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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

Addendum

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Algeria

[Original: French]
[19 October 2023]

Algeria is of the view that international cooperation in the peaceful uses of outer space is the most appropriate way to foster the exchange and transfer of knowledge and expertise and to promote space technologies and applications in support of sustainable development and human well-being.

Accordingly, over the course of 2023, it has continued to implement the various components of its national space programme.

At the national level, the Algerian Space Agency (ASAL), a government tool for the promotion and development of space activities, has developed projects on space-based applications for the benefit of user sectors, using remote sensing, geographic information systems and satellite positioning systems, notably in the following areas:

- Natural hazards (flooding, forest fires, locust control, etc.)
- Natural resources (water resources, the forecasting of cereal crop yields, geological mapping, etc.)
- Basic infrastructure (agriculture, energy and mining, water, housing, etc.)

In order to bring these multisectoral projects to fruition, steps have been taken to establish cooperation agreements with a number of the sectors in question, including the agriculture, public works, housing and urban planning, land registration, mining, water resources, culture and arts sectors.

The purpose of these agreements is to design, develop and implement decision-making tools based on space technologies and applications. Value-added cartographic products (space maps) derived from satellite images and geographic information systems are made available to ASAL partner entities, which are also provided with training, including advanced training, in the areas of remote sensing, geographic information systems and global navigation satellite systems.

With regard to the implementation of indicators relating to the goals and targets of the 2030 Agenda for Sustainable Development, ASAL contributes to the work of the intersectoral committee led by the Ministry of Foreign Affairs and the Algerian community abroad through the production of indicators derived from the use of space data.

With regard to training and human capacity-building in the area of space technologies, the National Geodesy and Space Technology Academy has successfully concluded its 2022–2023 academic year of specialized courses at the various academic levels, having implemented specific training programmes geared towards meeting the growing needs of the user sector for highly qualified personnel in the areas of space technology and applications, geomatics and space geodesy.

In addition, the following academic, specialized and short-term training activities abroad, conducted in person and/or remotely, have been carried out or are in progress:

- China: Regional Centre for Space Science and Technology Education in Asia and the Pacific, affiliated with the United Nations
- China: academic training as part of the Alcomsat-1 programme (universities of Beihang, Shanghai and Wuhan)
- Japan and the United Nations: nanosatellite technology training programme at the Kyushu Institute of Technology

- Republic of Korea: online training placements at the Korea Aerospace Research Institute (KARI)

With respect to space infrastructure and systems, over the course of 2023 ASAL has carried out maintenance operations to keep its satellites and ground control segments in optimum operating condition. This applies in particular to its high- and medium-resolution Earth observation satellites, namely, Alsat-2A/Alsat-2B (2.5 m) and Alsat-1B (12 m), and the telecommunications satellite Alcomsat-1.

Key information on Algerian space systems:

- Alsat-1B: in operation for seven years; has generated 14,279 products to date, covering a total area of more than 321 million square kilometres
- Alsat-2A/Alsat-2B: in operation for 13 and 7 years, respectively, these satellites have generated more than 371,938 products covering an area of more than 42.78 million square kilometres
- Alcomsat-1: completed its sixth year of operation in 2023 and has continued to broadcast national public and private television packages, including radio programmes, and to establish communications networks for the benefit of various user sectors

Algeria is also continuing its international cooperation efforts, which in 2023 have led to the conclusion of bilateral agreements and memorandums of understanding on the peaceful uses of outer space, notably with the Russian Federation, Italy and China; other memorandums of understanding are being finalized, including with the Republic of Korea and Türkiye. At the regional level, a cooperation agreement between ASAL and the Commission for Controlling the Desert Locust in the Western Region, part of the Food and Agriculture Organization of the United Nations, is being put in place.

ASAL has taken part or will take part in the following events dedicated to space technologies and applications, organized by the agencies, institutions and United Nations bodies responsible for space-related matters:

- International training workshop on the use of space technologies for flood management, Bonn, Germany, 20–22 February 2023
- United Nations expert meeting on the Access to Space for All initiative, online, 15–17 May 2023
- Thirteenth annual coordination meeting of regional support offices, Vienna, 29 May–1 June 2023
- International workshop on use of the Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters during activations, Bonn, Germany, 18–20 July 2023
- Meeting of Working Group B of the International Committee on Global Navigation Satellite Systems (ICG), online, 19 July 2023
- Seventy-fourth International Astronautical Congress (IAC), Baku, 2–6 October 2023
- Seventeenth meeting of the International Committee on Global Navigation Satellite Systems, online, 15–20 October 2023
- United Nations-Finland Workshop on the Applications of Global Navigation Satellite Systems, Helsinki, 23–26 October 2023
- BeiDou Navigation Satellite System cooperation forum, Alexandria, Egypt, 24–26 October 2023
- International Conference on Space and Global Health, Geneva, Switzerland, 1–3 November 2023

In parallel with the development of an Algerian satellite-based augmentation system, based on the capabilities offered by the Alcomsat-1 telecommunications satellite system, Algeria began the process of joining the International Committee on Global Navigation Satellite Systems in 2023, in the firm belief that such systems require enhanced international coordination and collaboration owing to their nature and scope.

