



# General Assembly

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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

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## I. Introduction

1. In the report on its fifty-third 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.105/1109](#), para. 36).

2. In a note verbale dated 29 July 2015, the Secretary-General invited Member States to submit their reports by 17 October 2016. 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

### Denmark

[Original: English]  
[10 October 2016]

#### Annual report on space activities for Denmark 2015

Denmark has signed and ratified four United Nations treaties on outer space: the Outer Space Treaty, the Rescue Agreement, the Liability Convention and the Registration Convention.

#### New Act on outer space

On 11 May 2016, the Danish Outer Space Act was adopted by the Danish Parliament (Folketinget) to implement the United Nations treaties into Danish legislation. The Act entered into force on 1 July 2016. The responsibility for Danish outer space activities is placed within the Ministry for Higher Education and Science. The Minister has issued an executive order with more detailed rules and delegated the main responsibilities to the Danish Agency for Science, Technology and Innovation.

The objective of the Danish Outer Space Act is to ensure that Danish activities in outer space take place on a regulated and safe basis through:

- (a) Approval and supervision of activities in outer space;
- (b) Registration of space objects;
- (c) Clarity of the liability of operators and others for damage and injuries caused by space objects.

The Act covers space activities carried out within the Danish State. Furthermore, the Act applies to space activities carried out outside the Danish State (a) on Danish craft or facilities or (b) by Danish operators.

The Act only applies to activities above an altitude of 100 km above sea level. The scope of the Act does not affect the Danish position in relation to where outer space begins under international law. Operators (both natural and legal persons) that wish to carry out activities covered by the Outer Space Act are required to apply for an approval from the Agency before the activity commences. The operator is requested to notify the Agency at least a year before launch and to send an application at least ten months before the launch.

Pursuant to the Outer Space Act, the Minister is to establish and manage a public registry of space objects. This registry is to contain information about space objects launched into Earth orbit or beyond and for which Denmark is the launching State. The national space registry will be established in 2016. According to the Danish Outer Space Act all previously launched Danish satellites have to be registered before the

end of 2016, both nationally and in the United Nations database, and new space objects will be added after launch.

Operators covered by the Outer Space Act are obliged to compensate for any damage caused by a space object to persons or property on Earth as well as to aircraft in flight. For damage caused by a space object in other situations, the operator is liable under the general rules of Danish law on compensation. Further, the operator may be requested to take out a liability insurance cover of up to 450 million Danish kroner (roughly 60 million euros).

### **The Division for Space**

To improve coordination between authorities and companies involved with space activities a new division, the Division for Space, was established in the Danish Agency for Science, Technology and Innovation in February 2016. The application process concerning approval of space activities and registration of space objects will be handled by the Division for Space, which will also be the future Danish point of contact for the United Nations.

### **Space activities in 2015**

One Danish satellite was launched in 2015: AAUSAT5. The satellite was approved by means of a Provisional Act by the Danish Parliament (Folketinget), since no Danish space authority had been established in 2015.

AAUSAT5 was a student 1U CubeSat from Aalborg University, i.e., the purpose was primarily educational. The AAUSAT5 CubeSat was a pilot project of the European Space Agency (ESA) “Fly your satellite from the ISS!” education programme, an extension of the “Fly Your Satellite!” CubeSats education programme. The most important components were designed by engineering students, e.g., the UHF transmitter, an Automatic Identification System (AIS) receiver of the software-defined radio (SDR)-type and the mission control centre. The satellite was launched on 19 August 2015 in a NanoRacks CubeSat Deployer by a Japanese H-2B launcher on board an HTV cargo vessel to the International Space Station from where it was deployed on 5 October 2015. It decayed during re-entry on 15 March 2016.

Another CubeSat made in Denmark, GOMX-3, was launched on board the same launcher as AAUSAT5, but since the satellite is operated by ESA, it is not regarded as a Danish satellite.

## **Mexico**

[Original: Spanish]  
[14 October 2016]

Mexico, as an emerging country with respect to space activities, gives special attention to the development of regional and international cooperation as a tool for supporting action to achieve national targets.

