

2017

# Annual Report



UNITED NATIONS





# UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS

## Annual Report 2017

Foreword . . . . .	iii
About us . . . . .	iv
Highlights of 2017 . . . . .	10
Focus: UNISPACE+50 preparations . . . . .	16
Partnership agreements. . . . .	22
Awareness-raising and capacity-building activities . . . . .	26
Administrative information . . . . .	36



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Cover image: Northeast Syrtis Major Region of Mars

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## Foreword



The year 2017 was an opportunity for the United Nations Office for Outer Space Affairs (UNOOSA) to consider both the history and future of human activities in outer space.

We joined the international community in celebrating the sixtieth anniversary of Sputnik-1, the first artificial satellite in space, and reflecting on the remarkable scientific and technological progress in space since. We also marked 50 years of the Outer Space Treaty, the foundation of international space law. The Treaty is an important commitment from the international community to preserve space peacefully, for everyone, and for the generations to come.

It was also a historic year for space activity, with nearly 500 functional space objects launched or deployed in Earth orbit or beyond in 2017. This was nearly double the number from 2016. 2017 was also the fortieth year of registration under the Convention on Registration of Objects Launched into Outer Space, and for that reason we have focused in depth on this important transparency and confidence-building tool further in this Report.

With regard to the future of space activities, in 2017 the Office increased its preparations for UNISPACE+50, the first United Nations global space summit of the twenty-first century. In June 2018, the international community will gather in Vienna for UNISPACE+50, the fiftieth anniversary of the first UNISPACE conference, and set out the future course of global space cooperation. The Office undertook a number of preparatory activities

throughout the year for UNISPACE+50, including flagship events for the UNISPACE+50 thematic priorities.

UNISPACE+50 will bring together the broader space community, including representatives from industry and the private sector. UNOOSA sees considerable value in partnerships and contributions from industry and the private sector in promoting the benefits of space for effectively addressing challenges before humanity. The Committee on the Peaceful Uses of Outer Space (COPUOS) in 2017 acknowledged the growth of the space sector and endorsed increased engagement by the Office with the private sector and industry. The Office is now working to implement procedures for such partnerships.

A personal highlight for me in 2017 was an increased focus by the Office on gender mainstreaming in the space sector. In partnership with UN Women, the Office held a “Space for Women Expert Meeting” to gather decision makers and experts from around the world to share ideas for improving the involvement of women and girls in science, technology, engineering and mathematics, especially in developing countries, and for the use of space technology and science in the achievement of Sustainable Development Goal 5: “Gender Equality”. I was also honoured to publically declare my commitment to gender equality by becoming an International Gender Champion.

This emphasis on the value of diversity is also a reminder of what we can achieve when we work together. As we focus on the future and a successful UNISPACE+50 summit, the Office and I are committed to working closely with all partners in the international community to bring the benefits of space to everyone, everywhere.

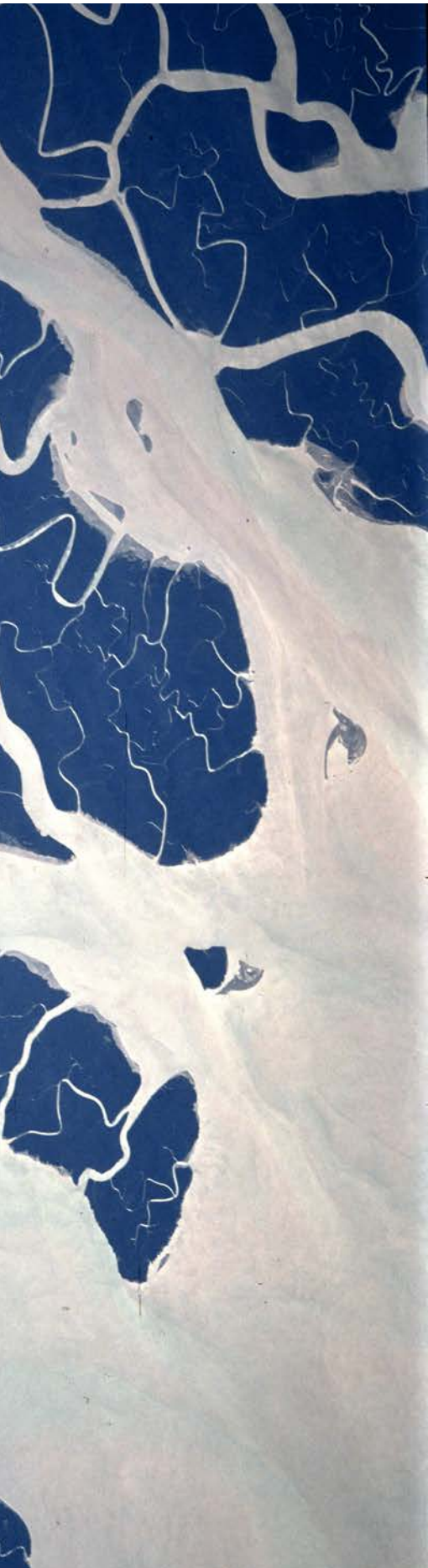
**Ms. Simonetta Di Pippo**  
Director, Office for Outer Space Affairs



An aerial photograph of a vast, intricate river network. The rivers are light-colored, appearing almost white or light grey, and they meander and branch out across a dark, textured landscape. The overall effect is that of a dense, organic web of waterways. The text "About us" is overlaid in the upper left quadrant in a clean, white, sans-serif font.

# About us





The United Nations Office for Outer Space Affairs (UNOOSA) promotes international cooperation in the peaceful use and exploration of space, and in the utilization of space science and technology for sustainable economic and social development.

Space is an invaluable tool that can help the international community achieve the SDGs



## Roles and responsibilities

UNOOSA is the sole United Nations office responsible for implementing the United Nations Programme on the Peaceful Uses of Outer Space. The Office supports all United Nations Member States in establishing legal and regulatory frameworks to govern space activities and assists in strengthening the capacity of developing countries to use space science, technology and applications for development by helping to integrate space capabilities into national development programmes.

The Office serves as the secretariat for the General Assembly's only committee dealing exclusively with international cooperation in the peaceful uses of outer space: the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS), established in 1959. The Committee has two subsidiary bodies: the Scientific and Technical Subcommittee (STSC), and the Legal Subcommittee, both established in 1961. The Committee reports to the Fourth Committee of the General Assembly, which adopts an annual resolution on international cooperation in the peaceful uses of outer space.

UNOOSA discharges the Secretary-General's responsibilities under international space law, including maintaining the United Nations Register of Objects Launched into Outer Space, the only existing treaty-based tool supporting TCBMs (transparency and confidence-building measures)

in outer space activities. UNOOSA also services the sessions of the United Nations Inter-Agency Meeting on Outer Space Activities (UN-Space).

The Office works closely with United Nations Member States to support their capacity-building efforts in space activities and their development of national space infrastructure. The Office does this by organizing workshops on

space-based technology subjects, space law and policy, as well as on questions relating to international cooperation in space activities and on United Nations space-related activities.

The UNOOSA Programme on Space Applications (PSA) builds capacity and promotes cooperation in space science and technology. UNOOSA provides capacity-building, education, research and development support and technical advisory services on topics that include basic space sciences, basic space technology and human space technology. The Office also promotes Global Navigation Satellite Systems and integrated space technology applications in areas such as global health, disaster management, climate change, humanitarian assistance, environmental monitoring and natural resource management. Additionally, through its United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) programme, UNOOSA supports United Nations Member States in accessing and using satellite data for disaster recovery, risk reduction and emergency response.

Furthermore, UNOOSA is the executive secretariat of the International Committee on Global Navigation Satellite Systems (ICG), which promotes voluntary cooperation on civil satellite-based positioning, interoperability, navigation, timing and value added services. UNOOSA is also the permanent secretariat to the Space Mission Planning Advisory Group (SMPAG), which considers asteroid impact mitigation.

UNOOSA prepares and distributes reports, studies and publications on various fields of space science, technology applications and international space law. These documents and reports are available through the UNOOSA website.

UNOOSA is located at the United Nations Office at Vienna (UNOV), and has satellite offices in Beijing and Bonn, Germany.







On 25 September 2015, United Nations Member States agreed on a set of goals to end poverty, protect the planet and ensure prosperity for all as part of the 2030 Agenda for Sustainable Development. On 1 January 2016, the 17 Sustainable Development Goals (SDGs) of the Agenda officially entered into force.