In terms of international coordination in the use of the frequency spectrum, the Government of Algeria, represented by the National Frequency Agency and supported by specialized national institutions, including ASAL, has contributed to the preparatory work for and actively participated in determining the Algerian position on the points to be addressed by the World Radiocommunication Conference, which is to be held in the United Arab Emirates from 20 November to 15 December 2023.

At the regional level, Algeria is actively contributing to the preparatory work for the establishment of a continental civil capacity mechanism for disaster preparedness and response, through the organization, in 2023, of several rounds of meetings and discussions bringing together African experts from specialized national institutions and organizations. This mechanism is aimed at pooling the continent's disaster prevention and management efforts by integrating all active mechanisms in this area.

In addition, Algeria, through ASAL, will be conducting a workshop on space-based solutions for forest fires in Algeria on 21 and 22 November 2023 in Algiers in collaboration with the Office for Outer Space Affairs. The workshop will be held as part of the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER), in partnership with the Centre for Remote Sensing of Land Surfaces of the University of Bonn. It will be attended by experts from relevant national institutions, UN-SPIDER regional support offices in Colombia, Germany, Greece and the United States of America and the civil defence organization of Tunisia and is aimed at promoting the use of space technologies and applications and solutions for managing forest fires during and after their occurrence.

In addition, as interest and activity in outer space continue to grow, the continued development of a strong national framework for regulating and guiding space activities is helping to facilitate the implementation of a national space policy in accordance with international law.

In this respect, national regulations are being enhanced through the drafting and enactment of texts implementing Act No. 19-06 of 17 July 2019 on space activities, including:

- A text on the procedures for registration in the national registry of objects launched into outer space, in application of the provisions of article 10 of chapter 2 (on the registration of space objects) of the above-mentioned Act No. 19-06
- A text on a system for space risk prevention and mechanisms for intervention in the event of a disaster, in accordance with the provisions of article 17 of chapter 3 (on space risk prevention and disaster management)

This Act defines the legal framework enabling the State to regulate its activities – which could give rise to international liability – and covers aspects relating to the State's liability in the event of damage while also defining the measures to be taken in the event of space objects falling on national territory. It also establishes the obligation to keep a national register of objects launched into outer space. Lastly, the Act covers aspects related to space risk prevention and disaster response.

Canada

[Original: English]
[20 October 2023]

Summary

In 2023, Canada continued to provide invaluable support to the International Space Station (ISS) through the use of Canadarm2 and Dextre; continued the operation of its Earth observation and scientific satellite fleet, including the RADARSAT Constellation Mission, SCISAT and the Near-Earth Object Surveillance Satellite (NEOSSat); and continued to actively support the Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters. Canada will shortly receive samples from the asteroid Bennu following the success of the OSIRIS-REx mission, which will enable scientists to begin analysis of this precious cargo. In collaboration with the Office for Outer Space Affairs, Canada hosted the Space4Women expert meeting held from 30 October to 3 November 2023. For the latest information, and more details on the programmes mentioned, visit the Canadian Space Agency (CSA) website at www.asc-csa.gc.ca.

International Space Station

The contribution of Canada to ISS, the Mobile Servicing System (Canadarm2, Dextre and the Mobile Base System), continues to operate successfully. Human health science on ISS and in deep space remains a priority for Canada, with its development of new multipurpose medical and research platforms and its conduct of research on food and health for deep space and terrestrial uses. Canada continues to advance novel and breakthrough technology for biological sample preparation for use on ISS. In addition, Canada pursued eight scientific studies related to human health science on ISS, namely, the CARDIOBREATH, Space Health, SANSORI, T-Bone2, Vascular Echo, Vascular Aging, Vascular Calcium and Wayfinding studies.

Planetary sciences

The country's OSIRIS-REx Laser Altimeter on the asteroid-sampling mission OSIRIS-REx of the National Aeronautics and Space Administration (NASA) of the United States of America played a critical role in localizing the sampling site on asteroid Bennu. In exchange for providing the Altimeter instruments, the scientific community of Canada will have direct access to a returned sample, which will be housed at CSA headquarters in a purpose-built laboratory. In September 2023, OSIRIS-REx returned its sample to Earth, which may refine our understanding of the solar system's history, how Earth formed, and possibly the origin of water and life on Earth.

Lunar exploration

Canada continued to prepare Canadarm 3, its contribution to the Lunar Gateway. A CSA astronaut, Colonel Jeremy Hansen, will be part of the NASA Artemis II mission, the first crewed mission to the Moon since 1972, becoming the first Canadian to travel beyond low Earth orbit.