As a member of the Committee on the Peaceful Uses of Outer Space, it has confirmed and provided information on its cooperation with other member States in space-related matters through the statements it has made at the meetings of the Committee and its Subcommittees. The most recent of those cooperation activities include the following:

#### *Courses and workshops*

- A joint workshop held by the Mexican Space Agency (AEM) and the UK Space Agency to present the project “Earth Observation for the Preservation of the

Ecological Bacalar Corridor: products and platform”, which brings together the efforts of both agencies to focus satellite technology on monitoring of the impact of human activities and protection of the Bacalar ecological corridor in Mexico.

- A joint workshop on best practices in the use of space technology for disaster management, held by AEM and the Indian Space Research Organization (ISRO) and aimed at agencies and entities of the Federal Government of Mexico that are responsible for the preparation of satellite information and products for disaster response and mitigation.
- A workshop on the environment, climate and oceans, the result of cooperation between AEM and the French space agency (Centre national d’études spatiales (CNES)) in joint research in those areas.
- Follow-up to the invitation of the Asia-Pacific Space Cooperation Organization (APSCO) to participate in its satellite data-sharing service platform, as part of efforts to promote cooperation among APSCO members, taking into account the fact that Mexico already has the status of observer member.
- An online course offered by the Bolivarian Agency for Space Activities (ABAE) of the Bolivarian Republic of Venezuela to Mexican government agencies, entitled “Remote-sensing applied to the assessment of the geographical environment of educational establishments”, approved by AEM for the development of applications aimed at space-related training and dissemination of information.

#### *Agreements*

- Signing of an agreement on cooperation between AEM and CNES concerning the stay of a Mexican engineer at the Toulouse Space Centre, France, to build capacity in the area of stratospheric balloons.
- In the context of the visit of the President of Mexico, Mr. Enrique Peña Nieto, to Argentina in July 2016, a framework agreement on space cooperation for peaceful purposes was signed between AEM and the National Commission on Space Activities (CONAE) of Argentina. This agreement will make it possible to undertake new projects among regional partners in such areas as ground infrastructure and Earth observation, for the purposes of both monitoring and conservation of the environment and natural resources and monitoring of climate change.
- Signing of a cooperation agreement between the United Nations and AEM for the purpose of establishing a regional support office in Mexico to implement the activities of the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) programme, contributing to efforts to ensure access to space-based resources for disaster management and emergency response and promoting the use of those resources, particularly in the countries of Latin America and the Caribbean.

#### *Forums*

- Participation in the second Office for Outer Space Affairs — International Civil Aviation Organization symposium on emerging space activities and civil aviation, at which developments, possibilities and challenges with respect to new technologies, especially the regulation that such activities require, were presented.

- Participation in the Space Conference forum, which was organized by the Italian Space Agency (ASI), aimed at bringing together representatives from Latin America, within the framework of the Year of Italy in Latin America, to discuss scientific, technological and industrial cooperation with the region, focusing on the areas of Earth observation and small satellites.
- Participation in the International Air and Space Fair (FIDAE) organized by the Chilean Air Force, at which Mexico gave a presentation on international cooperation in space-related matters and the Mexican perspective, touching on such issues as the importance to AEM of the role played by cooperation with other countries and international entities, as well as challenges and opportunities in the area of South-South cooperation.
- Following the formal handing over of the pro tempore secretariat of the Sixth Space Conference of the Americas to Nicaragua in 2015, Mexico participated in the first meeting of the Seventh Space Conference of the Americas in Managua, providing input on cooperation and space law and playing a supporting role by sharing ideas and experience gained through the hosting of the Sixth Space Conference of the Americas in order to enrich and give continuity to this important regional forum.
- Participation in a round table on international cooperation and capacity-building — held in the framework of the Toulouse Space Show in Paris — at which space cooperation with respect to the development of space activities and the use of outer space was discussed, taking into account the views and expectations of the countries that have recently become involved in the space sector.

