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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. In the report on its fifty-first session, 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.105/1065, para. 29).

2. In a note verbale dated 31 July 2014, the Secretary-General invited States members of the Committee on the Peaceful Uses of Outer Space to submit their reports, by 20 October 2014. The present note was prepared by the Secretariat on the basis of reports received in response to that invitation.

II. Replies received from Member States

Japan

[Original: English]
[13 November 2014]

International cooperation in the peaceful uses of outer space: Japan's activities

Participation in the International Space Station programme

The International Space Station (ISS) programme is the largest international science and technology programme ever attempted in the new frontier of space. The ISS programme has been pursuing the further utilization of outer space and will continue to improve the quality of our lives. Japan has been participating in this iconic international cooperation programme for the peaceful use of outer space from the beginning. One of the notable elements is the Japanese Experiment Module "Kibo", which has been utilized to conduct various national and international on-orbit experiments. Another notable element is the H-II transfer vehicle (HTV), also known as "Kounotori", and the preparation made for the fifth HTV flight to ISS in 2015.

Japanese astronaut Koichi Wakata completed his 188-day stay on ISS in May 2014. Having become the first Commander from an Asian country on 9 March 2014, he led the on-board operations and utilization activities of the ISS programme driven by the 15 nations. Kimiya Yui has been assigned as an ISS crew member for the 44th/45th expedition mission scheduled for 2015, and Takuya Onishi will follow them as a crew member for the 48th/49th expedition mission, scheduled for 2016.

Japan has been strongly committed to the utilization of the space environment on ISS. The Japanese Aerospace Exploration Agency (JAXA) implemented various experiments in 2014, including the seventh and eighth protein crystal growth experiments and aquatic life experiments. JAXA also promoted the utilization of the KIBO Exposed Facility, including the Monitor of All-sky X-ray Image (MAXI) and the deployment of CubeSats. CubeSat deployment has been gaining popularity in recent years, particularly among nations that have recently undertaken space utilization. All these activities benefit people around the globe.

The Kibo Utilization Office for Asia (KUOA) has been collaborating with space agencies participating in the Asia-Pacific Regional Space Agency Forum (APRSAF). At the moment, KUOA is preparing for a series of "Try zero-G" space experiments for young researchers and engineers, scheduled for early 2015.

Space transportation

The first Epsilon launch vehicle (Epsilon-1), with the Spectroscopic Planet Observatory for the Recognition of Interaction of Atmosphere (Hisaki) on board, was launched in September 2013. Hisaki is the world's first space telescope for remote observation of planets such as Venus, Mars and Jupiter from orbit around the Earth.

Space exploration

JAXA is now preparing Hayabusa-2, the next sample-return mission to a carbonaceous asteroid, to be launched on 30 November 2014, with an expected arrival at the target asteroid in 2018 and an expected return to Earth in 2020.

Japan will contribute to global discussions for future international space exploration, and Japan is honoured to host the next International Science and Engineer Fair in Japan, scheduled to take place in 2016 or 2017.

Remote sensing

Japan has been intensively promoting the utilization of Earth observation satellites data through international frameworks such as the Group on Earth Observations and the Committee on Earth Observation Satellites (CEOS). JAXA will act as chair of CEOS in the next year, as well as leading an Earth observation event at the upcoming third United Nations World Conference on Disaster Risk Reduction. As a part of the coordination contributed by Japan, the seventh Global Earth Observation System of Systems Asia-Pacific Symposium was held in Tokyo from 26 to 28 May 2014. The Symposium focused on the benefits for society of the evolution of the Global Earth Observation System of Systems towards addressing the United Nations global sustainable development goals.

The Global Change Observing Mission (GCOM) allows long-term and ongoing observations that are essential to understanding the effects of climate change over many years. The GCOM mission consists of two series of satellites: GCOM-W for observing water circulation changes and GCOM-C for observing climate changes. JAXA successfully launched GCOM-W (Shizuku), in May 2012. GCOM-W observes water cycle mechanisms, such as water vapour and liquid, ocean wind velocity, sea surface temperature and snow extent and depth. As the name implies, GCOM contributes to monitoring climate changes around the world. For example, in September 2012, Shizuku observation data showed that the sea ice extent in the Arctic Ocean had become the smallest in observation history. GCOM-C, which is scheduled to be launched in 2016, will observe surface and atmospheric parameters related to the carbon cycle and radiation budget, such as clouds, aerosol, seawater colour, vegetation, snow and ice.

