEOSS Week took place at INPE from 6 to 10 August. AmeriGEOSS Week 2018 brought the AmeriGEOSS community together to reflect on progress, plan for the future to meet the priority needs in the focus areas identified as the highest priorities in the region (water, agriculture, disaster, and biodiversity/ecosystems) and to provide training in the use of Earth observations.

In 2018, at INPE, the joint meeting of two working groups of the Committee on Earth Observation Satellites, the Working Group on Calibration and Validation and the Working Group on Information Systems and Services, was held. At the meeting, experts discussed the most effective use of Earth observation data for the benefit of society. INPE also held the meeting of the CEOS Working Group on Capacity Building and Data Democracy.

Finland

[Original: English]
[22 November 2018]

Several activities took place in Finland in 2018 to promote international collaboration in the field of space.

Act on Space Activities

The Finnish Act on Space Activities (63/2018) and the complementing Decree of the Ministry of Economic Affairs and Employment on Space Activities (74/2018) entered into force in January 2018. The new Act establishes the national authorization process for space activities as well as the national space object registry. The Ministry of Economic Affairs and Employment maintains the space object registry and acts as the authority for authorization. The objective of the national legislation is to create a predictable and legally transparent environment for national space activities and to ensure the safety of the activities as well as the sustainable use of outer space.

In parallel with the new Act, Finland acceded to the United Nations Registration Convention in January 2018. Finland has been a State party to three of the five United Nations space treaties since the 1970s: the Outer Space Treaty, the Liability Convention and the Rescue Agreement.

Revision of the national space strategy

The Minister of Economic Affairs and Minister of Transport and Communications set up a working group in March 2018 with the task of preparing a proposal for new measures in the Finnish space strategy to promote growth and employment. The aim of the working group was to create a firm common understanding between representatives of the economy, research and administration

sectors on what kind of choices, emphases and structures will enable Finland to be among the top nations in utilizing the opportunities that space has to offer.

The working group has outlined in its report a vision for space business in Finland as well as a number of goals and measures to help enterprises enter the market, to influence international development and to promote research by 2025.

Moreover, the working group made a recommendation to develop the national space administration shifting towards a more centralized structure. That was based on a survey published by the Ministry of Transport and Communications on alternative ways to organize the space administration, including a comparative study of the situation in other countries.

New Space Economy programme

In March 2018, Business Finland launched the New Space Economy programme, which offers funding, networks and export services for developing international space-related business in the next five years. The objective of the New Space Economy programme is to double the exports of participating companies by 2020 and to reach an annual turnover of 600 million euros in services provided by that sector.

The European Space Agency (ESA) business incubation centre in Finland was established in November 2017, offering a good platform for 50 growth-seeking companies for a launch to reach international markets in the coming years.

First Finnish satellites

The space technology education programme at Aalto University developed the first Finnish national satellites using the CubeSat technology, and Aalto-1 was launched in June 2017. At the same time, several space-related start-ups have been spun out of these activities, and the first private sector satellite, X-1 of ICEYE Ltd., was launched in January 2018.

Finland's Chairmanship of the Arctic Council in 2017–2019

As the Chair of the Arctic Council in 2017–2019, Finland emphasizes the implementation of the Paris Agreement under the United Nations Framework Convention on Climate Change and the Sustainable Development Goals in Arctic cooperation. During its term, Finland will strengthen the Arctic cooperation and its continuity also at the highest political level. The priorities of the Finnish chairmanship are environmental protection, connectivity, meteorological collaboration and education, and in each of those, activities in space have a role to play. The Ministry for Foreign Affairs coordinates the activities in collaboration with other ministries and various stakeholders.

International collaboration

Finnish industry and research organizations continue to participate actively in ESA programmes, in particular in the areas of Earth observation, navigation and Advanced Research in Telecommunications Systems (ARTES), as well as in opportunities offered by the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT), the rapidly increasing number of European Union space activities and the European Southern Observatory (ESO). In addition to opportunities offered by these organizations, the Finnish space sector has established a wide network with international space organizations, research institutes and universities, as well as private industries and service providers. In addition, bilateral collaborations continue to have a significant role in the Finnish space programme. The most significant partners are the two neighbouring countries of the Russian Federation and Sweden, but significant collaboration has also been carried out with the United States of America and Canada, and more recently with the Asian space powers Japan and India.

In October 2018, the launch of BepiColombo, the ESA/Japanese Aerospace Exploration Agency (JAXA) mission to Mercury, was an important milestone for the Finnish space research and industry sectors, which participate actively in the project, in particular through the Solar Intensity X-ray Spectrometer (SIXS) (with a Finnish Principal Investigator) and the Mercury Imaging X-ray Spectrometer (MIXS).