Last but not least, Mexico coordinated and participated in the International Astronautical Congress 2016, organized by the International Astronautical Federation (IAF) and held in Guadalajara, Mexico, from 26 to 30 September.

Prior to the Congress, the Office for Outer Space Affairs and IAF held a joint workshop entitled “Workshop on space technology for socio-economic benefits: integrated space technologies and applications for a better society”, the outcome of which met expectations in terms of both participation and content.

Mexico also engaged with the Space Generation Advisory Council through the Space Generation Congress, addressing the topic “UNISPACE+50: the governance of outer space activities”, which was very well received by the young audience in that the importance of the role played by the governance of space activities through the provisions of the United Nations space treaties was recognized, in the light of the approaching fiftieth anniversary, in 2018, of the first United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE+50).

At the 2016 International Astronautical Congress, Mexico was represented at various forums and plenary meetings of the Congress, and was also involved in the coordination of bilateral meetings with the space agencies of Israel (the Israel Space Agency (ISA)), Italy (ASI), Argentina (Comisión Nacional de Actividades Espaciales (CONAE)), the United States of America (National Aeronautics and Space Administration (NASA)), Germany (the German Aerospace Center (DLR)), Poland (through its Space Research Centre (CBK)), the United Kingdom of Great Britain and Northern Ireland (the UK Space Agency), Ukraine (through the Yuzhnoye State Design Office), France (CNES) and India (ISRO).

It should be noted that, within the framework of the Congress, Mexico signed a letter of intent with the Russian State Corporation for Space Activities (Roscosmos) concerning collaboration in such areas as satellite navigation and related technologies and services and protection of the space environment, including with regard to space

debris; it also signed a letter of intent with the Ecuadorian Civilian Space Agency (EXA) to promote collaboration in the areas of development of suborbital vehicles and launches from Mexican space ports, as well as the development of low-orbit microsattellites and nanosatellites for Earth observation and telecommunications.

## Norway

[Original: English]

[14 October 2016]

The majority of Norwegian space activities are carried out through Norway's participation in the space programmes of the European Space Agency (ESA), the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT) or the European Union. Norway is an active participant in European programmes such as Galileo, Copernicus, Meteosat, MetOp and in upcoming ESA scientific missions such as EUCLID and Solar Orbiter. However, there is also some national and bilateral space activity in Norway, which is briefly described below.

Two Norwegian scientific sounding rockets (Maxidusty-1A and Maxidusty-1B) were launched from Andøya Space Center during the summer of 2016. Both launches were successful, and in situ measurements were conducted at altitudes of around 100 km. There is also active use of student rockets for educational purposes at Andøya.

Norway's two microsattellites for ship traffic monitoring, AISSat-1 and AISSat-2, are both performing well. Three more Norwegian microsattellites are expected to be launched in 2017.

Ground stations operated by the Norwegian company KSAT in mainland Norway, Svalbard and Antarctica provide important services for satellite operators from many nations, both during the critical launch and early orbit phase, and in regular operations.

There is much space-related ground-based scientific infrastructure in Norway. The new Super Dual Auroral Radar Network (SuperDARN) radar at Svalbard is part of an international radar network to monitor Earth's upper atmosphere and is useful for monitoring space weather. The radar is co-located with both the Kjell Henriksen Observatory and the European Incoherent Scatter Scientific Association (EISCAT) Svalbard radar, and operated by the University Centre in Svalbard (UNIS). The Kjell Henriksen Observatory is the world's largest optical northern light observatory with 32 different instruments from international institutions.

Norway has bilateral agreements with several other nations regarding space research and applications. Norway makes important contributions to the National Aeronautics and Space Administration (NASA) Mars 2020 Rover and the Interface Region Imaging Spectrograph (IRIS) solar observatory, and to Japan's Hinode solar observatory.

The Norwegian Mapping Authority and Tromsø Geophysical Observatory have important roles in the space weather programme of the European Space Agency. A new geodetic observatory is currently being established at Svalbard.

Many Norwegian research institutes and companies are involved in the development of new and innovative downstream applications of satellite remote sensing data.