The Global Precipitation Measurement (GPM) mission is an international constellation of satellites that aims to achieve highly accurate and frequent global rainfall observation. The mission was initiated by JAXA and the National

Aeronautics and Space Administration (NASA) of the United States of America, and comprises a consortium of international space agencies. The GPM core observatory was successfully launched by the H-IIA launch vehicle on 28 February 2014, carrying the Dual-frequency Precipitation Radar, which was developed by JAXA and the National Institute of Information and Communications Technology, and the Global Precipitation Measurement Microwave Imager, provided by NASA. GPM data will be distributed to user organizations in near real time. It is expected to be of use in operational fields and hydrometeorological disaster mitigation, such as the prediction of floods and improvement in the accuracy of numerical weather and typhoon forecasting, as well as in research fields such as the elucidation of climate and water cycle variations. JAXA has completed calibration activities during the initial calibration/validation phase to improve data accuracy and started data distribution to the public through the JAXA Earth observation satellite data distribution service, G-Portal.

With respect to monitoring greenhouse gases from space, the Greenhouse Gases Observing Satellite (GOSAT or Ibuki), the joint mission of the Ministry of the Environment, the National Institute for Environmental Studies and JAXA, launched in January 2009, can accurately observe the concentration distribution of global greenhouse gases in the atmosphere. In October 2011, for the first time in the world, the Ministry of the Environment, the National Institute for Environmental Studies and JAXA quantitatively demonstrated the effectiveness of the application of satellite data to the observation of greenhouse gases. Japan is developing the GOSAT-2 satellite.

With regard to monitoring of forests and carbon tracking, following the successful Advance Landing Observation Satellite (ALOS) with phased array type L-band synthetic aperture radar (PALSAR) observation, which can detect forest and non-forest areas and measure the amount of above-ground forest biomass, the Advanced Land Observing Satellite-2 (ALOS-2 or Daichi-2) with the state-of-the-art phased array type L-band synthetic aperture radar (PALSAR-2) was successfully launched by the H-IIA launch vehicle on 24 May 2014. ALOS-2 enables wide-swath and high-resolution observation compared to its predecessor; thus, it will further contribute to global forest monitoring, as well as disaster, land, agricultural and other types of monitoring.

Lastly, the third United Nations World Conference on Disaster Risk Reduction will be held in March 2015, in Sendai, Japan. The World Conference will review the progress with respect to the Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters and develop the post-2015 framework for action.

International Committee on Global Navigation Satellite Systems

Japan has continuously and actively participated in activities related to the International Committee on Global Navigation Satellite Systems (ICG). In particular, Japan is contributing to promoting utilization of multiple global navigation satellite system (GNSS) constellations by supporting Multi-GNSS Asia, which was established in September 2011. An annual regional workshop of Multi-GNSS Asia, the Sixth Asia-Oceania Regional Workshop on GNSS, was held in Phuket, Thailand, from 9 to 11 October 2014, and was jointly organized by JAXA, the National Science and Technology Development Agency of Thailand, the

Satellite Positioning Research and Application Center, Quasi-Zenith Satellite System Services Inc. and Growing NAVIS and supported by ICG and the International Global Navigation Satellite Systems Service (IGS).

Also, Japan has been promoting the Quasi-Zenith Satellite System and the Multifunctional Transport Satellite (MTSAT) Satellite-based Augmentation System (MSAS). Japan hosted the sixth meeting of ICG and the seventh meeting of the Providers' Forum in Tokyo and will host the twelfth meeting of ICG, in 2017.

Asia-Pacific Regional Space Agency Forum

APRSAF was established in 1993 to enhance space activities in the Asia-Pacific region. Space agencies, governmental bodies and international organizations such as United Nations agencies, as well as companies, universities and research institutes, from over 30 countries and regions, take part each year in APRSAF, which is the largest space-related conference in the Asia-Pacific region.

APRSAF commemorated its twentieth anniversary in 2013. The twentieth session of APRSAF (APRSAF-20) was held in Hanoi from 3 to 6 December 2013 under the theme entitled "Values from space: 20 years of Asia-Pacific experiences", jointly organized by the Vietnamese Academy of Science and Technology, the Ministry of Education, Culture, Sports, Science and Technology of Japan and JAXA. The executive committee of APRSAF is currently working on the renovation of APRSAF, and the twenty-first session of APRSAF (APRSAF-21) will be held in Tokyo from 2 to 5 December 2014, with the new working group framework to contribute to solving common issues in the Asia-Pacific region through APRSAF.