Under the Lunar Exploration Accelerator Program (LEAP), several initiatives are under way to deliver Canadian technologies to the Moon over the next five years. The NASA Commercial Lunar Payload Services delivery flight will deliver a Canadian rover, carrying both United States and Canadian instruments, to the Moon.

Canada continued to advance the Lunar Surface Exploration Initiative, which included concept studies for potential options for the next major Canadian infrastructure contribution to human spaceflight to the lunar surface. In the context of lunar exploration, Canada also secured funding to design, build and operate a utility vehicle capable of surviving the harsh lunar night. This will contribute to the NASA

Artemis programme by providing assistance to the crew, transporting resources, and performing logistics and construction duties.

CSA and Impact Canada continue to advance the Deep Space Healthcare Challenge to develop innovative health-care technologies for remote communities and for crews on long-duration space missions. This year, five companies developed a proof of concept to test in a laboratory environment. Finalists will refine their designs, with the ultimate goal of testing prototypes in a simulated environment.

Space atmospheric sciences

The SCISAT satellite of Canada remains the only satellite to measure hydrofluorocarbon concentrations from space, by measuring the ozone layer and substances that contribute to its depletion, and continues to operate nominally.

Canada is also contributing to the Atmosphere Observing System (AOS) mission led by NASA, along with the Japan Aerospace Exploration Agency (JAXA), the National Centre for Space Studies (CNES) of France and the German Aerospace Center (DLR). AOS is equipped with instruments that will measure aerosols and clouds and how their interaction affects Earth's weather and climate. The contribution of Canada, the High-altitude Aerosols, Water vapour and Clouds (HAWC) mission, consists of two Canadian instruments on a Canadian satellite and a third instrument on a NASA satellite. The data collected by HAWC and AOS will improve the ability to predict near-term weather events, long-term climatic conditions and air quality. HAWC is scheduled to be launched in 2031.

Space-based astronomy

Canada is currently preparing to participate in the Atmospheric Remote-sensing Infrared Exoplanet Large-survey (Ariel) mission of the European Space Agency (ESA) through the provision of a cryogenic harness. Canada continued to support the James Webb Space Telescope project, a partnership between NASA, ESA and CSA. Canada also continued to operate its own space telescope, NEOSSat, and participated in international space observation campaigns under the International Asteroid Warning Network.

Space weather

Canada continued to operate ground-based imagers and magnetometers across Canada, with support from the University of Calgary and University of Alberta. This system contributes to the NASA THEMIS mission, which focuses on ground-based observations of the aurora borealis. Canada continues to collaborate with the ESA Swarm mission, which measures the magnetic fields generated by the Earth.

Space situational awareness

The space-based space situational awareness work of Canada continues to provide data on deep-space objects to the United States-led Space Surveillance Network, helping to maintain the safety of space objects in Earth orbit. The NEOSSat space telescope supports advanced research and development by tracking and characterizing space objects in orbits from low Earth orbit to deep space. The Conjunction Risk Assessment and Mitigation System of Canada continues to provide invaluable analysis services to help satellite operators in Canada and beyond make informed decisions in response to on-orbit close approaches identified by the Space Surveillance Network. The service plays an important role in avoiding on-orbit collisions.

Earth observation

To deliver on its Strategy for Satellite Earth Observation of 2022, Canada established the Satellite Earth Observation Office, located within CSA. The objective of the Office is to facilitate coordination and engagement across the Government and with

public, private and academic actors involved in the collection or application of satellite Earth observation data.

The RADARSAT Constellation Mission continues to support the Government of Canada in its mandate to monitor the impacts of climate change, also supporting efforts to protect our environment and foster sustainable development, manage natural resources and support disaster relief.

The NASA Surface Water Ocean Topography (SWOT) satellite was launched in December 2022. Canada contributed three instruments (Extended Interaction Klystrons) that are at the heart of the Ka-band Radar Interferometer. In operation since July 2023, SWOT will survey 90 per cent of the Earth's surface water and is expected to lead to improvements in many water-related services, including flood warning systems and the monitoring of sea levels and ocean currents.

Canada continues to develop the WildFireSat mission, which is aimed at providing daily monitoring of all active wildfires in Canada from space. The mission will use infrared sensors to measure energy coming from wildfires, based on microbolometer technology. WildFireSat will support wildfire management and provide Canadians with more precise information on smoke and air-quality conditions. WildFireSat is scheduled to be launched in 2028.

Science, technology, engineering and mathematics outreach

CSA continues to engage with education and science, technology, engineering and mathematics (STEM) outreach collaborators, and to work on Objective: Moon, a series of STEM initiatives and resources for youth and educators on the return to the Moon. CSA complemented its "digital first" commitment to making all its content and resources available via the Internet in English and French by offering with both virtual presentations and in-person opportunities to learn more about upcoming missions and Canadian contributions to advancements in space STEM.