The Norwegian company Telenor owns and operates several telecommunication satellites in geostationary orbit.

There is an increased focus on the critical role that space technology plays in modern society. This has generated an interest in the legal and political dimensions necessary to ensure the peaceful uses of outer space.

Norway is actively promoting the use of satellite data in the United Nations system, in particular the use of high-resolution data for tropical forest monitoring.

## Oman

[Original: Arabic]

[23 August 2016]

Satellite technologies contribute to meeting the strategic needs of States, whether those needs are security-related, economic or scientific. Various satellite applications are used in the Sultanate for remote reconnaissance, remote sensing and satellite communications in order to serve the country's growth and development process and draw benefit from the scientific revolution in satellite technologies. The use of satellites in low-Earth orbit for space imaging helps to achieve various objectives, the most important of which are security maintenance, physical planning, mineral exploration and land cover monitoring. In the field of space communications, satellites are used to cover wide land areas so as to transmit data to remote destinations and provide telephone communications there.

Although the Sultanate does not yet possess its own satellite system, it has entered into contracts to rent satellite channels from regional and international companies in order to benefit from such technologies for various purposes, including the following:

1. *Communication services.* These services enable the transmission and reception of telephone calls and data batches between satellites and Earth stations. The Sultanate, with its extensive area and diverse natural environments which include desert and mountainous areas, has realized that there is a need to develop communication services and use satellite technology to bring communication services to citizens wherever they are on the Sultanate's territory in order to implement the Government's development and strategic plans.

2. *Broadband services.* The Oman Broadband Company was established in January 2014 as a State company with the objective of implementing the National Broadband Strategy by creating and developing an integrated national broadband network in the Sultanate. This is because demand for the expansion of broadband Internet coverage, which stimulates economic growth, job creation and social inclusion, is now higher than ever before in the Sultanate. Satellite channels for broadband satellite applications play a pivotal role in making the national strategy a success.

3. *Radio and television transmission services.* These services enable the transmission of various television and radio channels to their various coverage areas around the world.

4. *Meteorology services.* These services help meteorologists to predict weather conditions and observe developments in real time. Weather satellites have played an important role in the Sultanate in recent years. With cyclones, low pressure systems and other weather phenomena affecting the Sultanate, weather change is having a tangible effect on the daily lives of the Sultanate's population.

5. *Air and marine navigation services.* These services help ships and aircraft to find their routes. The strategic location of the Sultanate, overlooking the Strait of Hormuz — one of the most important and most crowded straits of the world, crossed

by 20-30 oil tankers daily — has enabled the Sultanate to develop and modernize its navigation system so as to keep up with modern satellite technologies.

6. *Physical planning.* Remote sensing technology is among the most important technologies presently used to design and monitor the physical planning of towns and states of the Sultanate. The dramatic development of this technology has made it of indisputable importance in urban planning. It has enabled the establishment of physical development plans that have helped to solve many problems of rapid land development in the Sultanate.

7. *Monitoring red tide.* The red tide phenomenon has begun to invade the coasts of the Sultanate. The unpleasant smells it produces, as well as fish die-offs on the coast, are major problems for persons at sea, visiting the beaches or living in coastal areas. The danger of this phenomenon is, however, not confined to bad odours, fish die-offs or change in sea colour, but extends to harming the health of people who eat fish affected by the phenomenon, which can lead to human poisoning. Using satellites, the Sultanate is making a great effort to forecast the phenomenon and alert the population, particularly fishermen, to the times of its appearance and how to deal with it and reduce its environmental effects.

8. *Palm weevil pest control.* The red palm weevil is one of the most dangerous date palm insect pests, as it damages and destroys palm trees and shoots to the extent that in some countries the phenomenon of the weevils is called “date palm AIDS”. Satellite technologies enable the Sultanate to track this pest and control it at an early stage so as to protect palm trees.

## Spain

[Original: Spanish]  
[18 October 2016]

Spain continues to develop its national space activities, which often involve a very high degree of international cooperation. Its main activities related to international cooperation in the area of space are set out below.