Working groups will be updated after the twenty-first session of APRSAF, in the following areas: the Space Application Working Group (originally, the Earth Observation Working Group), Space Technology Working Group (originally, the Communication Satellite Applications Working Group) and the Space Education Working Group (originally, the Space Education and Awareness Working Group). In addition, the Space Environment Utilization Working Group will expand its activities of International Space Station/Kibo utilization and establish a new sub-session on space exploration. Each working group will deepen inter-working group cooperation.

Plenary sessions will feature keynote speeches and country reports from major Asian space agencies and organizations. Status reports from each working group and the Sentinel Asia (disaster management support system in the Asia-Pacific region), Space Applications For Environment (SAFE), Regional Readiness Review for Key Climate Missions (Climate R3), Asian Beneficial Collaboration through Kibo Utilization (Kibo-ABC) initiatives, as well as a summary of the Sixth Asia-Oceania Regional Workshop on GNSS, will be presented.

Mexico

[Original: Spanish]
[28 October 2014]

In response to the invitation of the United Nations Office for Outer Space Affairs, the report of the Government of Mexico on space activities is presented below.

Mexico promotes international cooperation in the peaceful use and exploration of outer space. International cooperation in the exploration and use of outer space must be guided by peaceful purposes, in accordance with international law. The signing of cooperation agreements is one of the ways to make the most of international cooperation.

To date, the Government of Mexico, through the Mexican Space Agency, has concluded agreements with France, Germany, Italy, Ukraine, the United Kingdom of Great Britain and Northern Ireland and the United States of America on such matters as cooperation, development of human capital and technology transfer.

From 20 to 23 October 2014, the third United Nations/Mexico Symposium on Basic Space Technology was held in Ensenada, Baja California, focusing on the region of Latin America and the Caribbean and coordinated by the Center for Scientific Research and Higher Education and the Mexican Space Agency on behalf of the Government of Mexico.

The main objectives of the Symposium were, inter alia:

(a) To examine capacity-building in basic space technology and opportunities for regional and international collaboration;

(b) To analyse the implementation of small satellite programmes, including in the field of Earth observation, disaster management and early warning systems;

(c) To address issues relating to the regulation of programmes to develop space technology, including frequency allocation and the mitigation of space debris in order to ensure the long-term sustainability of space activities.

Mexico will host the International Astronautical Congress in 2016 in Guadalajara, Jalisco. The Congress will secure a prominent position for Mexico in the international space sector and enable it to establish strategic alliances with respect to space-related issues.

Norway

[Original: English]
[11 November 2014]

Norway has long traditions in space, largely due to its northern latitude. The country has leading scientists within several space-related fields, and is an established user of satellite communication, satellite navigation and Earth observation. Norway also has an internationally competitive space industry. This paper is a short summary of Norwegian space-related activities.

Space research

Norwegian space science is concentrated within relatively few areas. This concentration is necessary due to limited resources, both in funding and personnel. The main scientific activities are within middle and upper atmospheric physics, solar physics and cosmology.

Andøya is important for space science in Norway, with a launching site for scientific rockets, as well as the international Arctic Lidar Observatory for Middle Atmosphere Research facility, which uses lidars to study the middle and upper atmosphere. At Tromsø and on Svalbard, European Incoherent Scatter Scientific Association radars probe the nature of the ionosphere.

Norwegian solar scientists are active in several international space projects and are deeply involved in the ongoing Solar and Heliospheric Observatory (SOHO) project of the European Space Agency (ESA) and the National Aeronautics and Space Administration (NASA) of the United States of America. The scientific data from the Japanese Hinode mission are downlinked to the Svalbard and Troll ground stations, and processed and distributed at a European data centre at the University of Oslo. Norwegian scientists are also involved in the NASA solar mission, the Solar Dynamics Observatory, launched in 2010. The most recent solar mission, the Interface Region Imaging Spectrograph (IRIS), was launched in June 2013, with a significant Norwegian contribution in data analysis and theoretical modelling of the solar atmosphere, as well as providing downlink of data via the Svalbard Satellite Station.