CSA is taking further action to support equity-seeking groups that are underrepresented in space STEM fields. For example, applicants for funding opportunities are encouraged to demonstrate how their activities would meet the needs of girls, Indigenous youth, socioeconomically disadvantaged groups and visible minorities.

Space4Women expert meeting

From 30 October to 3 November 2023, CSA co-hosted, in collaboration with the Office for Outer Space Affairs, the fourth Space4Women expert meeting. Space4Women is aimed at promoting women's empowerment in space in support of the Sustainable Development Goals and the 2030 Agenda for Sustainable Development. A key outcome of the expert meeting has been the development of a gender mainstreaming toolkit for the space sector.

National technical, science and human capacity-building

In 2023, Canada continued the Canadian CubeSat Project, in which 15 teams, one from each Canadian province and territory, composed of researchers, professors and post-secondary students, are taking part in real space missions by designing, building, launching and operating their own CubeSats. A second round of this initiative, named CUBICS, was launched in 2023, and nine projects were selected for funding. Each CubeSat developed by the students will gather data from space that will help increase scientific knowledge to better understand climate change.

More than 50 academic research projects supported by CSA under the Flights and Fieldwork for the Advancement of Science and Technology (FAST) initiative progressed in 2023. These projects are contributing to the development of new scientific knowledge and the application of space technologies, while making it possible for students and postdoctoral fellows to acquire valuable, hands-on experience.

CSA continued its stratospheric balloon initiative, STRATOS, in collaboration with CNES. In August 2023, four zero-pressure balloons carrying 18 payloads from Canada and Europe were launched from the Canadian stratospheric balloon base to test new technologies, conduct science experiments and take measurements.

Support to global challenges

In 2023, the country's scientific and operational satellite missions continued to contribute to the achievement of the Sustainable Development Goals in multiple ways. Earth observation missions and projects under smartEarth, the application development initiative, helped strengthen resiliency and adaptability to climate-related hazards and natural disasters. Canada continues to actively support the International Charter on Space and Major Disasters, a collaboration founded by ESA, CNES and CSA, that currently has 17 members.

Space policy

Canada is actively working towards the sustainability and ongoing use of space for peaceful purposes through multilateral and international forums. CSA continues its internal assessment of the country's compliance with the 21 Guidelines for the Long-term Sustainability of Outer Space Activities in order to identify gaps and areas for review to further strengthen its commitment to the safety and sustainability of outer space.

Since its annual report of 2022, Canada has registered 11 satellites with its national and United Nations registries.

Democratic Republic of the Congo

[Original: French]
[18 October 2023]

Preamble

The National Centre for Remote Sensing is a scientific and technical public body with legal personality created pursuant to Decree No. 18/006 of 24 April 2018. It is a strategic centre of the Democratic Republic of the Congo and operates under the auspices of the Ministry of Scientific Research and Technological Innovation.

Its aims are to:

- Develop and coordinate the import, export, processing, sale and use of satellite remote sensing products and services in all their forms throughout the country and ensure that those products and services are maintained, with the exception of meteorological satellite imagery
- Deploy an Earth observation satellite of the Democratic Republic of the Congo, control its movement and trajectory in orbit, obtain and process space information in real time with a view to the commercialization of such information, and monitor the national territory

The tasks of the National Centre for Remote Sensing are as follows:

- Carrying out aerial imagery activities throughout the country and supervising those activities when they are carried out by private individuals
- Collecting, processing, disseminating and archiving remote sensing data
- Using space-related and remote sensing technologies to conduct studies on the country's socioeconomic development
- Undertaking scientific and technical research and studies in the various areas of competence of the Centre and providing relevant training for a fee

- Providing services, for a fee, to national and foreign natural and legal persons and public bodies
- Providing remote sensing support to public and private institutions
- Representing the Democratic Republic of the Congo in relevant international organizations

Background

The Democratic Republic of the Congo, as a vast country with a wealth of natural resources that have not yet been fully geolocated or certified owing to a lack of suitable scientific instruments, needs to access space (satellite) data in order to have reliable, high-resolution information so as to boost its sustainable development in a number of areas, including mining, agriculture, the environment, energy and health.

A number of activities and projects are in progress, including the mapping of all mining sites, the monitoring of protected areas and the management of natural disasters.

Current activities in international cooperation in the peaceful uses of outer space

The National Centre for Remote Sensing works with satellite imagery from existing Earth observation satellites to:

- Manage the Kivu volcanoes in the east of the country
- Monitor refugee camps
- Map mining sites
- Map water pipelines to find a solution to the risk of erosion and flooding
- Map electrical installations in the city of Kinshasa
- Map the country’s tourist sites, digitization of which is ongoing

The National Centre for Remote Sensing plans to use drones in its work from February 2024 to:

- Conduct surveillance of the national territory
- Monitor protected areas and lakes

At present, work to develop legislation on the use of drones in space is ongoing, with the aim of the peaceful regulation of space.