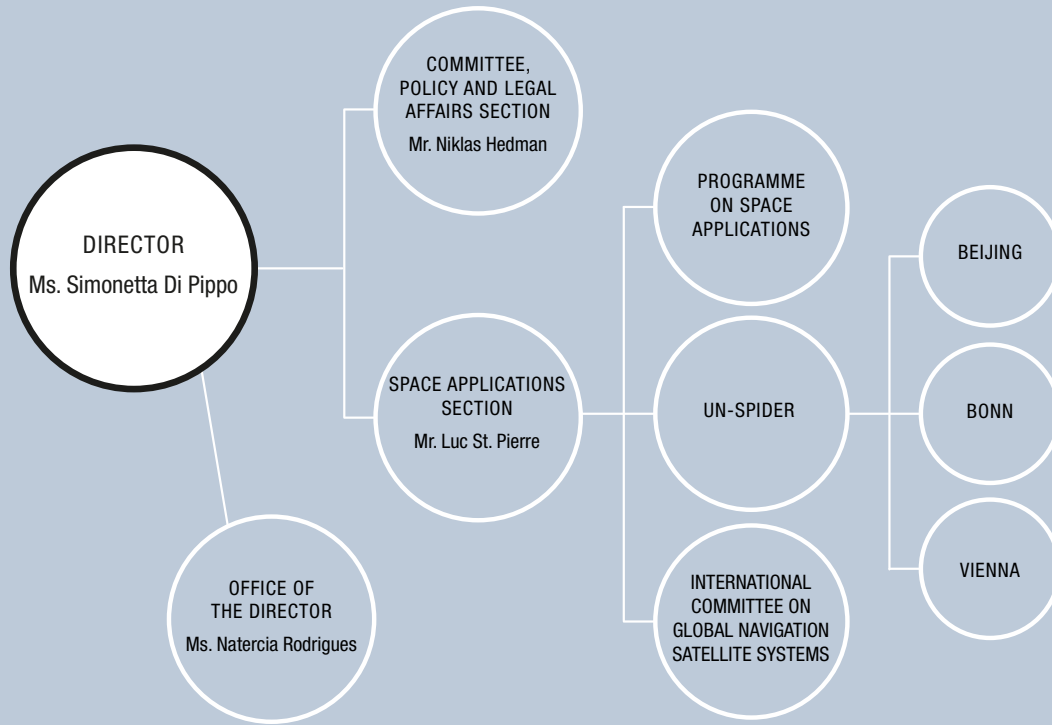
Space is an invaluable tool that can help the international community achieve the SDGs. With space science, technology and applications, we can:

- monitor climate change and pollution
- survey crops, land cover and soil moisture
- observe desertification and droughts
- respond to disasters
- map diseases and public health emergencies
- learn remotely
- enable smart cities and transportation
- achieve gender equality

... and much more

The SDGs provide an additional framework for the work of UNOOSA. UNOOSA is employing new, more holistic and tangible approaches to its traditional capacity-building role to help Member States, particularly developing countries, use space to address the targets enshrined in the SDGs in a cross-sectoral and multidisciplinary manner.

## Organizational structure of the Office



## 2017: Forty Years of Mandatory Space Object Registration with the United Nations Secretary-General

Believing that a “mandatory system of registering objects launched into outer space would, in particular, assist in their identification and would contribute to the application and development of international law governing the exploration and use of outer space”, States adopted the Convention on Registration of Objects Launched into Outer Space in 1975, which then entered into force in 1976. Subsequently, in April 1977, the United Nations Secretary-General received the first information to be included in a new United Nations Register of Objects Launched into Outer Space established under the Convention.

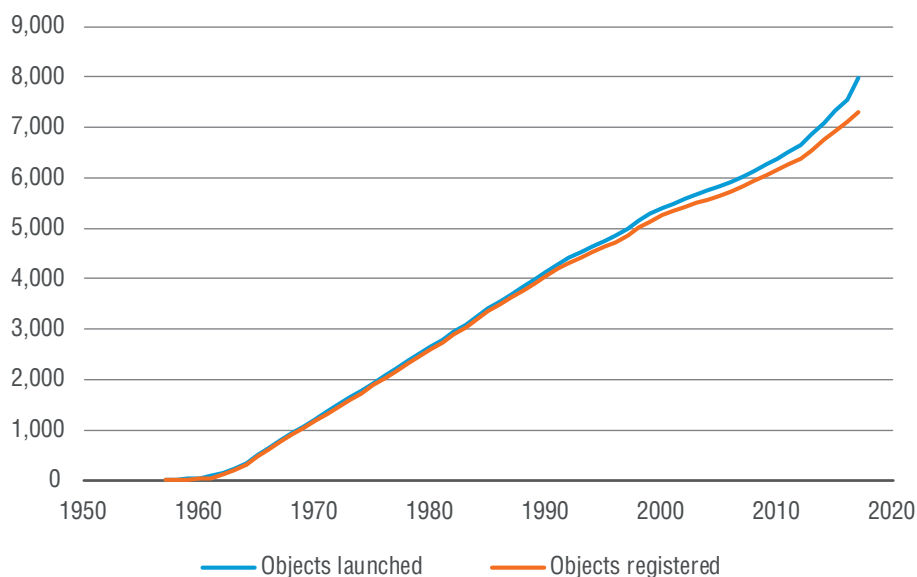
The United Nations Office for Outer Space Affairs is responsible for discharging the Secretary-General’s obligations under the treaties, principles and General Assembly resolutions governing activities in outer space. Drawing on nearly six decades of expertise in this area, the Office provides technical assistance to States and international intergovernmental organizations in implementing

their treaty obligations, including registration of space objects with the Secretary-General.

In 2007, the General Assembly adopted resolution 62/101, which made recommendations on how States could enhance their registration practices. The resolution suggested ways to harmonize registration data provided to the Secretary-General and types of additional information (such as when a space object is “decommissioned”) that would be of interest to nations. The resolution also encouraged all States that carry out space activities to register their satellites with the Secretary-General.

After 40 years of mandatory registration, over 50 States and two international organizations have registered over 91 per cent of all satellites, probes, landers, crewed spacecraft and space station flight elements launched into Earth or beyond since 1957. Currently, of the approximately 4,600 satellites in Earth orbit, nearly 2,000 are operational.

Functional space objects launched and registered by launch year





### Number of satellites and other space objects registered in 2017

State of registry	Functional*	Non-functional**
Austria	1	
Belarus	2	
Belgium	28	
Brazil	1	
Canada	14	
China	56	
Denmark	8	
France	4	30
India	13	7
Indonesia	3	
Israel	1	
Japan	15	
Mongolia	1	
Norway	2	
Pakistan	1	
Papua New Guinea	1	
Peru	3	
Philippines	1	
Republic of Korea	4	
Russian Federation	26	
Slovakia	1	
South Africa	1	
Spain	1	
Sweden	1	
United Arab Emirates	1	
United Kingdom	7	
United States	284	27
Uruguay	2	
European Space Agency	6	
<b>SUBTOTAL</b>	<b>489</b>	<b>64</b>
<b>TOTAL SPACE OBJECTS</b>		<b>553</b>

In 2017, a record 489 satellites (launched in 2017 and earlier) were registered with the Secretary-General by 28 States and one international inter-governmental organization. Sixty-four spent rocket stages and inter-satellite structures were also registered under the Convention.

#### Satellite registration in the 60s and 70s

The first United Nations Register of Objects Launched into Outer Space was established in 1961. The General Assembly requested that space nations voluntarily register their satellite with the Secretary-General to help the newly established COPUOS develop laws governing activities in humanity's newest frontier. The first Register was superseded by the Convention's Register in 1976. However, the first Register is still used by States who have not joined the Convention to register their space objects with the Secretary-General.

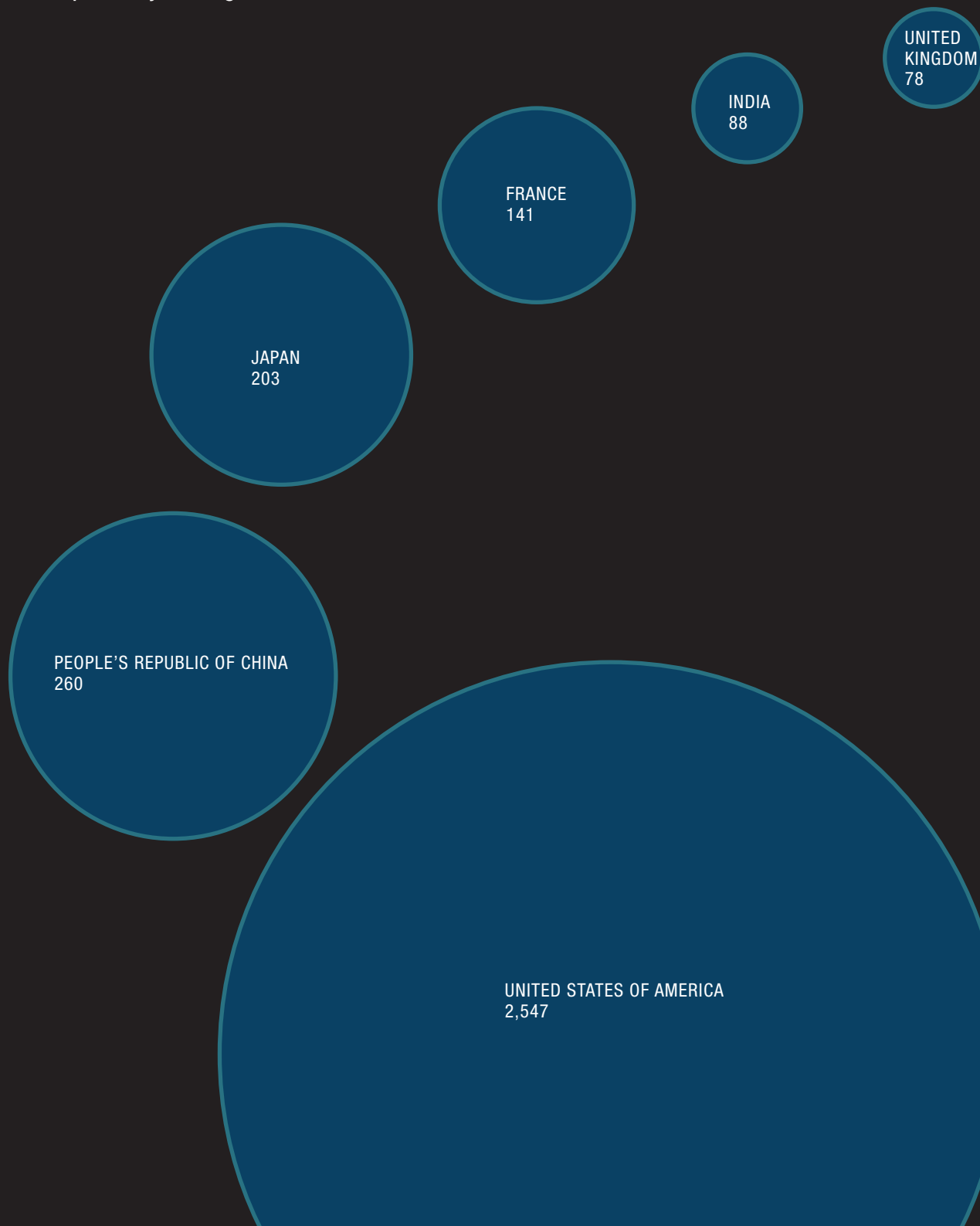


\*Functional space objects: satellites, probes, landers, crewed spacecraft and space station flight elements.