The European Centre for Space Law Summer Course

The European Centre for Space Law organized its 27th Summer Course on Space Law and Policy in Helsinki from 27 August to 7 September 2018. The course was organized in collaboration with the Finnish Ministry of Economic Affairs and Employment, and with several partners including Tallinn University of Technology, Aalto University, Helsinki University, Bird and Bird, the Finnish Meteorological Institute and ESA.

Myanmar

[Original: English]
[12 November 2018]

Myanmar Space Activities

The Government of the Republic of the Union of Myanmar has formulated a space programme (Myanmar Space Programme) aimed at consolidating the aspirations vis-à-vis space of launching national satellites and gaining control over strategic national communications and broadcasting. A second aim is to create a commercially viable and sustainable satellite-based communications industry in Myanmar, building a selective position in regional and multiregional markets.

In this respect, the Republic of the Union of Myanmar issued a request for proposal, dated 10 August 2015, and selected the satellite operator Intelsat, a global leader in the supply of satellite services, with the aim of setting up a venture for the joint operation of a satellite to be launched in the future, and in the meantime for the lease of satellite capacity through a five-year agreement on satellites (IntelSat 902, located at 62 degrees East, and IntelSat 906, located at 64.15 degrees East).

The agreement was signed on 27 May 2016 at the Ministry of Transport and Communications (MOTC) office No. 2. In the agreement, it is mentioned that the agency (the Information Technology and Cybersecurity Department of that Ministry) desires to operate a portion of the payload of the satellites (called MyanmarSat-1) and the operator (Intelsat) desires to lease MyanmarSat-1 to the agency. This activity is a first step of the Myanmar Space Programme.

In the agreement, there is mention of long-term service and that the agency shall have the option of accepting an indefeasible right of use (IRU). If the agency would like to exercise the long-term option, the agency has to notify the operator. According to the approval of Government, the indefeasible right of use agreement for the MyanmarSat-2 satellite payload was signed on 1 June 2018.

- Intelsat will launch the IntelSat 39 satellite in March 2019. Terms and conditions for the indefeasible right of use agreement are as below:
  - Bandwidth: 6 x 72 MHz C-band and 6 x 72 MHz Ku band
  - Satellite orbital location: 60 degrees East
  - Beam: Myanmar Regional C-band spot beam and steerable Ku-band Myanmar regional spot beam
  - Indefeasible right of use rate: $155.7 million, to be paid in 10 quarterly payments.

- Intelsat 39 is a high-power geostationary communications satellite that will have broadband networking and video distribution services in Africa, Europe, the Middle East and Asia.
- Space Systems/Loral announced that the IntelSat 39 satellite is built on the SSL-1300 platform and carries a C-band and Ku-band communications payload.
- The satellite will use both electric and chemical propulsion for orbit raising and will be operated with all-electric propulsion on orbit.
- The satellite will be launched by Arianespace.

The third step of the Myanmar Space Programme is to launch a national satellite for Earth observation in the near future. The Earth Observation Satellite project will be undertaken in cooperation with Hokkaido University, Japan. The satellite will be located in low-Earth orbit and the size will be small. Its mass is just 50 kg. Therefore, the satellite launching costs are cheap and will result in sky photos of the whole country, taken daily with a high resolution camera that can be tilted up and down, installed on the satellite.

Through cooperation between Hokkaido University and the Myanmar Aerospace Engineering University, Myanmar can carry out in the area of technologies (a) construction of a spacecraft bus, (b) payload and sensors, (c) ground control station, and (d) utilization of space technology. After that, Myanmar can produce and control the satellites on its own.

The estimated cost includes $6 million for the two satellites (including transportation and installation), $2 million for the cost of the Earth station, $3 million for the launching and insurance, $2,100,000 for satellite training, $500,000 for application training, and $800,000 for the laboratory to test satellites. The total cost will be about $16 million. Within five years, Myanmar can launch two satellites and they can be used for seven years. The Space Centre can be established at the Myanmar Aerospace Engineering University. The use of satellite images, remote sensing and geographic information system technologies will be greatly beneficial for each ministry of the country.

Using space technologies may affect international peace, safety and security. Therefore, the Government may undertake to ensure the peaceful, safe and secure continuity of space activities while operating the Earth Observation project. Moreover, as a milestone of the UNISPACE+50 symposium for the wider space community to exchange views on the future of international space cooperation and the peaceful uses of outer space, Myanmar will take part as a participant for the regional and global development of present and future space science technology for the peaceful use of outer space.