Mexico

[Original: Spanish]
[22 September 2023]

Mexico fosters international cooperation in the peaceful uses of outer space by promoting, coordinating and carrying out activities in collaboration with national scientific and academic institutions and with space agencies, international bodies and intergovernmental organizations.

Its international cooperation activities involving space agencies include the following:

- The National Commission on Space Activities (CONAE) of Argentina: under an agreement on space cooperation concluded between the Mexican Space Agency (AEM) and CONAE, CONAE offered to provide radar images, multispectral images and digital models free of charge.

- The European Space Agency (ESA): existing space data applications, such as Earth observation, satellite communication and satellite navigation, are being used as part of the Integrated Applications Promotion programme.
- The Indian Space Research Organization (ISRO): activities aimed at strengthening the capacities and skills of Mexican experts in relation to the monitoring and processing of satellite images of forest fires are being promoted and an application for the detection of forest fires is being adapted for use in Mexico.
- The National Aeronautics and Space Administration (NASA) of the United States of America: AzTechSat-1 was developed by a multidisciplinary team of students and teaching staff from the Universidad Popular Autónoma del Estado de Puebla (UPAEP), supported by a team of mentors comprising specialists from AEM and NASA. The satellite was launched on 4 December 2019.
- The National Oceanic and Atmospheric Administration (NOAA) of the United States: NOAA donated 10 GEONETCast receiving antennas to Mexico; the antennas have been installed and are in operation throughout the country.
- The Office for Outer Space Affairs: AEM is a regional support office for the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) and, as such, is responsible for coordinating outreach, capacity-building, cooperation and technical assistance activities.
- The Asia-Pacific Space Cooperation Organization (APSCO): training courses on various topics have been provided.
- The Copernicus Emergency Management Service (EMS): detailed information has been provided in relation to emergency situations in Mexico, such as floods in 2020, forest fires in 2021 and 2022 and floods caused by natural disasters.

Paraguay

[Original: Spanish]
[19 October 2023]

Space development activities in the Republic of Paraguay, with a focus on international cooperation as a pillar of the space community, are covered by the second stage of the ongoing Paraguay in Space project, which involves the development of the second Paraguayan satellite. The satellite will be called GuaraniSat-2 and will be a three-unit CubeSat; its purpose will again be academic and experimental, and a number of space agencies and institutions are expected to be involved.

The Paraguay Space Agency (AEP) continues to focus on capacity-building in all areas of the space sector through the establishment and enhancement of laboratories, such as the Space Systems Laboratory Network (SPACELab) and the Earth Observation and Geographic Information Systems Laboratory (GEOLab), to provide infrastructure for the development of a sustainable domestic space programme, as well as applications of space science and technologies.

For several years, AEP has been working in the area of disaster risk reduction and response management, assisting the Secretariat for National Emergencies of Paraguay and other national institutions.

AEP has benefited from the invaluable cooperation of the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER), with a number of activities and training courses aimed at supporting the work of GEOLab in order to build its capacities.

The Disasters programme area of the National Aeronautics and Space Administration (NASA) of the United States of America has also provided significant assistance in providing information on fires and floods, and Paraguay is working together with other institutions on annual fire and flood monitoring campaigns to improve decision-making based on geospatial data. AEP has once again been selected as a global partner of NASA in the NASA International Space Apps Challenge, along with other prestigious space agencies.

As part of World Space Week, the Paraguay Space Agency organized its traditional annual event, the seventh Paraguay Space Conference, on 4 October 2023.

AEP continues to strengthen its international cooperation through projects with cooperating organizations, such as the Japan International Cooperation Agency, with the aim of contributing to the building of national capacities in the space sector, notably in the areas of work of AEP and the GEOLab and SPACELab laboratories relating to Earth observation and the development of space systems, promoting decision-making based on geospatial data and strengthening the country's social, economic, scientific and technological development. This is the first such project with the Japan International Cooperation Agency in the region.

AEP participates in a number of space-related forums, such as the International Astronautical Federation, in which the representative of Paraguay chairs the Committee on Connecting Emerging Space Ecosystems, the International Academy of Astronautics and the World Space Week Association, as well as the Space Generation Advisory Council, as a member of the Advisory Board, and the Group on Earth Observations, as a member of the Executive Committee. Paraguay is also co-chair of AmeriGEO.

Russian Federation

[Original: Russian]
[17 October 2023]

Space activities in the Russian Federation are carried out in accordance with the Space Activities Act of the Russian Federation and other relevant guiding documents.

As at 1 September 2023, nine Russian space rockets had been launched for the purpose of launching satellites for socioeconomic and scientific applications and educational and commercial programmes. A total of 57 such satellites have been launched, including 48 small satellites (cube satellites and picosatellites). Of the satellites launched, 9 were for socioeconomic and scientific applications and 48 were for educational and commercial programmes (45 Russian satellites and 3 foreign satellites).