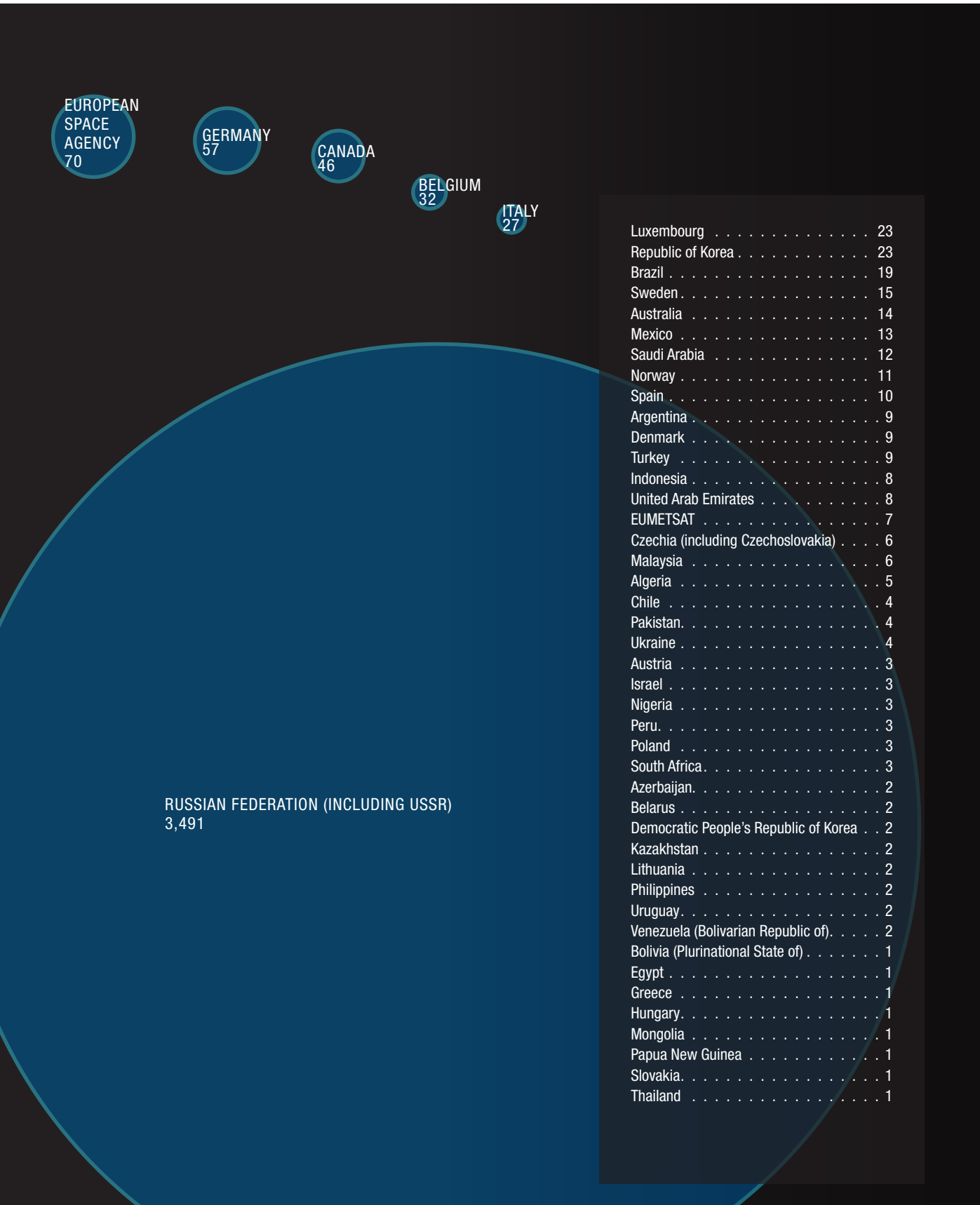
\*\*Non-functional space objects: rocket boosters, upper stages, payload adapters, shrouds, other launcher elements and space debris.



Total space objects registered 1957–2017









# Highlights of 2017





The year 2017 was characterized by celebrations of the history of human activity in space alongside preparations for the future of international cooperation in space. It was also a year of important developments in the key work areas of UNOOSA, and the establishment of new initiatives for bringing the benefits of space to humankind.



# Highlights of 2017



## International Asteroid Day

After the General Assembly proclaimed International Asteroid Day, in December 2016, UNOOSA celebrated the first such day on 30 June 2017 with a social media campaign and a video message by the Director. Through International Asteroid Day, UNOOSA aims to publicly highlight the global work undertaken in this area by UNOOSA, COPUOS and Member States.

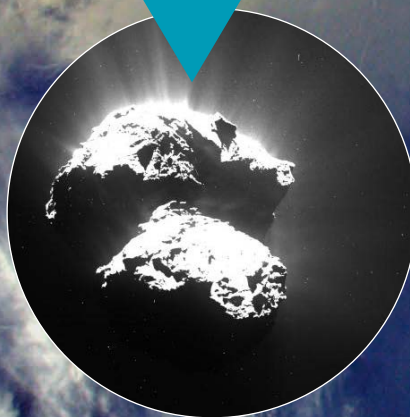


## Universidad del Valle de Guatemala selected for KiboCUBE

UNOOSA and the Japan Aerospace Exploration Agency (JAXA) selected a team from the Universidad del Valle de Guatemala for the opportunity to develop and launch a cube satellite from the Kibo module of the International Space Station under the UNOOSA-JAXA KiboCUBE programme. As the successful candidate of the second round of KiboCUBE, the Universidad del Valle de Guatemala team plans to use its CubeSat to test equipment for monitoring the concentration of harmful algae blooms over inland bodies of water.

## Increased engagement with private sector and industry

Partnerships, including with the broader space community, are essential for the work of UNOOSA and for the achievement of the SDGs. At its sixtieth session, in June 2017, COPUOS endorsed greater engagement by UNOOSA with the private sector and industry. In the latter part of 2017, UNOOSA began developing procedures to appropriately engage with the private sector and industry.





## Call for interest for the proposed orbital mission

During the International Astronautical Congress in Adelaide in 2017, UNOOSA and the Sierra Nevada Corporation issued a Call for Interest for a proposed orbital space mission using the Corporation's Dream Chaser® spacecraft. The mission would allow countries to have payloads or experiments flown in low-Earth orbit that contribute to the achievement of one or more of the SDGs. Through the Call, UNOOSA and SNC provided details of the proposed mission and sought to assess international interest in the mission. The Call was open for seven weeks, and resulted in 150 expressions of interest from 75 countries, covering all 17 SDGs.



## Sputnik-1 sixtieth anniversary

UNOOSA joined the space community in celebrating in 2017 the sixtieth anniversary of the launch of Sputnik-1, the first artificial satellite, in 1957. The Office supported the Permanent Mission of the Russian Federation to the United Nations in Vienna in an exhibition about Sputnik-1 in the Rotunda of the Vienna International Centre during the annual COPUOS session. The Director of UNOOSA also joined the United Nations Secretary-General and the Permanent Representative of the Russian Federation to the United Nations in speaking at a celebration of the Sputnik-1 anniversary at United Nations Headquarters in New York.

## Space for Women

UNOOSA began work on its Space for Women project by convening a Space for Women Expert Meeting in New York from 4 to 6 October 2017, in cooperation with UN Women. The meeting brought together experts from around the world to consider how to get more women involved in the space sector and encourage more women and girls into science, technology, engineering and mathematics education and careers, particularly in developing countries. This event highlighted the need for greater gender awareness, as well as for supporting the future of youth and their engagement through a multi-stakeholder and multidisciplinary approach. Recommendations that emerged from the Expert Meeting are being incorporated into the Office's Space for Women Project, currently under development.





### First and Fourth Committee joint panel

A joint half-day panel discussion of the First Committee and Fourth Committee of the General Assembly on possible challenges to space security and sustainability was held on 12 October 2017 in New York. The panel was co-organized by UNOOSA and the United Nations Office for Disarmament Affairs (UNODA). Keynote addresses were given by the Director and Deputy to the High Representative, UNODA, and the Director of UNOOSA, and were followed by presentations by invited panellists.