Oman

[Original: Arabic]
[18 October 2018]

Sultanate of Oman Ministry of Transport and Communications

Through its membership of the Committee on the Peaceful Uses of Outer Space, Oman plays a pioneering role in the space sector. Currently, several teams are engaged in a concerted national effort to launch the country’s first communications satellite. The Government closely follows the wide range of space applications being developed in cooperation with neighbouring and other States with a view to ensuring that benefits also accrue locally.

The following brief report outlines the key activities undertaken in this vital sector by the Government, the private sector and specialized non-governmental organizations. The report covers five areas within the country’s space sector: space radio monitoring station, simulation of life on Mars, memorandum of understanding

with India concerning the peaceful use of space, the Omani CubeSat project and World Space Week.

1. Space radio monitoring station

In January 2018, Oman launched its first space radio monitoring station for space services. The station, which is the first of its kind in the Middle East and the ninth in the world according to report ITU-R SM.2181 of the Radiocommunication Sector of the International Telecommunication Union (ITU), will enable the country's Telecommunications Regulatory Authority to provide multiple space radio services at both the local and regional levels. It will also help to improve the use of frequency spectrum resources as well as current and future space resources. Operating in accordance with national and international regulatory norms, the station will be able to identify the geographical location of signals received in Oman, detect any illegal use of satellite services in uplinks and downlinks and resolve any accidental or intentional interference in such services.

The space radio monitoring station is the fruit of more than five years of efforts and will undoubtedly put Oman on the map in the sphere of spectrum management. The station will permit rapid detection of unauthorized radio interference in services using satellite frequencies in the country. Furthermore, the station has the potential to provide services to other countries in the region, upon request, to assist them in detecting sources of interference. The Telecommunications Regulatory Authority is currently drafting appropriate regulatory and financial rules, and it has confirmed that it has received a number of requests for the station's services from regulators and administrations that oversee frequency management in a number of countries. The station will enable such authorities to measure signals and identify illegal uses of space services, as well as resolve any harmful radio interference detected. It can also monitor compliance with licences awarded by the Authority. The opening of the space radio monitoring station in Muscat is important not only for Oman but also for ITU and the region as a whole. It is one of the best-equipped and most modern stations in the world and holds enormous potential as a regional service provider. It will certainly contribute to the formulation of appropriate solutions for detecting sources of radio interference in space services.

2. Simulation of life on Mars

In February 2018, the desert of the Dhofar Governorate, in southern Oman, was the venue for an experiment, the Mars analogue field simulation, to simulate life on the surface of the red planet, which is similar to the Omani desert in several respects. The experiment was intended to explore the potential for life on Mars. The project, named AMADEE-18, was carried out by the Austrian Space Forum in partnership with the Oman National Steering Committee for AMADEE-18.

More than 200 scientists from 25 different countries chose the location for this Mars analogue simulation to field-test technology for a crewed mission to Mars, which is hoped to be launched in 2030. Tests showed that the Dhofar desert had many features in common with the surface of Mars, such as sedimentary structures dating back to the Palaeocene and Eocene epochs. The test site also offered a broad range of sandy and rocky surfaces and significant variety in terms of surface inclination. The Government of Oman had extended its offer to host the project at a meeting of the Committee on the Peaceful Uses of Outer Space.

The Oman Astronomical Society signed three memorandums of understanding with Austrian partners on the hosting of the project, following the announcement by the Austrian Space Forum that Oman had been selected after a global competition based on a number of key parameters and criteria. Seven locations bearing structural similarity to the surface of Mars were visited and the choice was made on the basis of those visits. Conducting field research in the Omani desert is an excellent way to gain operational experience and an understanding of the benefits and limitations of

scientific operations on other planets. The project's objectives included studying the test site as a model region representing Martian deserts and extreme living conditions.

A series of experiments in the fields of, inter alia, engineering, planetary surface operations, astrobiology, geophysics, geology and life sciences were conducted in preparation for future crewed missions to Mars. Among the experiments conducted was the testing of inflatable spacesuits and capsules. Furthermore, astronauts working with the Austrian Space Forum carried out 19 experiments using drones and robotic rovers to simulate Mars missions.

3. Memorandum of understanding with India concerning the peaceful use of space

The Government of Oman, represented by the Ministry of Transport and Communications, and the Government of India, represented by the Indian Space Research Organization (attached to the Department of Space), signed a memorandum of understanding on the peaceful use of space. This was a result of the two countries' desire to progress further in the exploration and use of outer space for peaceful purposes to the benefit of their respective peoples, while pursuing a common interest in broadening the scope of application of space technology for peaceful purposes and ensuring that outer space remains an area of peace in which there is full international cooperation. At the same time, they reaffirmed their wish to develop a regulatory framework and effective means for bilateral action in the field of space activities and to foster joint relations.