Norwegian scientists participate in nearly 20 experiments on board spacecrafts, including research on particle currents, electric fields, X-ray radiation and dust. This includes the Cluster mission, a constellation of four satellites flying in formation around the Earth to provide a three-dimensional map of the magnetosphere. The University of Bergen is developing a camera for the Atmospheric Space Interactions Monitoring Instrument (ASIM), which will be mounted on the International Space Station. ASIM is designed to study the mysterious lightning phenomena high in the Earth's atmosphere called "sprites", "jets" and "elves". Norwegian space scientists also participate in international projects such as Planck, Rosetta and the upcoming ESA missions Euclid and Solar Orbiter.

The Norwegian Mapping Authority also actively contributes to the International Earth Rotation Service and Reference Systems Service through analysis of Global Positioning System (GPS) and very-long-baseline interferometry (VLBI) measurements. A major upgrade of the Svalbard VLBI observatory is ongoing.

Additionally, Norway is involved in microgravity research. The University of Tromsø conducts research in dust formation in space and the upper atmosphere and will take part in an experiment to produce such dust on board the International Space Station. The Norwegian University of Science and Technology is also conducting plant research on the International Space Station and also hosts the user support operation facility for one of the key experiments on board the Station.

Earth observation

Norway has for many years focused on the development of Earth observation applications for maritime and polar areas. National user needs have been the driving force, furthered by close cooperation with major users, research institutes and industry. An example is radar satellite images, which have become an essential tool for the management of Norway's vast maritime areas, especially in combination with Automatic Identification System (AIS) data. Radar satellites are also used in the study of the melting of permafrost and in monitoring areas in danger of rockslides or tsunamis. Norway is an active member of the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT).

Kongsberg Satellite Services operates satellite stations at Svalbard, Tromsø and Grimstad and in Dubai, South Africa and Singapore, as well as at the Troll station in Antarctica. These ground stations support a large number of both national and international satellites and offer near-real-time services. The stations have a very high level of reliability of services.

Industry

Norwegian industry is involved in, among other activities, the International Space Station, the Ariane 5 launchers, space telescopes and satellites for Earth observation, communication and navigation. Key companies within the Norwegian space industry are Telenor and the Kongsberg Group. In 2013, the Norwegian space industry had a turnover of about 6.3 billion Norwegian krone, of which about 70 per cent was from exports.

Communications

Telecommunications account for the lion's share of the Norwegian space industry, generating two-thirds of the sector's annual turnover. Telenor is the principal company, with services and products for mobile satellite communications (Inmarsat), television broadcasting and, increasingly, satellite systems for multimedia and broadband. Several Norwegian companies are active in the market for maritime satellite communications.

Ship traffic and oil spill detection

Norway's first satellite for space-based AIS ship traffic monitoring, AISSat-1, was launched in 2010. It is still in operation and has provided the first maps of annual ship traffic in the Arctic. The satellite has proved to be a great success. AISSat-2 was successfully launched in July 2014.

Kongsberg Satellite Services provides satellite-based monitoring and rapid reports of illegal discharges and accidental oil spills at sea. The combination of AISSat-1 ship identification and the detection of oil spills through use of radar satellites is a powerful tool for identifying polluters.

Satellite navigation

With its vast land areas and territorial waters, low population density and sub-Arctic to Arctic location, Norway benefits immensely from the GPS satellite navigation system.

Norway takes part in Galileo through its membership in ESA, as well as through cooperation agreements with the European Union.

Infrastructure

Norway's high latitude is a valuable asset for its space activities. Norway, particularly northern Norway and Svalbard, has geographical advantages with respect to the observation of northern lights and communication with polar-orbiting satellites.

Rockets launched from the Andøya rocket range are well suited to studying phenomena related to Sun-Earth interactions, as Andøya lies under the middle of the magnetic belt around the North Pole, where auroral activity peaks. Scientists can use sounding rockets launched from Svalbard to study the interactions of the solar wind with the polar magnetic cusp near the magnetic north pole.

Northern Norway and Svalbard are well located for studying the processes taking place in near-Earth space above the Arctic. Those processes can provide indications of global climate changes. The Kjell Henriksen Observatory at Svalbard is one of the world's leading facilities for observation of the northern lights.

Polar-orbiting satellites pass near the North and South poles 14 times a day. The SvalSat ground station on Svalbard is ideal for spacecraft control and for downloading data, because the station can see all 14 daily orbits of the satellite. With the added capacity of the Troll ground station at Queen Maud Land in Antarctica, Norway possesses a pole-to-pole downlink capability.

Space debris

Norway contributes actively to space debris monitoring and takes part in the ESA programme on space situational awareness. The possible role of the European Incoherent Scatter Scientific Association research radar system in this context is being explored.