### High Level Forum

The 2017 High Level Forum on “Space as a Driver for Socioeconomic Sustainable Development”, held in Dubai, United Arab Emirates, from 6 to 9 November consisted of expert presentations and high-level panels focused on space economy, space diplomacy, space society and space accessibility, as well as UNISPACE+50. Over 150 participants from more than 40 countries, representing the broader space sector, delivered concrete recommendations for supporting space as a tool for sustainable development.



### Fiftieth anniversary of the Outer Space Treaty

10 October 2017 marked 50 years since the Outer Space Treaty entered into force. UNOOSA celebrated this important anniversary in a number of ways, including a high-level panel discussion during the annual COPUOS session, the publication of an updated version of the UNOOSA Space Law booklet, a quiz video on the Treaty featuring United Nations Champion for Space Scott Kelly, and a video message from National Aeronautics and Space Administration (NASA) astronauts on the International Space Station to the United Nations, which was played to the Fourth Committee of the UNGA.



## Launch of Group of Friends of UNOOSA in New York

In late 2017, the Permanent Missions of Austria and Zambia launched the Group of Friends of UNOOSA in New York to support the awareness of the Office and its work among Permanent Missions to the United Nations and the wider United Nations system. This will allow the Office to create more synergy in the space-related work of the United Nations system and support enhanced delivery and services of the United Nations in meeting the needs of Member States more efficiently.



## Enhanced cooperation within the United Nations system

In 2017, UNOOSA strengthened its cooperation with other entities within the United Nations system. The Office signed a memorandum of understanding with the United Nations Institute for Training and Research (UNITAR) for greater collaboration on the use of space technology for the SDGs, and a memorandum of understanding with the United Nations Development Programme (UNDP) to strengthen cooperation in supporting UNDP country offices and various mandated activities with space technology applications.



## Discovery Day

The Office, together with the UNDP, organized a second “Discovery Day” on 6 December at United Nations Headquarters with a focus on geospatial solutions for sustainable development, building upon a successful first event in late 2016. Participants—double the number of the previous year—learned how geospatial solutions can be applied to sustainable development in multiple domains, including damage assessment, disaster risk reduction, early warning, infrastructure and rehabilitation, water monitoring, climate change, planning, and telecommunication.



A photograph of a Progress cargo spacecraft in orbit above Earth. The spacecraft is cylindrical with a white nose cone and a black body. The word "ПРОГРЕСС" (Progress) is written in red Cyrillic letters on the black section. Two large, rectangular solar panel arrays are extended horizontally from the sides. The Earth's surface is visible below, showing blue oceans, white clouds, and brownish landmasses. The background is the blackness of space.

# Focus: UNISPACE+50 preparations





UNISPACE+50 is a special segment of the sixty-first session of COPUOS on 20 and 21 June 2018. The purpose of UNISPACE+50 is to celebrate the fiftieth anniversary of the first United Nations Conference on the Exploration and Peaceful Uses of Outer Space and take stock of the contributions to global space governance of the three UNISPACE conferences, held in Vienna in 1968, 1982, and 1999. It is also an opportunity for the international community to gather and consider the future course of global space cooperation for the benefit of humankind.

# UNISPACE +50

UNISPACE+50 not only coincides with the ever-growing importance of space applications and technologies for humankind, but also with global efforts, goals and targets under three major international frameworks: the 2030 Agenda for Sustainable Development and its 17 SDGs, the Sendai Framework for Disaster Risk Reduction 2015–2030 and the Paris Agreement on Climate Change.



In order to guide preparatory work for UNISPACE+50, in June 2016 COPUOS identified and agreed on seven thematic priorities, as well as their objectives and mechanisms:

1. Global partnership in space exploration and innovation
2. Legal regime of outer space and global space governance: current and future perspectives
3. Enhanced information exchange on space objects and events
4. International framework for space weather services
5. Strengthened space cooperation for global health
6. International cooperation towards low-emission and resilient societies
7. Capacity-building for the twenty-first century





Ariane 5 lift-off



Optical ground station in Canary Islands

In 2017, a number of flagship activities under the seven thematic priorities took place.

Under **Global partnership in space exploration and innovation**, an Action Team on Exploration and Innovation, co-chaired by China, Jordan and the United States of America, was established. The Action Team, substantively supported by UNOOSA, met on multiple occasions to discuss the future of international exploration and innovation, and to develop recommendations related to the coordination of global space exploration efforts. Furthermore, an event on exploration and innovation was held in collaboration with the Global Space Exploration Conference (GLEX) in Beijing on 6 June 2017.

With regard to the **Legal regime of outer space and global space governance: current and future perspectives**, UNOOSA co-organized with the International Civil Aviation Organization (ICAO) the third ICAO/UNOOSA Aerospace Symposium in August 2017 to consider, among other topics, the regulatory and practical perspectives of aerospace operations. On 6 May 2017, in Montreal, Canada, UNOOSA also organized a high-level panel entitled “Pillars of Global Governance of Outer Space Activities in the 21<sup>st</sup> Century” during the Institute of Air and Space Law of McGill University International Conference on Global Space Governance - the United Nations 2030 Agenda for Sustainable Development. These activities built upon the discussions and recommendations from the 2016 United Nations Workshop on Space Law.

The way forward under **Enhanced information exchange on space objects and events** was considered by STSC and COPUOS in 2017. Proposals for the working process were made for further consideration. In parallel, the Office prepared a report under this thematic priority, addressing what the Office can do under its mandate of discharging the responsibilities of the Secretary-General under the United Nations treaties and principles on outer space, including the Register of Objects Launched into Outer Space.



Baby plays with doctor's stethoscope in Darfur

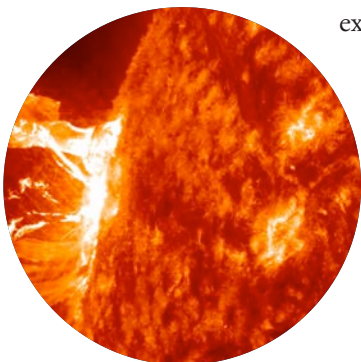


California ablaze

For the thematic priority **International framework for space weather services**, the Expert Group on Space Weather of the STSC served as a mechanism for deliberations. In addition, UNOOSA organized the United Nations/United States of America Workshop on the International Space Weather Initiative: The Decade after the International Heliophysical Year 2007, in Boston, United States, from 31 July to 4 August 2017. A dedicated session on space weather was also held during the third ICAO/UNOOSA Aerospace Symposium in August.

An Expert Group on Global Health, substantively supported by UNOOSA, considered and made recommendations for **Strengthened space cooperation for global health**. UNOOSA also co-organized the United Nations/World Health Organization/Switzerland Conference on Strengthening Space Cooperation for Global Health in Geneva, Switzerland, from 23 to

25 August, which brought together experts and decision makers from around the world to develop ways to improve this field.



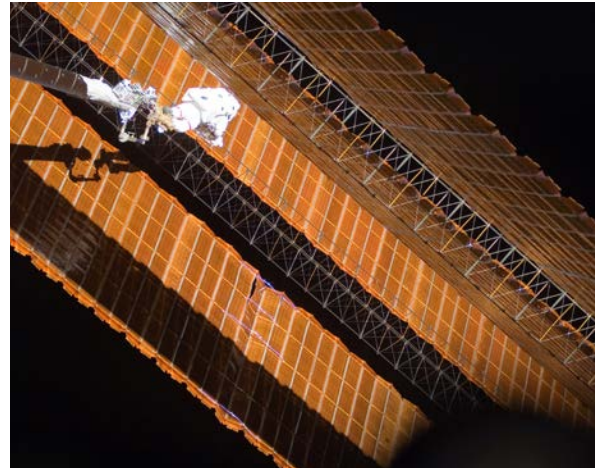
Under **International cooperation towards low-emission and resilient societies**, the United Nations/Germany International Conference on International Cooperation Towards Low-emission and Resilient Societies, held in Bonn, Germany, from 22 to 24 November 2017, resulted in a number of recommendations for this thematic priority. Likewise, the seventh annual United Nations International Conference on Space-based Technologies for Disaster Risk Reduction on “building resilience through integrated applications”, in Beijing from 23 to 25 October, was closely linked to this thematic priority. These events complemented recommendations that emerged from the UN-SPIDER+10 Conference: Enhancing the Resilience of Nations through the Use of Space-based Information, held in Vienna in June 2016.

Concerning the seventh thematic priority **Capacity-building for the twenty-first century**, UNOOSA organized a number of activities to gather experts and hear their ideas, including:

- The United Nations/Italy Workshop on the Open Universe, in Vienna from 20 to 22 November 2017, as well as its preparatory Expert Meeting in Rome from 11 to 12 April 2017
- The United Nations Expert Meeting on Space for Women, held in New York, United States, from 4 to 6 October 2017



Expert Meeting on Space for Women



EVA in front of ISS solar arrays

- The United Nations/Austria Symposium on Access to Space: Holistic Capacity-Building for the 21st Century, held in Graz, Austria, from 3 to 7 September 2017
- The United Nations/Russian Federation Workshop on Human Capacity-building in Space Science and Technology for Sustainable Social and Economic Development, held in Samara, Russian Federation, from 30 October to 2 November 2017
- The United Nations/South Africa Symposium on the Basic Space Technology Initiative “Small Satellite Missions for Scientific and Technological Advancement”, held in Stellenbosch, South Africa, from 11 to 15 December 2017

In addition, in 2017 UNOOSA continued the High Level Forum series on “Space as a driver for socioeconomic sustainable development” with a Forum in Dubai, United Arab Emirates, from 6 to 9 November. Representatives from throughout the broader space community considered the economic, environmental, social, policy and regulatory dimensions of space.