The memorandum of understanding provides for cooperation in the fields of satellite-based navigation systems, space sciences, exploration, bilateral exchange of expertise and visits by experts, exchange of findings from scientific experiments, joint organization of courses, conferences, meetings and symposiums and encouragement of cooperation between government, the private sector and academia in the two countries to promote exploration and the use of outer space.

The areas of cooperation under the memorandum include the following: (a) Earth remote sensing; (b) satellite-based navigation; (c) space sciences and planetary exploration; (d) potential uses of space rovers, space systems and terrestrial systems; (e) practical application of space technology; and (f) other areas of cooperation identified by the two parties.

4. Omani CubeSat project

Oman has been an active participant in and a key contributor to the launch of the ArabSat programme, which has yielded a wide range of benefits. However, there has been a shift towards more economically feasible solutions, and now, with the space gap widening and costs coming down, there is a need to focus attention on space programmes. With that in mind, the Omani CubeSat project was established to build capacity and enable Omani personnel to acquire the expertise and knowledge that will enable them to take part in larger-scale, more important programmes in the future. The project comes at a time when world interest in CubeSats is on the rise, as it has been shown that they can make an effective contribution to space programmes at reasonable cost in comparison with large projects.

Various bodies are participating in the national capacity-building project for the design, testing and launch of the country's first CubeSat. The CubeSat Steering Committee, chaired by the Oman Astronomical Society, includes representatives from the Ministry of Transport and Communications, Sultan Qaboos University, the Telecommunications Regulatory Authority and the Royal Omani Amateur Radio Society, as well as several other public and private sector bodies. They each have a part to play in providing and supporting specialized staff, determining the type of scientific payload carried, estimating costs, gauging the importance of the programme to Oman, booking the necessary frequencies for satellite communications and subsequently processing the data gathered. The mission's primary purpose is to monitor light pollution, although it may also be extended to cover atmospheric and environmental monitoring.

The project included a three-day workshop on basic space sciences, held at the headquarters of the Oman Astronomical Society, with lectures delivered by members of the teaching staff of Sultan Qaboos University and specialists from other institutions. The workshop presented an historical overview of the space sciences, focusing on technological developments, types of satellite orbit and how to shift from one orbit to another, CubeSats, satellite communications, booking and registering of frequencies, local and international licensing, terrestrial stations, remote sensing and the engineering model for achieving the objectives of space missions in the following months. International experts will be engaged to develop the programme of qualification, capacity-building, transfer of expertise and practical training for Omani personnel.

5. World Space Week

From 4 to 10 October 2018, Oman joined the rest of the world in commemorating World Space Week. This international commemoration celebrates the contribution of the space sciences and space technology to ensuring better lives for humans. The United Nations has officially declared 4 to 10 October each year as World Space Week, during which numerous space-related educational activities and events are held around the world. Those activities enjoy broad coverage by the press, which informs the public about space-related matters. The dates of World Space Week commemorate the launch of the first satellite, Sputnik 1, on 4 October 1957, and the entry into force of the Outer Space Treaty on 10 October 1967. World Space Week is the largest annual space event in the world.

To mark the occasion, the Oman Astronomical Society, in collaboration with a number of other institutions, organized an exhibition in a shopping mall in Oman. Events included documentary film screenings, lectures and displays, an exhibit on the Mars analogue simulation, astronomical observation points, competitions, an International Space Station corner and many other activities.

Slovakia

[Original: English]
[15 November 2018]

Activities of the Slovak Republic

Slovakia currently focuses on cooperation with the European Space Agency (ESA) within the Plan for European Cooperating States (PECS). Slovakia cooperates with ESA, launching the fourth call for proposals under PECS. The number of stakeholders participating in the projects in the space sector is increasing. Successful stakeholders are coming not only from academia but also from industry, mainly small and medium-sized enterprises and stakeholders from the information and communication technology sector. They concentrate namely on data processing for navigation, space surveillance and tracking and the utilization of data from Earth observation programmes for agricultural, forestry and water sources.

The ESA training session on Earth observation, held in Bratislava from 17 to 21 September 2018, is an example of good cooperation between Slovakia and ESA. The training, which was attended by participants from other PECS countries and ESA member States, strengthened the international dimension of using space-related data for peaceful purposes.