Piloted space flight programmes have been implemented and the country's international obligations with respect to the operation of the International Space Station (ISS) have been fulfilled. As part of the programme for 2023, one crewed Soyuz-MS transport vehicle and three Progress-MS cargo spacecraft have been launched. The Government of the Russian Federation has approved the extension of the country's participation in the ISS project to 2028.

The GLONASS orbital constellation of 26 satellites has continued to operate and support has been provided for the necessary ground infrastructure.

The Gonets-D1M multifunctional system of personal satellite communications, comprising 18 Gonets-M satellites in low Earth orbit, remains in operation.

The Earth remote sensing orbital constellation comprised 14 satellites, of which 1 satellite was for natural resource monitoring, 7 were hydrometeorological satellites and 6 satellites were for the real-time monitoring of human-caused and natural disasters.

In the area of fundamental space research, the following main activities have been carried out in 2023:

- Scientific data have been obtained from the Spektr-RG space X-ray observatory following the successful launch of the observatory in 2019
- Scientific experiments have been performed using Russian instruments aboard the foreign spacecraft WIND, Lunar Reconnaissance Orbiter, Mars Odyssey, Mars Express, BepiColombo and the Mars rover Curiosity of the National Aeronautics and Space Administration (NASA) of the United States of America
- The science programme of the ExoMars 2016 mission has been carried out using the Russian neutron telescope FREND aboard the Trace Gas Orbiter spacecraft

In July 2023, the Luna-25 space probe was launched. It reached lunar orbit within six days. Although the Luna-25 mission has not yet been completed, all the data obtained will be used in the implementation of the Russian lunar programme.

As part of the work of the Joint Committee on Space Cooperation of the BRICS countries (Brazil, Russian Federation, India, China and South Africa), discussions were held in July 2023 on the results and practical relevance of the Committee's work to implement the cooperation agreement on the BRICS remote sensing satellite constellation. That work has made it possible to significantly enhance the capacity of all BRICS members and associations to tackle the problems of global climate change, mitigate the impact of emergency situations, protect the environment and ensure sustainable socioeconomic development.

On the margins of the second Russia-Africa Summit and Economic and Humanitarian Forum in Saint Petersburg, Russian Federation, talks were held with representatives of a number of African countries on potential areas for bilateral cooperation in outer space activities.

Togo

[Original: French]
[20 October 2023]

The Applied Remote Sensing and Geoinformatics Laboratory was created at the University of Lomé in accordance with Decree No. 61/UL/P/SG/2022. It is based at the ED730-LH Doctoral School for Literature and Humanities at the University of Lomé. Its purpose is to develop skills, provide training and carry out research in the field of geomatics. It is also aimed at carrying out projects and providing services within the framework of national and international partnerships, as well as creating geospatial data for bodies requesting such data. Accordingly, the Laboratory works in three areas: teaching, research and serving the community.

Teaching

The teaching area is focused on training. To that end, the Laboratory is piloting a master's degree in applied geomatics, which provides students with training in the sciences of space observation and analysis in general, and in the use of related technologies, including optical and radar remote sensing in particular. As the Laboratory's name suggests, particular emphasis is placed on remote sensing. Much of the course content covers the physical bases (electromagnetic radiation, spectral windows, interaction of electromagnetic radiation with matter, data acquisition, etc.) of remote sensing and the use of data from such space platforms (satellites), as well as the orbits used.

The training also covers the methodological and technological foundations of space data processing and analysis. These include the processing and analysis of digital remote sensing images, geometric and radiometric corrections, information

processing and extraction, arithmetic processing, filtering, index calculation and classifications.

The courses also address the environmental problems caused by spacecraft in terms of the debris left in space, as part of an awareness-raising effort in anticipation of the future development of a line of research dedicated entirely to the design and launch of satellites.

Research

In terms of research, in the absence of appropriate complementary equipment, the focus of the Laboratory is on the application of geospatial technologies to resolve problems related to the environment and to land and its development, in particular land use and socioenvironmental dynamics, using geographic information systems to manage such data. These applications cover natural, urban, agricultural, rural and wetland environments.

As the Laboratory does not have its own satellite, it is currently dependent on satellite images produced by private and public bodies in Europe, the United States of America and Asia, in particular the Sentinel and Landsat programmes, which are by far the platforms whose data are most widely used.

Mechanisms for publishing these spatially referenced data online and conducting web mapping are also aspects being explored and developed by the Laboratory. Another of the major techniques used to acquire geographic information is geopositioning. This provides a spatial dimension to geographic information, making it possible to take positioning measurements on the surface through geometric means used to measure the relative positions of certain points (topometry), as well as through satellites (geolocation and navigation by means of a satellite system – (global navigation satellite systems (GNSS)).

However, the Laboratory is currently waiting for a data-receiving station, the functionalities of which could enable the detection of space objects and debris. This will be the first step in an ambitious and technologically cutting-edge aerospace project aimed at developing and launching satellites “made in Togo” by a team of researchers from the University of Lomé in the near future.