Furthermore, on 22 and 23 May 2017 UNOOSA held a joint coordination meeting with the Committee on Space Research (COSPAR) to consider how the space science community can contribute to UNISPACE+50 and implement its results.

Involving the space community at large throughout all these preparatory activities, UNOOSA listened to all stakeholders, including scientists, policymakers, researchers, civil society, private and industry sector representatives, and took note of their discussions, contributions and ideas. In late 2017, UNOOSA produced summary reports of activities under each thematic priority for consideration by COPUOS and its subcommittees during their 2018 cycle of sessions. The reports are available on the website of the Office.







UNOOSA's partnerships are integral to our ability to carry out our work. In 2017 the Office initiated procedures for partnerships with industry and the private sector, after COPUOS endorsed increased engagement with such actors.

On behalf of the United Nations, the Office signed agreements with the following Governments, institutions and organizations in 2017 to support and develop our activities:



Funding Agreement with the Republic of Austria (Bund) represented by the Federal Ministry for Transport, Innovation and Technology (bmvit) and the Austrian Research Promotion Agency (FFG) (10 February 2017)

Agreement with the University of Bonn for cooperation on the EvIDENz (Earth Observation Based Information Products for Drought Risk Reduction at the National Level) project (23 May 2017)

Memorandum of Understanding with UNITAR for collaboration on the use of space-based technology for the achievement of the 2030 Agenda for Sustainable Development (7 June 2017)

Funding Agreement with the Government of Switzerland, represented by the Federal Department of Foreign Affairs acting through the United Nations International Organizations Division and the Sectoral Foreign Policies Division (4 August 2017)

Memorandum of Understanding with the United States Department of State Bureau of Oceans and International Environmental and Scientific Affairs on providing secretariat support to the International Committee on Global Navigation Satellite Systems (ICG) (22 August 2017)

Memorandum of Understanding with the World Space Week Association for cooperation on the promotion and celebration of World Space Week (14 September 2017)

Memorandum of Understanding with the United States Department of State Bureau of Oceans and International Environmental and Scientific Affairs on providing secretariat support to the International Committee on Global Navigation Satellite Systems (4 October 2017)



Memorandum of Understanding with Peace and Cooperation on the organization of a global art competition for children on the theme of “Galaxy of Peace: Space, Common Heritage of Humanity” (20 October 2017)

Funding Contribution of the United States Government to UNOOSA in support of the International Committee on Global Navigation Satellite Systems (3 November 2017)

Memorandum of Understanding with the United Arab Emirates Space Agency for increased cooperation in the peaceful uses of outer space (8 November 2017)

Framework Agreement with the Government of Italy on cooperation in space science and technology for the peaceful use and exploration of outer space (20 November 2017)

Memorandum of Understanding on Joint Collaboration with the Italian Space Agency (ASI) (20 November 2017)

Funding Agreement with the People’s Insurance Company of China (PICC) Property and Casualty Company Limited (29 November 2017)

Memorandum of Understanding with the UNDP to increase cooperation in the use of geospatial and space-based technologies and coordination in activating emergency response mechanisms for the benefit of Member States (6 December 2017)

Amendment No.1 to the memorandum of understanding between the United Nations and DigitalGlobe Inc. (extension of the duration for one year until 1 January 2019) (8 December 2017)





In addition to the activities outlined in the Highlights chapter, the Office conducted the following major awareness-raising and capacity-building activities in 2017.

### Seminar on the Use of Global Positioning System (GPS) Data for Ionospheric Studies

Rabat, 16–20 January 2017

A seminar on the use of data from the United States GPS for ionospheric studies was organized by UNOOSA and Telecom Bretagne (Brest, France). It was held in French at the African Regional Centre for Space Science and Technology during a nine-month postgraduate course on Global Navigation Satellite Systems (GNSS). The seminar comprised two sections: one on theoretical information about space weather and the ionosphere, while the second consisted of four interactive sessions on GPS data, measurement and file processing, and global ionospheric map cartography. The seminar was a follow-up to recommendations made at the 2016 United Nations/Nepal workshop on the applications of GNSS.

### Panel discussion on space technology and climate change and launch of “Fragility and Beauty: My Planet from Space” book

Vienna, 6 February 2017

UNOOSA and the European Space Agency (ESA) hosted a panel discussion on the value of space technology for monitoring and combating climate change and other environmental challenges during the fifty-fourth session of the STSC. The event also served as the launch of a book created from the exhibition “Fragility and Beauty: My Planet from Space”—a collaboration between UNOOSA and ESA—which was displayed at the United Nations Headquarters in New York, United States in 2015. The book comprises images taken from space highlighting the beauty and vulnerability of our planet, the challenges posed by climate change and how space-based technology such as satellite Earth observation can help us address these challenges.

### Women in Space Panel Discussion

Vienna, 7 February 2017

UNOOSA hosted a “Women in Space” panel discussion during the fifty-fourth session of the

STSC in honour of International Day of Women and Girls in Science on 11 February. As humanity makes significant scientific and technological advancements, women remain under-represented in the fields of science, technology, engineering and mathematics. Speakers in this panel, representing women throughout the space community, discussed how to improve the gender imbalance in these fields, with a special focus on the space sector. The event was made available online.

### ICG-URSI-ICTP School on Radio Physics

Trieste, Italy, 27–31 March 2017

A school on radio physics, organized by the International Committee on Global Navigation Satellite Systems (ICG), the International Union of Radio Science (URSI), and the Abdus Salam International Centre for Theoretical Physics (ICTP) of Boston College, provided radio physics training to young scientists and graduate students from around the world, with a particular focus on developing countries. The school consisted of lectures and hands-on laboratory sessions in remote sensing and radio wave propagation.

### Expert meeting on preparation of the United Nations/Italy Workshop on the Open Universe Initiative

Rome, 11–12 April 2017

Organized by UNOOSA and the Italian Space Agency (ASI), the expert meeting on the preparation of the United Nations/Italy Workshop on the Open Universe Initiative was the first step in a series of activities to define the objectives and road map of the initiative. The initiative aims to stimulate the pursuit of space science through the application of the principles of unrestricted access to data and greatly expanded provision of software services. It also strives to foster dialogue between data providers and





networks of users and developers in order to extend the potential of scientific discovery for research, education and inspiration among all communities.

### Director visit to China and launch of Tianzhou-1

China, 20–24 April 2017



The Director of UNOOSA attended the launch of China's first cargo spacecraft "Tianzhou-1" at the Wenchang launch site in China with six high-level representatives from Permanent Missions to the United Nations in Vienna. This was the first time that foreign visitors had been invited to a launch at the Wenchang site. The high-level group also visited space facilities, universities and agencies in China, and the Director attended the opening ceremony of the second Space Day of China.

### Planetary Defense Conference

Tokyo, 15–19 May 2017

UNOOSA co-chaired, together with JAXA, the first panel on key international and political developments at the 2017 Planetary Defense Conference. The panel considered the topic of strengthening international cooperation in planetary defence, including work by the Space Mission Planning Advisory Group (SMPAG) and the International Asteroid Warning Network (IAWN). The United Nations facilitates IAWN and SMPAG's work. These entities represent important pillars in global collaboration efforts in preparing an internationally coordinated response to threats to Earth originating from near-Earth objects.

### COSPAR-UNOOSA Coordination Meeting on COSPAR's contributions to UNISPACE+50

Vienna, 22–23 May 2017

UNOOSA and the Committee on Space Research (COSPAR) held a coordination meeting to consider COSPAR's contribution to UNISPACE+50. The meeting consisted of a series of panel

exchanges on the scientific and research needs for the implementation of the thematic priorities of UNISPACE+50, and resulted in recommendations for the COPUOS mechanisms responsible for each of the UNISPACE+50 thematic priorities.

### ICG/ICTP Extended Workshop on Space Weather Effects on Global Navigation Satellite Systems Operations

Trieste, Italy, 22 May–2 June 2017

A workshop on the effects of space weather on GNSS was held in cooperation with the Abdus Salam ICTP, Boston College, and ICG. The workshop provided theoretical and practical training on the physics of space weather and its main effects on GNSS operations, with particular emphasis on low latitude ionospheric processes.

### Director participation in the ZeroG Summit: Space Diplomacy in the Age of NewSpace

Washington, D.C., 25 May 2017

The Director of UNOOSA gave a presentation at the Space Trust's ZeroG Summit on Space Diplomacy in the Age of NewSpace alongside United States Congressman Jim Bridenstine, Sierra Nevada Corporation Vice President of Space Systems Mark Sirangelo, and Space Trust founder and Executive Chair Namira Salim. The Director spoke about the work of UNOOSA, the UNISPACE+50 process, engagement with the broader space sector, and the value of space for achieving the SDGs.

### High-level Political Forum Side Event on Space for the Sustainable Development Goals

New York, United States, 14 July 2017

In partnership with the Permanent Missions of Austria and Ethiopia to the United Nations in New York, the Office organized a side meeting to the 2017 High-level Political Forum on Sustainable Development. UNOOSA built upon

the main theme of the Forum—“Eradicating poverty and promoting prosperity in a changing world”—by highlighting the importance of the use of space-based technologies and applications for achieving the SDGs, as well as the need for the international community to work together on preserving our planet.