- *Participation in the European Space Agency.* Spain carries out a high proportion of its space activities through the European Space Agency (ESA), which is, by definition, an international cooperation organization. Within ESA, Spain participates in numerous programmes and projects, in which it works with other ESA member States to develop space systems and define European space policy. Through ESA, Spain also takes part in collaborative projects with the space agencies of countries that are not ESA member States, such as the International Space Station and ExoMars.
- *European Organization for the Exploitation of Meteorological Satellites (EUMETSAT).* Spain is a member of EUMETSAT, the leading organization for space system-based meteorological observation. It makes a significant contribution to and participates in the programmes of the organization.
- *National Space Programme.* This programme funds Spanish space research projects, which usually relate to instruments provided by Spain within the context of international collaborative missions. These instruments are often used in ESA missions, although projects are also funded for collaborative missions with the space agencies of other countries, such as the National Aeronautics and Space Administration (NASA) of the United States of America and the Russian State Corporation for Space Activities (Roscosmos).



- *Space-related bilateral cooperation projects.* This programme funds space projects that are developed in cooperation with the space agencies of other countries. To date, it has funded projects in collaboration with the Russian Federation (World Space Observatory), France (Centre national d'études spatiales) and the United States (NASA). It is worth highlighting the involvement of Spain, through this programme, in several missions to Mars (Mars Science Laboratory, Insight and Mars 2020) in collaboration with NASA.
- *National Institute for Aerospace Technology programmes.* The National Institute for Aerospace Technology (INTA) participates in various space programmes, including, most notably, the European satellite navigation system Galileo, the provision of instruments to ESA and NASA missions, and collaboration with ESA for the management of data transmission stations.
- *European Union space programmes.* Spain actively participates in all European Union space programmes, including in particular:
  - *All space-related European Union committees.* Spain is involved in both defining European space policy and establishing and monitoring European Union space programmes (e.g., EGNOS, Copernicus and Galileo).
  - *Collaboration in the development of the Strategic Research Clusters.* The activities of the Strategic Research Clusters are led by a consortium of space agencies, including the Centre for the Development of Industrial Technology (CDTI) representing Spain, and support the European Commission in defining areas of work and funding strategic technologies. To date, two clusters have been established: one on in-space electrical propulsion (EPIC), and another on space robotic technologies (PERASPERA).
  - *Collaboration in the development of European space surveillance and tracking capabilities.* This programme is funded by the European Commission and its activities are led by a consortium of space agencies, with the participation of CDTI representing Spain. The consortium is implementing a European space surveillance system based on the set of national systems of the States in the consortium.

In summary, the vast majority of space activities being conducted in Spain involve a high degree of international cooperation. This is because international cooperation enables countries to participate in very complex and expensive projects which they would struggle to take on at the national level.

## Turkey

[Original: English]  
[27 October 2016]

### Space activities of Turkey in 2016

#### 1. Projects and activities in progress

##### TURKSAT 6A project

Turkey plans to build its geostationary national communications satellite, TURKSAT 6A. The project is in the design stage. It is to be operated by TURKSAT. The production of the satellite is planned to be completed in 2019. It will be positioned at 42 degrees East. Assembly, integration and test activities will be performed at the Space Systems Integration and Test Center at TAI.

**CubeSat (UBAKUSAT) development**

The work on the development of a CubeSat named UBAKUSAT continues within the Istanbul Technical University. In accordance with the cooperation agreement that has been signed between the Directorate General of Aeronautics and Space Technologies of Turkey and the Japan Aerospace Exploration Agency (JAXA), JAXA will arrange the launch and manage the departure from the International Space Station (ISS) for the UBAKUSAT CubeSat.

The size of the satellite will be 10 cm x 10 cm x 34 cm. UBAKUSAT carries a linear transponder, a dosimeter for radiation measurement and a 9 Degrees of Freedom inertial sensor. The expected life span of UBAKUSAT is 6-12 months. The exact lifespan will be determined by the ISS orbital position and solar activity on a yearly basis at the time of departure from ISS.