Serving the community

The Laboratory works in collaboration with other geomatics bodies and firms. These entities contribute to research and the resolution of social and environmental problems through the use of remote sensing and geographic information systems, and include the following:

- Tech-Innovation
- Geomadev
- Togo Climatology Association
- Hi-Tech Informatique-Lomé
- EARTH Consulting & Services

This collaboration takes the form of participation in expert assessments, training and research.

Ukraine

[Original: English]
[6 November 2023]

In 2023, Ukraine participated in the following international projects:

- Antares: as part of the project, Ukrainian enterprises are producing the main structure of the first stage of the Antares launch vehicle, which was developed by the United States company Orbital ATK on the order of the National Aeronautics and Space Administration (NASA) of the United States of America for the delivery of cargo to the International Space Station. This year, as at the beginning of October, two launch vehicles have been launched from the Wallops Island spaceport in the United States.
- Vega: within the framework of the European Space Agency (ESA) project, Ukrainian enterprises are creating, developing and manufacturing the upper stage of the Vega light-class launch vehicle. The main executor of the project is the Italian company Avio. This year, as at the beginning of October, one Vega launch vehicle was launched from the Kourou spaceport.

In the area of international cooperation, the development of cooperation with the European Union, ESA and the countries of North America and Europe remains a priority. India, Japan, Türkiye, South Africa, the United Arab Emirates and Mexico are also important partners of Ukraine in the space sphere.

Work with Canada on the creation of a launch complex for space launches in the Canadian Province of Nova Scotia continued, in the form of cooperation between Ukrainian enterprises and the Canadian company Maritime Launch Services.

On 21 April 2023, a meeting was held between the Deputy Chairman of the State Space Agency of Ukraine (SSAU), Volodymyr Mikheev, and the NASA Administrator, Bill Nelson, at NASA headquarters in Washington, D.C., with the aim of promoting the development of cooperation between Ukraine and the United States in the space sphere. During the meeting, a joint statement on cooperation in the field of peaceful space was signed between SSAU and NASA.

Cooperation with NASA has been ensured, in particular practical cooperation under the Artemis programme. To coordinate work in this area, together with the Ministry of Education and Science and the National Academy of Sciences of Ukraine, the work of the relevant working group was supported to prepare proposals for the above cooperation.

Since March 2023, the activities of multilateral working groups have been launched to coordinate interaction between the signatory countries of the Artemis Accords on the Principles for Cooperation in the Civil Exploration and Use of the Moon, Mars, Comets, and Asteroids for Peaceful Purposes.

SSAU regularly participates in meetings of working groups, which are held online on a monthly basis. In addition, a representative of SSAU took part in the seminar of working groups within the framework of the Artemis programme, which was held from 18 to 22 June 2023 in Gdansk, Poland.

The priority direction of international integration in the space sphere for Ukraine is involvement in the implementation of European space projects, and its subsequent membership of ESA.

On 12 September 2023, Order No. 796 of the Cabinet of Ministers of Ukraine approved the action plan for the country to become a member of ESA. Among other things, the tasks outlined in the plan include ensuring the development of cooperation with ESA, the European Union and European Union member States regarding the implementation of projects in the field of space activities.

The priority for the integration of Ukraine into the sphere of space activities of the European Union is for the country to join the European Union Space Programme. Cooperation is implemented under the following components of that Programme: “Copernicus” (remote observation of the Earth) and the European Geostationary Navigation Overlay Service (EGNOS) (space navigation). In particular, the regional data bank for Copernicus was created and operates under the National Space Facilities Control and Test Centre. The negotiation process for the preparation of the draft agreement on the extension of EGNOS to the territory of Ukraine is under way.

In March 2023, a meeting of the Ukraine-European Union working group in the field of space activities was held via video conference between Kyiv and Brussels. During the meeting, the issues of the accession of Ukraine to the European Union Space Programme and the status of and further measures regarding cooperation between Ukraine and the European Union on individual components of the European Union Space Programme were considered.

In Baku on 3 October 2023, within the framework of participation in the events of the seventy-fourth International Astronautical Congress, SSAU and the Polish Space Agency (POLSA) signed a joint statement on cooperation on the path of Ukraine to membership of ESA. The joint statement attests to the parties’ mutual interest in expanding cooperation and in strengthening bilateral relations, to the aspirations of Ukraine to become a member of ESA, to support for SSAU in certain activities and to steps that will contribute to the dialogue between Ukraine and ESA.

Uruguay

[Original: Spanish]
[11 October 2023]

Uruguay created the Centre for Aeronautical and Space Research and Dissemination through Decree No. 607/975 of 5 August 1975. The Centre is an official agency under the authority of the Uruguayan Air Force and is tasked with researching and promoting the study of aeronautical and space-related topics, thus helping, as a global pioneer, to create public awareness of the importance of those subjects.

The Centre promoted Uruguayan membership of the Committee on the Peaceful Uses of Outer Space, to which the country was admitted as a voting member in 1981.