### Technical Seminar on Reference Frames in Practice

Kobe, Japan, 29–30 July 2017

In accordance with the ICG recommendation on reference frames, the Office for Outer Space Affairs cooperated with a number of partners to organize a technical “reference frames in practice” seminar. The “Reference frames in practice” seminar series has been held since 2012. The 2017 seminar provided fundamental geodetic reference frame background and concepts and examined the associated data and analysis techniques, with a focus on practical implementation and application. It was highlighted that there was a need for more sharing of knowledge and experiences among agencies and countries in the region with respect to geodesy.

### United Nations/United States Workshop on Space Weather: The Decades after the International Heliophysical Year 2007

Boston, United States, 31 July–4 August 2017

Organized jointly by UNOOSA, NASA and Boston College, this workshop commemorated the tenth anniversary of International Heliophysical Year 2007. The workshop provided a forum to discuss the establishment of common warning and observation systems, and the improvement of the collection, exchange and delivery of space weather data, modelling and forecasting methods, as well as of accuracy, reliability and interoperability. Participants recognized the global importance of space weather for its potential negative impacts on our planet and infrastructure.

### United Nations/World Health Organization/Switzerland Conference on Strengthening Space Cooperation for Global Health

Geneva, Switzerland, 23–25 August 2017

The Conference was organized jointly with the World Health Organization (WHO) and Government of Switzerland to foster dialogue on creating and reinforcing relevant partnerships for the better utilization of space-based assets, data and technologies in addressing global health. Participants considered topics such as data access, data provision services and information-sharing in order to address resiliency and interoperability of space infrastructure so that in case of breakdown of ground technology, data could still be provided, especially in times of humanitarian crises or emergency situations, thereby strengthening global health.



### Thirty-seventh session of UN-Space

Geneva, Switzerland, 24 August 2017

The thirty-seventh session of UN-Space was organized in August 2017 by UNOOSA, in its capacity as Secretariat of UN-Space. An open session of UN-Space was held in conjunction with the United Nations/WHO/Switzerland Conference on Strengthening Space Cooperation for Global Health, focusing on the use of space technology within the United Nations system and its potential contribution to UNISPACE+50. This included special consideration of UNISPACE+50 thematic priorities on “Strengthened space cooperation for global health” and “International framework for space weather services”. A dedicated meeting of UN-Space, open to participation of United Nations entities only, was held in parallel with the conference; it focused on UNISPACE+50 and the Report of the Secretary-General on the coordination of space-related activities within the United Nations system.

### Third ICAO/UNOOSA Symposium 2017

Vienna, 29–31 August 2017

The third ICAO/UNOOSA Symposium was held in Vienna as a continuation of the first and second ICAO/UNOOSA aerospace symposiums held in Montreal, Canada, in 2015 and Abu Dhabi in 2016, respectively. This third symposium provided participants with perspectives on the latest trends in aviation, space activities, commercial space transportation and suborbital operations, and sustainability of aerospace activities.

### United Nations/Austria Symposium on Access to Space: Holistic Capacity-building for the 21st Century

Graz, Austria, 3–7 September 2017

The annual Graz symposium was organized by UNOOSA jointly with the Government of Austria. Participants considered, and made recommendations regarding, innovative approaches to capacity-building in the space domain, particularly in areas of applications and technology; policy and law, including the need to measure progress and development; identification of partners, tools for capacity-building and funding opportunities.

### International Astronautical Congress

Adelaide, Australia, 25–29 September 2017

UNOOSA undertook a number of activities at the annual International Astronautical Congress. The Office had a booth at the Congress exhibition to promote the work of the Office and the benefits of space for humankind. The booth was also the site of two press events by UNOOSA and partners: one with Sierra Nevada Corporation to announce the Call for Interest for the proposed orbital space mission using the corporation's DreamChaser®, and another with JAXA and the Universidad del Valle de Guatemala to provide a briefing on the second round of KiboCUBE and announce the third round. UNOOSA also hosted a Global Networking Forum event on the fiftieth anniversary of the

Outer Space Treaty, and the Director participated in a number of speaking and outreach events. Two technical papers were presented by UNOOSA staff.

### Ceremony for Peace and Cooperation School Award

Vienna, 20 October 2017

In order to reach out to younger audiences about space, in 2016 the Office partnered with Spanish non-governmental organization (NGO) Peace and Cooperation on a children's art competition entitled "Looking to the Stars—the Future of the World". An awards ceremony for this competition was hosted by the Office at the Vienna International Centre on 20 October 2017, and was attended by a number of Permanent Representatives and other diplomatic representatives, as well as 50 students, parents and teachers from five countries. During the awards ceremony, UNOOSA and Peace and Cooperation signed a memorandum of understanding to work together on an art competition in 2018 entitled "Space: common heritage of humanity".



### United Nations/Russian Federation Workshop on Human Capacity-building in Space Science and Technology for Sustainable Social and Economic Development

Samara, Russian Federation, 30 October–2 November 2017

This workshop, organized by the Office and Samara National Research University of the Russian Federation, with the support of the Government of the Russian Federation and ESA, addressed the role of human capacity-building for using space science, technology and its applications in support of sustainable development, with a particular focus on developing and emerging countries.



### United Nations/Italy Workshop on the Open Universe Initiative, Vienna

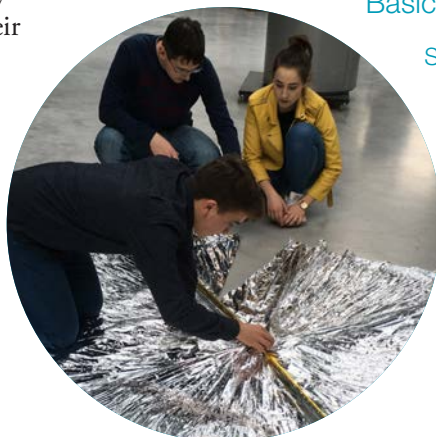
Vienna, 20–22 November 2017

Organized by UNOOSA and the Italian Space Agency, on behalf of the Government of Italy, the aim of the workshop on the Open Universe Initiative was to promote and facilitate the visibility, free accessibility and easy utilization of astronomical data collected by space-based and ground-based facilities by everyone, everywhere. Among the recommendations of the workshop was a call for data to be stored and made available in online archives, including being made accessible to the public after required proprietary periods and without the need for further data processing.

### Drop Tower Experiment Series (DropTES) microgravity experiment

Bremen, Germany, 27 November–1 December 2017

In collaboration with the Center of Applied Space Technology and Microgravity and the German Aerospace Center, the UNOOSA Drop Tower Experiment fellowship programme offers selected research teams the opportunity to conduct their own microgravity experiments at the Bremen Drop Tower. The series of experiments consists of four drops or catapult launches during which approximately 5 or 10 seconds of microgravity, respectively, are created. In the fourth cycle of the DropTES in 2017, a student team from the Warsaw University of Technology in Poland was awarded the fellowship. The aim of their drop experiment was to verify, in vacuum and microgravity conditions, the deployment of the deorbit sail system on their two unit CubeSat called “PW-Sat2”. The deorbit sail is a type of passive deorbit device based on the drag augmenting phenomenon, and its main purpose is to prevent satellites becoming orbital debris after completing their missions.



### International Committee on Global Navigation Satellite Systems: Annual Meeting

Kyoto, Japan, 2–7 December 2017

The twelfth meeting of the ICG and the nineteenth meeting of the Providers’ Forum reviewed and discussed developments in GNSS, and allowed ICG members, associate members and observers to address recent developments in their organizations and associations with regard to GNSS services and applications. ICG also addressed disaster risk reduction and management using GNSS. The Cabinet Office and the Ministry of Foreign Affairs hosted and organized the meetings on behalf of the Government of Japan.

### Heads of Space Agencies meeting and One Planet Summit

Paris, 11–12 December 2017

The Director of UNOOSA attended the Heads of Space Agencies meeting on 11 December, convened by the French Space Agency (CNES) ahead of the One Planet Summit on 12 December. The Heads of Space Agencies held a panel discussion on greenhouse gases, water and disasters, and adopted the Paris Declaration. The Declaration called for the creation of a space climate observatory as a contribution to the UNISPACE+50 process. The One Planet Summit, held two years after adoption of the Paris Climate Change Agreement, considered partnerships for climate action.

### United Nations/South Africa Symposium on Basic Space Technology

Stellenbosch, South Africa,  
11–15 December 2017

The United Nations/South Africa Symposium, the fourth in a series, was organized in cooperation with the country’s Department of Science and Technology, Department of Trade and Industry, and the South African National Space Agency. It reviewed the

current status and trends in the domain of small satellite missions, including lessons learned from the past and ongoing activities. The symposium objectives reflected this approach, focusing on capacity-building, in particular for the African region, and covered areas such as legal frameworks, and applications such as agriculture, environment and urban development monitoring. Additionally, for the first time in the series, a two-day hands-on workshop, “HEPTA Workshop”, was organized back-to-back in the same location as the symposium to allow participants to experience the hardware assembly, software programming and testing of a picosatellite kit known as HEPTA-Sat.

### “Star Wars: The Last Jedi” screening

Vienna, 18 December 2017

UNOOSA partnered with the United States Mission to International Organizations in Vienna for a public screening of “Star Wars: The Last Jedi”. Opening remarks by the United States Chargé d’affaires and the UNOOSA Director focused on the benefits of space, gender mainstreaming in the space sector, and UNISPACE+50. In a video message, United Nations Champion for Space and former NASA astronaut Scott Kelly celebrated the value of international cooperation in space for achieving common goals.