**QB50 satellite project (HAVELSAT and BeEagleSat CubeSats)**

Within the QB50 project that is supported by the European Union Seventh Framework Programme for Research and Technological Development, 50 CubeSats that will carry out scientific tests and measurements will be developed and launched. In the scope of this project, two CubeSats, named BeEagleSat (QB50 TR01) and HAVELSAT (QB50 TR02), have been developed in Turkey.

BeEagleSat, a 2U CubeSat, has been developed by the Istanbul Technical University, the Turkish Air Force Academy and Sabanci University. It will carry an X-ray detector which will characterize the hard X-ray background in 20-150 keV in low-Earth orbit conditions as a function of altitude. As a payload for QB50, the satellite carries a multi-needle Langmuir probe (m-NLP) sampling the electron density of the space around it. The satellite will be launched with the bulk of the QB50 constellation to ISS, from which they will be deployed.

HAVELSAT, a 2U CubeSat, has been built jointly by HAVELSAN and the Istanbul Technical University. The technological payload of HAVELSAT is a software-defined radio (SDR) system for communication. The satellite also performs small-scale on-board image processing. As a payload for QB50, the satellite carries a multi-needle Langmuir probe (m-NLP), sampling the electron density of the space around it. The satellite will be launched with the bulk of the QB50 constellation to ISS, from which they will be deployed.

**2. Currently active satellites****RASAT**

RASAT is an Earth observation satellite that was launched in 2011 to low-Earth orbit. The satellite's COSPAR international designator is 2011-044D. It is being operated by the Scientific and Technological Research Council of Turkey (TUBİTAK). The images taken by the satellite are being used for mapping, disaster monitoring, agriculture, forestry, the environment, urbanization and planning.

**TURKSAT 4A**

TURKSAT 4A is a Turkish communications satellite that was placed in geostationary orbit (42 degrees East) in 2014 and remains in service. It has increased the communications capacity of Turkey. It is operated by TURKSAT.

## **TURKSAT 4B**

TURKSAT 4B is a Turkish communications satellite that was placed in geostationary orbit (50 degrees East) in 2015 and remains in service. It has increased the communications capacity of Turkey. It is operated by TURKSAT.

## **Qatar**

[Original: Arabic]  
[30 September 2016]

Qatar's inauguration of its membership in the Committee on the Peaceful Uses of Outer Space this year, 2016, shows its appreciation of the importance of the Committee as the unique global forum for international cooperation in the field of peaceful uses of space activities, and its belief in the role that the Committee is playing in national, regional and international efforts to advance space exploration and to ensure the benefits of space technology for our planet so that all countries can achieve sustainable development.

Qatar has been working on integrating space sciences and technologies in the national development plan (Qatar National Vision 2030) and in its curricula, applying a gradual approach that takes into consideration the vast horizons and applications that outer space has opened to humanity and the State needs and priorities. Qatar has also endeavoured to achieve the highest level of regional and international cooperation in order to facilitate the optimal use of space sciences and technologies. Qatar has been preparing national personnel specialized in space sciences and technologies, especially in communication, weather forecasting, natural resources detection and environment protection. It has also disseminated knowledge about astronomy and astronomical education and established astronomical observatories.

The Qatar Satellite Company, Es'hailSat, was established in 2010 with the aim of possessing satellites and rights to operate them, and providing different services to individuals, corporations and the public sector. In the third quarter of 2012, the satellite Es'hail-1 was launched to the orbital point 25 degrees East, to provide all public and private sectors in the Middle East and North Africa with television broadcasting, communication and Internet services. The second satellite, Es'hail-2, is to be launched next year, 2017, to orbital point 26 degrees East, to enhance the services provided by Es'hail-1. Another satellite project, specialized in meteorological observation, is currently under consideration. The team, composed of the Ministry of Transport and Communications, the Qatar Satellite Company and the Civil Aviation Authority, is evaluating the available options, including renting a satellite channel from a satellite company to operate the meteorological management programme, or launching a national satellite devoted to meteorological observation and climate studies.