Spain

[Original: Spanish]
[24 November 2014]

Review of international mechanisms for cooperation in the exploration and peaceful use of outer space

Spain attaches the utmost importance to international cooperation in space matters. For more than 50 years, it has been continuously engaged in cooperation in outer space affairs with other States and international organizations and continues to conduct most of its space activities in collaboration with other States. As the local aerospace industry has been developing, national projects have also been

undertaken, but Spain is aware of the tremendously positive impact that international cooperation has always had and continues to have on the development of the Spanish aerospace sector.

Multilateral cooperation

A large number of the space activities of Spain are carried out within the framework of multilateral cooperation. Within the United Nations, Spain has been a member of the Committee on the Peaceful Uses of Outer Space since 1980. Moreover, Spain is a party to four of the five United Nations treaties on outer space: the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (Outer Space Treaty) of 1967; the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (Rescue Agreement) of 1968; the Convention on International Liability for Damage Caused by Space Objects (Liability Convention) of 1972; and the Convention on Registration of Objects Launched into Outer Space (Registration Convention) of 1976. All of those treaties, which were published at the time of their adoption in the *Boletín Oficial del Estado* (Official Gazette), are considered to constitute law applicable in Spain.

Spain is also a member of the International Telecommunication Union and, as such, is a party to the Union's two basic treaties: the Constitution and Convention of the International Telecommunication Union, the current version of which dates back to 1992. Within the field of satellite telecommunications, Spain is a member of the International Telecommunications Satellite Organization (ITSO, formerly INTELSAT), the International Mobile Satellite Organization (IMSO, formerly the International Maritime Satellite Organization (INMARSAT)) and the European Telecommunications Satellite Organization (EUTELSAT-IGO, formerly EUTELSAT), having ratified at the time of their adoption the conventions and operating agreements, as well as the subsequent amendments thereto, that privatized the assets of those three organizations and modified their internal structure in order to adapt to reform. Spain has also participated since 1992 in the International Satellite System for Search and Rescue (COSPAS-SARSAT), a system of satellites used for search and rescue in cases of shipwreck and other emergencies, contributing to the programme a part of the ground segment.

Within the European Union, of which it has been a member State since 1986, Spain plays a key role in the Galileo satellite navigation system and the Copernicus Earth observation system. Furthermore, Spanish universities and companies are participating to a growing extent in the successive framework programmes for science of the European Union.

Spain plays an even more prominent role as member of the European Space Agency (ESA). In that regard, it should be recalled that Spain has participated from the outset in the European space effort, becoming a member of the European Space Research Organization, one of the then two regional space institutions, in 1964. Once both the European Space Research Organization and the parallel organization dedicated to launchers (the European Launcher Development Organization) were replaced by the new European Space Agency, Spain became a founding member of ESA on ratifying the convention of 1975 that established the Agency. Owing to that role in ESA, Spain was one of the 18 nations that participated in the construction of

an orbital research laboratory, Spacelab, for launch aboard the National Aeronautics and Space Administration (NASA) Space Shuttle.

In 1986, Spain established a public entity, the Centre for Industrial Technological Development, dedicated to managing and promoting the participation of Spanish companies in the Agency's programmes. Spain is active in all ESA programmes, from space science to Earth observation, microgravity experiments, telecommunications, etc. In addition, a Spanish astronaut (Pedro Duque), who has travelled to outer space twice, both times on international cooperation missions, has been part of the European astronaut corps. As of 2014, Spain is the sixth largest net contributor to ESA, providing 139 million euros or approximately 5 per cent of the budget. ESA has two key facilities on Spanish soil: the European Space Astronomy Centre in the Madrid region and a deep space tracking station in Cebreros.

Through ESA, Spain is one of the 15 States participating in the International Space Station. Spanish companies have contributed to the construction of many objects that are part of the hardware of the International Space Station. In order to make that participation possible, Spain ratified the International Space Station Intergovernmental Agreement of 1998. Both the Intergovernmental Agreement and all other agreements and memorandums of understanding that accompany it constitute law applicable in Spain. The Agreement is an excellent legal framework that can serve as a model for future international initiatives relating to cooperation in outer space affairs.

Spain is also a founding member and an active member of another European space agency, the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT), established in 1986.

Bilateral cooperation

At the bilateral level, Spain has maintained a very close relationship with the United States of America since 1960, maintaining permanent space cooperation treaties since that date to the present. Those treaties have been of great importance to both parties, allowing the United States to establish on Spanish territory several space stations for tracking both manned and unmanned space vehicles and benefiting Spain through the training of numerous technical staff trained to manage those stations.