## UN-SPIDER

The United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) was established in 2006 under UNOOSA. UN-SPIDER develops solutions to address the limited access developing countries have to specialized technologies that can be essential in the management of disasters and the reduction of disaster risks. UN-SPIDER aims to improve actions to reduce disaster risk and support disaster response operations through knowledge-sharing and the strengthening of institutions in the use of space technologies, and facilitates cooperation between satellite data and information providers and the different groups of users of such data, such as policymakers, disaster risk managers or emergency responders.

### UN-SPIDER IN 2017

The United Nations-Germany International Conference on International Cooperation Towards Low-emission and Resilient Societies, organized by UNOOSA in cooperation with the German Aerospace Centre (DLR) and the German Federal Ministry for Economic Affairs and Energy, was held in Bonn, Germany, from 22 to 24 November 2017. It brought together over 110 participants to consider how space technology can help make societies more environmentally-friendly and more resilient to challenges such as disasters and climate change. This conference aimed to define synergies between climate change efforts, disaster risk reduction and sustainable development worldwide based on three international frameworks: the 2030 Agenda for Sustainable Development and its 17 SDGs, the Sendai Framework for Disaster Risk Reduction 2015-2030, and the Paris Agreement on Climate Change.

The seventh annual United Nations International Conference on Space-based Technologies for Disaster Risk Reduction was

hosted by UNOOSA and organized by the UN-SPIDER Beijing Office in Beijing from 23 to 25 October 2017. The theme was “building resilience through integrated applications”. The conference offered a forum for disaster management communities and experts to strengthen their capabilities in using space technology to identify, assess, monitor and respond to disaster risks, and in integrating space technology into long-term disaster risk management efforts.

In addition, the UN-SPIDER programme contributed to the organization of the fourth international Multi-Hazard Early Warning Conference, held in Cancun, Mexico, on 22 and 23 May 2017. The conference brought together more than 400 experts involved in early warning efforts from national, regional and international organizations. UN-SPIDER also co-organized a side event at the 2017 Global Platform for Disaster Risk Reduction, which took place the same week in Cancun.

The eighth annual meeting of UN-SPIDER Regional Support Offices took place from 6 to 8 June 2017, in parallel to the sixtieth session of COPUOS. Focal points from 11 regional support offices attended the meeting, as did representatives from other partner institutions.

In 2017 UN-SPIDER requested the activation of the International Charter Space and Major Disasters and the European Earth Observation Programme (Copernicus) Emergency Management Service (EMS) for a landslide in Sierra Leone as well as for floods in Nepal. Copernicus EMS was also activated for floods following heavy rains in Niger. In addition, organizations that had been supported by UN-SPIDER in becoming authorized users of the Charter, such as the Disaster Management Center of Sri Lanka, also requested the activation of the Charter, and UN-SPIDER Regional Support Offices acted several times as project managers for activations.

## UN-SPIDER also conducted the following activities in 2017:

### Expert meetings

**11–13 July 2017:** The UN-SPIDER/Mexican Space Agency (AEM) Regional Latin America and the Caribbean Expert Meeting in Mexico City brought together around 50 participants from eight countries to consider how space-based technologies can be used to improve multi-hazard early warning systems in the region.

### Technical advisory missions

**31 July–4 August 2017:** A technical advisory mission was carried out to Nepal to evaluate the current and potential use of space-derived information in all aspects of disaster management and to offer recommendations to strengthen the disaster risk management and emergency response in the country. The mission was conducted upon request from the Nepalese Ministry of Home Affairs (MoHA) and with the technical support of the International Centre for Integrated Mountain Development (ICIMOD), a UN-SPIDER Regional Support Office.

### Workshops and training

**20–24 February 2017:** Hosted by the Gabonese Space Agency in Libreville, UN-SPIDER supported the third synthetic aperture radar workshop coordinated by the Working Group on Capacity Development and Data Democracy of the Committee on Earth Observation Satellites (CEOS). The course aimed at opening up new opportunities for the use of synthetic aperture radar technology for the participants in the areas of disaster management, environment or food and water security.

**27 February–2 March 2017:** UN-SPIDER conducted a four-day workshop on information management in decision-making in Solomon Islands in collaboration with World Vision. The course was a follow-up activity to a 2012 technical advisory mission.

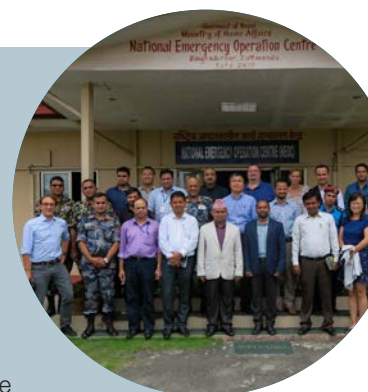
### 28 March–2 April 2017:

UN-SPIDER followed up on a previous technical advisory mission to Myanmar and organized a training programme on “Post Disaster (Earthquake) Rapid Damage Assessment”. The objective of the training was to build capacity for rapid damage assessment using geospatial and Earth observation technologies. The course included theory and hands-on sessions focused on the use of Earth observation in providing critical information and rapid mapping during earthquakes.

**24–28 April 2017:** As part of a follow-up to an earlier technical advisory mission to the country, UN-SPIDER and the Disaster Management Centre (DMC) of Sri Lanka conducted a three-day training on the UN-SPIDER Knowledge Portal and Recommended Practices related to drought monitoring. The mission also provided an opportunity to participate in the first meeting of the Advisory Board for the National Risk Assessment Project that the Disaster Management Centre was conducting.

**24–28 July 2017:** UN-SPIDER and the General Directorate for Civil Protection of El Salvador (DGPC) joined forces to conduct a one-week training course in San Salvador, focusing on general remote sensing techniques and on two UN-SPIDER Recommended Practices on droughts and floods. The training course targeted members of the inter-institutional technical team that is being set up by DGPC at the recommendation of UN-SPIDER as a result of a previous technical advisory mission to the country.

**31 July–2 August 2017:** UN-SPIDER, the National Secretariat of the Council of Science and Technology of Guatemala (SENACYT) and Executive Secretariat of CONRED (SE-CONRED) cooperated to conduct a three-day training course in Guatemala City. The training, which was a





follow-up to a previous technical advisory mission, focused on two UN-SPIDER Recommended Practices regarding droughts and forest fires in order to generate relevant and timely geospatial information that is useful for disaster risk reduction, preparedness and emergency response efforts.

**21–22 September 2017:** As part of the joint project “Earth Observation Based Information Products for Drought Risk Reduction at the National Level” (EVIDENZ), UN-SPIDER, the Institute for Environment and Human Security of the United Nations University (UNU-EHS) and the Centre for Remote Sensing of Land Surfaces (ZFL) of the University of Bonn held a workshop in Bonn, Germany.

**16–19 October 2017:** UN-SPIDER facilitated a training course in Guatemala on the use of radar imagery to map the extent of floods, focusing on the UN-SPIDER Recommended Practice on flood mapping. The event was a follow-up activity to a training course held from 31 July to 2 August.

**25–31 October 2017:** An international training course on integration of multisource Earth observation data for disaster damage assessment was held at Beihang University, Beijing. Twenty-four participants from 15 countries attended the training, which focused on flood and earthquake damage assessments, and was organized jointly with the Asia-Pacific Space Cooperation Organization (APSCO) and the National Disaster Reduction Centre of China (NDRCC).

**5–8 December 2017:** In Bangkok and Sri Racha, Thailand, UN-SPIDER held a regional workshop on drought resilience in agriculture and a regional training course on Earth observation-based tools for drought monitoring. The events were organized together with the International Water Management Institute (IWMI), the Geo-Informatics and Space Technology Development Agency (GISTDA), the ASEAN Research and Training Center for Space Technology and Applications (ARTSA) and the CGIAR Research Program on Water, Land and Ecosystems.

## Information resources

UN-SPIDER continued efforts to enhance its Knowledge Portal by adding additional links to web pages and portals that host satellite imagery and products; providing specific examples of satellite data applications for disaster risk reduction or emergency response focusing on accumulated rainfall and to monitor earthquakes; and providing a series of Earth observation and space technology applications supporting the implementation of the Sendai Framework provided by members of the Global Partnership Using Space-based Technology Applications for Disaster Risk Reduction (GP-STAR).

To support countries in assessing areas affected by wildfires, in 2017 UN-SPIDER developed a new step-by-step procedure on burn severity mapping. The procedure is available on the UN-SPIDER Knowledge Portal and can be followed using two software packages.

To promote the use of space-based information to improve drought monitoring efforts, UN-SPIDER elaborated a series of maps depicting the Vegetation Condition Index and the Standard Vegetation Index for Bolivia, El Salvador, Ghana, Guatemala, Kenya, Nicaragua, Nigeria and Sri Lanka. More than 350 maps were developed for each of these countries and provided to representatives of civil protection and other government agencies to improve their drought monitoring efforts. Efforts are under way to incorporate the routine use of information related to these two drought indices in drought early warning systems.