In 1985, the Centre became a member of the International Astronautical Federation.

It participated in the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE II), presenting, at the request of the Secretary-General of the United Nations, its National Monograph, the country’s first space policy document. It also took part in the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III) and the fiftieth anniversary of the United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE+50).

With regard to technology, the foundations were laid for the use of remote sensing technologies with the creation of the Aerospace and Remote Sensors Service in accordance with Decree No. 369/991 of 16 July 1991. The Service’s main aim is to guide, carry out, supervise, develop and coordinate all activities related to the application of aerospace and remote sensor technologies in order to support the work of the Air Force.

With regard to legal matters, our country has ratified the five international space law treaties.

At present, one of our country’s priorities is to unify long-term national space policy through a single entity, which will make it possible to develop space technology applications, thus contributing to the economic, social and cultural development of Uruguay.

Although there are several agencies within the Uruguayan institutional framework that are involved in space-related issues, it is important to bring them together in order to centralize projects and efforts for the benefit of the population.

National regulatory development project

The Uruguayan Air Force is currently working on developing a regulatory framework for a space agency.

To that end, it established a space affairs commission in 2020. Since then, coordination efforts have been initiated and links established between various domestic public and private actors, as well as with other space agencies around the world, in recognition of the fact that international cooperation is of great importance to developing countries.

Four draft texts have been promoted:

- Decree on the creation of a space policy board, approved by the executive branch on 7 March 2022 (Decree 71/2022)
- Decree on the National Registry of Objects Launched into Space

The two decrees are complementary and are aimed at addressing the gap in the country's domestic legislation, in compliance with the international agreements to which Uruguay is a party.

- Bill on the creation of a space directorate within the Uruguayan Air Force

The bill is aimed at fulfilling the need for a specific body responsible for addressing defence issues, bringing together and developing technical capabilities related to the space applications required by the Air Force to carry out its duties. It takes into consideration those matters of greatest interest to the defence bodies, such as intelligence, surveillance, reconnaissance, emergency management and the security of space operations, defining those matters as falling within the exclusive competence of the defence bodies in the interest of the State.

- Bill on the creation of a Uruguayan space agency under the Office of the President of the Republic

The bill takes into account the most recent recommendations of the United Nations General Assembly on national legislation. From an administrative perspective, the purpose of the bill is to meet the need for consistency and transparency in the authorization and supervision of space activities.

Spaceport project

The private sector has shown an interest in investing in projects in Uruguay involving the launch of rockets to transport small satellites into space. The State has begun to analyse the legal and technical feasibility of developing a spaceport zone in the national territory, as the country needs to have adequate regulations and to strengthen its capabilities in relation to the establishment and operation of launch sites.

The Air Force thus considers it necessary to draw up a report and technical guidance in the area of space engineering that will serve as a basis for such regulations.

The production of satellites of different sizes has begun in the country, and new companies interested in satellite services have been identified, which indicates the likelihood of a sector cluster being established in Uruguay.

For launches from a spaceport, Uruguay would initially be at an advantage in the region as it has a coastline extending more than 100 kilometres, which, owing to its position, would allow eastward launches (polar and equatorial orbits) to be carried out without space objects entering Argentine or Brazilian airspace.

At present, the “value proposition” of Uruguay for the launch of small satellites includes:

(a) Launches into polar and equatorial orbits from the same point, without the involvement of neighbouring countries; delivery of the Space Infrastructure Fund;

(b) Institutional robustness, social, political and economic stability, and the absence of adverse climate events;

(c) Ease of doing business, logistics hub and tax incentives;

(d) World-class telecommunications and a dynamic innovation ecosystem.

The potential location of a spaceport in Uruguay would be a milestone in making the development of the sector viable and makes it essential to have new-generation regulations.

History of international cooperation events

Date	*Event*
20 June 2022	Meeting of leaders of Italian-Latin American Institute (IILA) space agencies in Rome
7–11 February 2023	Space Force delegation visit, United States Space Command
9 April 2023	International Visitor Leadership Program, United States Department of State, for the development of emerging space countries
26–29 April 2023	Mexico Aerospace Fair, Famex, and meeting with the Latin American and Caribbean Space Agency (ALCE)
9–12 May 2023	Second meeting of leaders of IILA space agencies. São Paulo, Brazil. Col. Molina, Cap. García
15 June 2023	Second International Aerospace Conference, Paraguay
4–5 July 2023	Technical Assistance and Information Exchange Instrument (TAIEX) Workshop on European Union-Latin America and Caribbean Space Cooperation. Buenos Aires
11–15 September 2023	School on Suborbital Flight, Taranto, Italy, with the support of IILA and the Embassy of Uruguay in Rome

These activities demonstrate the continued commitment of Uruguay to space exploration and development, as well as its active participation in international collaboration activities. Uruguay looks forward to continuing to contribute to the growth and development of the global space community.