Specifically, the NASA stations located in Maspalomas (1960), Cebreros (1966) and Fresnedillas (1967) had a prominent role in the first United States manned programmes: Mercury, Gemini and the Apollo lunar missions. In addition, the Robledo de Chavela tracking station (1964), one of three such stations worldwide that form the NASA Deep Space Network and currently managed jointly with the National Institute for Aerospace Technology (INTA) of Spain, has played a key role in the tracking both of the Apollo lunar missions and unmanned NASA missions to explore the solar system, such as Mariner, Pioneer, Voyager, Viking, Cassini and Mars Exploration Rovers.

The El Arenosillo rocket launch site, which began operating in 1966, was also the fruit of a cooperation agreement between Spain and the United States. Over the years, both the United States and various European countries have made use of the launch facility, which remains in operation today. The launch of the first Spanish satellite, Intasat, was also the result of a cooperation agreement between INTA and

NASA. The satellite was built in Spain and was launched aboard a Delta rocket from the United States in 1974.

A further noteworthy aspect of space cooperation between Spain and the United States was the memorandum of understanding signed by the two countries in 1983 and elevated to the status of international treaty in 1991, which allowed the Space Shuttle to land in case of emergency in certain Spanish airports (Morón and Zaragoza). This bilateral agreement referred to and was fully compatible with the Outer Space Treaty and the Rescue Agreement.

Lastly, the Astrobiology Centre (CAB) in Torrejón de Ardoz (Madrid) maintains close ties with NASA since it is an associate partner of the NASA Astrobiology Institute. It was as a result of those ties that, through a specific bilateral cooperation agreement, Spain participated in the NASA Mars Science Laboratory mission, CAB providing the Rover Environmental Monitoring Station (REMS), which has been operating aboard the robot Curiosity since its landing on Mars in 2012. A high-gain antenna enabling direct communication between Curiosity and the Earth was also built in Spain.

In 2006, Spain concluded another important bilateral treaty on cooperation in outer space affairs with the Russian Federation. That instrument can be considered a model framework treaty since it covers multiple aspects of space cooperation both at the Government level and between private entities, and activities relating both to launches and to the exploration and use of outer space, whether scientific or commercial.

The treaty establishes the conditions governing the conclusion of subsequent agreements and specific contracts relating to each of the activities covered by the treaty. Thus, the treaty provides for the planning and implementation of joint programmes and projects; regulates the exchange of scientific and technical information among the parties, including the protection of confidential information and intellectual property rights; adopts the principle of cross-waiver of liability, which is typical of joint space projects; and facilitates the customs clearance of staff and the import and export of space materials between the two countries; as well as the provision of technical assistance and mutual access to national and international programmes and projects involving each of the parties. Disputes are settled amicably through consultations between the parties and, if necessary, referral to an arbitral tribunal agreed upon by both parties.

International cooperation at the level of entities and companies

No less important are the activities of Spanish entities involving cooperation with private companies and other entities of other countries. Some examples of such cooperation are set out below.

To date, Spain has launched all of its space objects by means of United States, European (Ariane) and Russian (Soyuz) private launch systems.

Several Spanish companies participate in the European consortium Arianespace, which is responsible for marketing Ariane rockets, and contribute directly to the construction of the Ariane launcher.

For its part, Hispasat, the Spanish operator of telecommunications satellites, has built all of its satellites in collaboration with European and United States

companies and has a subsidiary company in Brazil to market the services of the Amazonas transatlantic satellite system.

The Swiss company, Swiss Space Systems (S3), together with several Spanish aerospace companies, has in recent months established a private consortium that plans to launch manned suborbital flights, as well as small space objects into Earth orbit, from Spanish territory (the Canary Islands).

A number of satellites manufactured in Spanish universities are involved in the so-called QB50 project to launch 50 small satellites (including CubeSats and nanosatellites), led by the von Karman Institute for Fluid Dynamics in Brussels.

Conclusion

Spain supports the adoption, in the future, of appropriate international measures to promote transparency in outer space activities. It also supports the development of multilateral regulations that ensure the long-term sustainability of outer space activities, such as the European Union proposal for a code of conduct governing the activities of States in outer space.

For Spain, international cooperation in space matters is essential both in order to ensure the long-term safety and security of the space environment and in order to make possible the sustainable development of all countries.