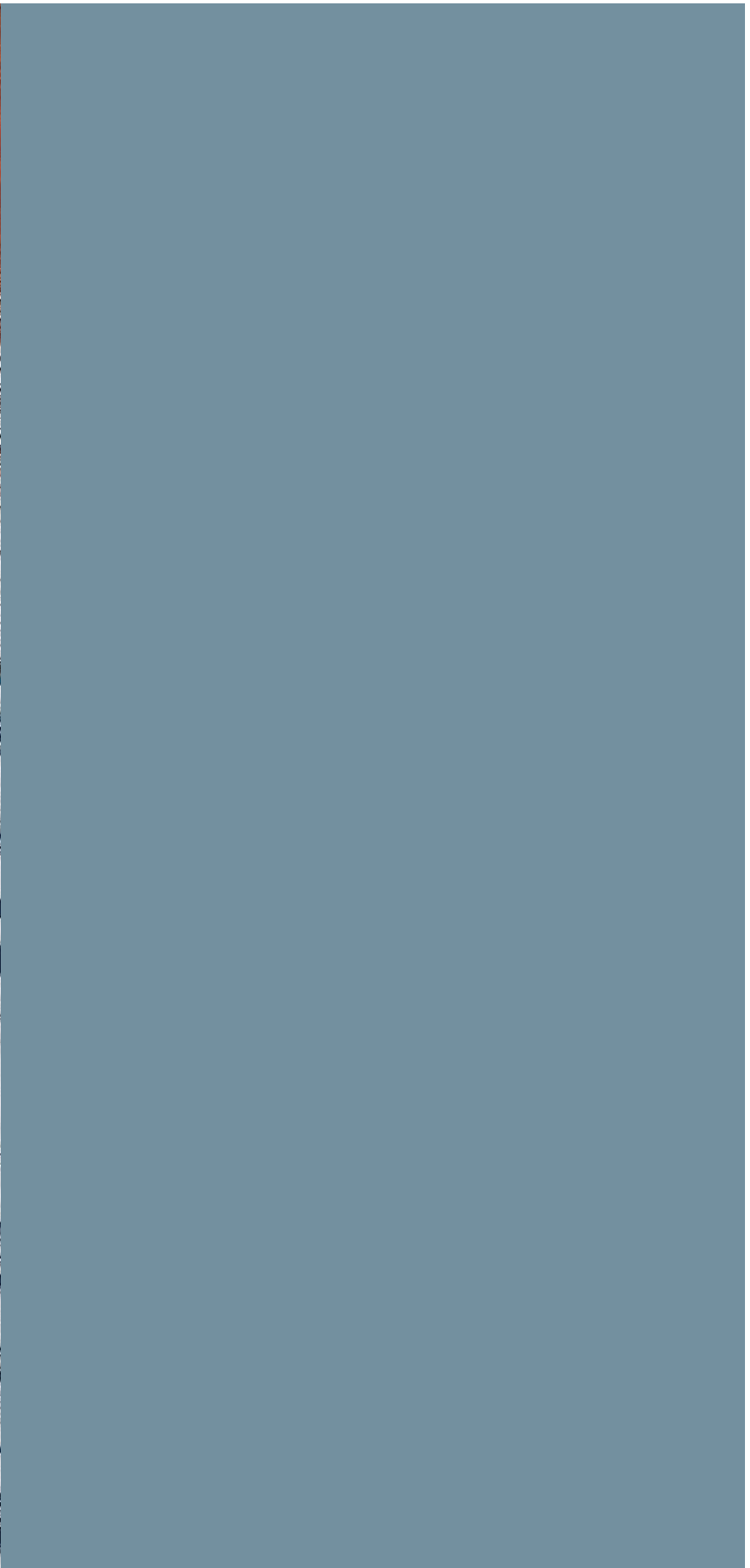




A satellite image showing a complex landscape. The upper portion is dominated by brown and tan terrain, likely a high-altitude or semi-arid region with a dense network of small, light-colored channels or roads. A large, irregularly shaped reservoir or lake is visible in the lower-left quadrant, surrounded by a darker, more vegetated area. The lower-right portion of the image shows a large, white, textured area that could be a snowfield, a large reservoir, or a highly reflective surface. The overall scene is a mix of natural and possibly human-made features.

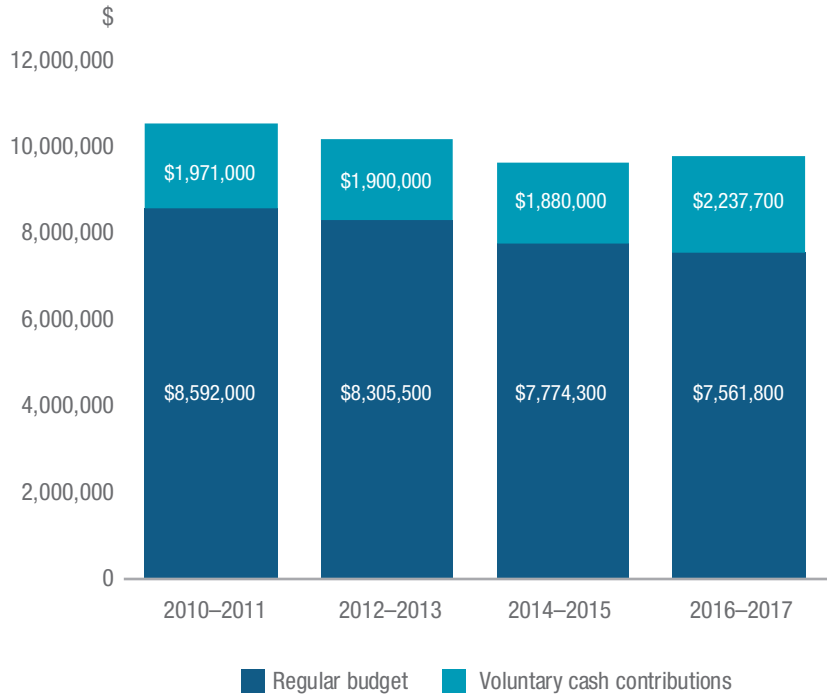
# Administrative information



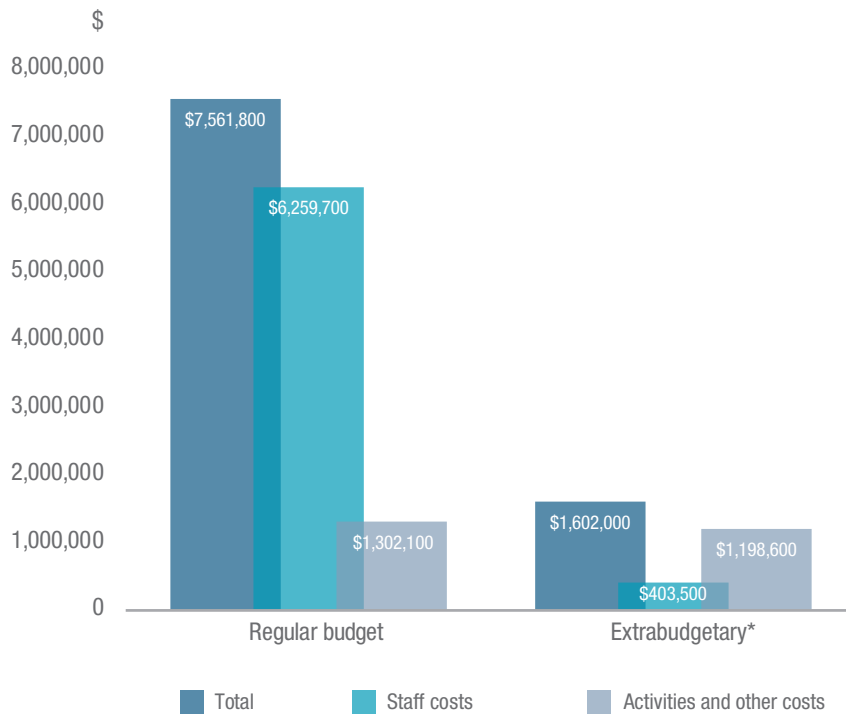




### Budget overview

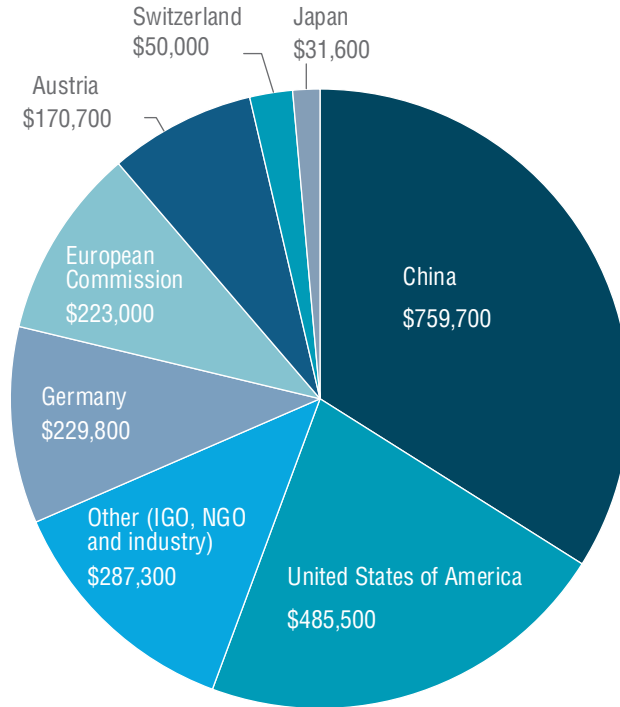


### Expenditure, 2016-2017

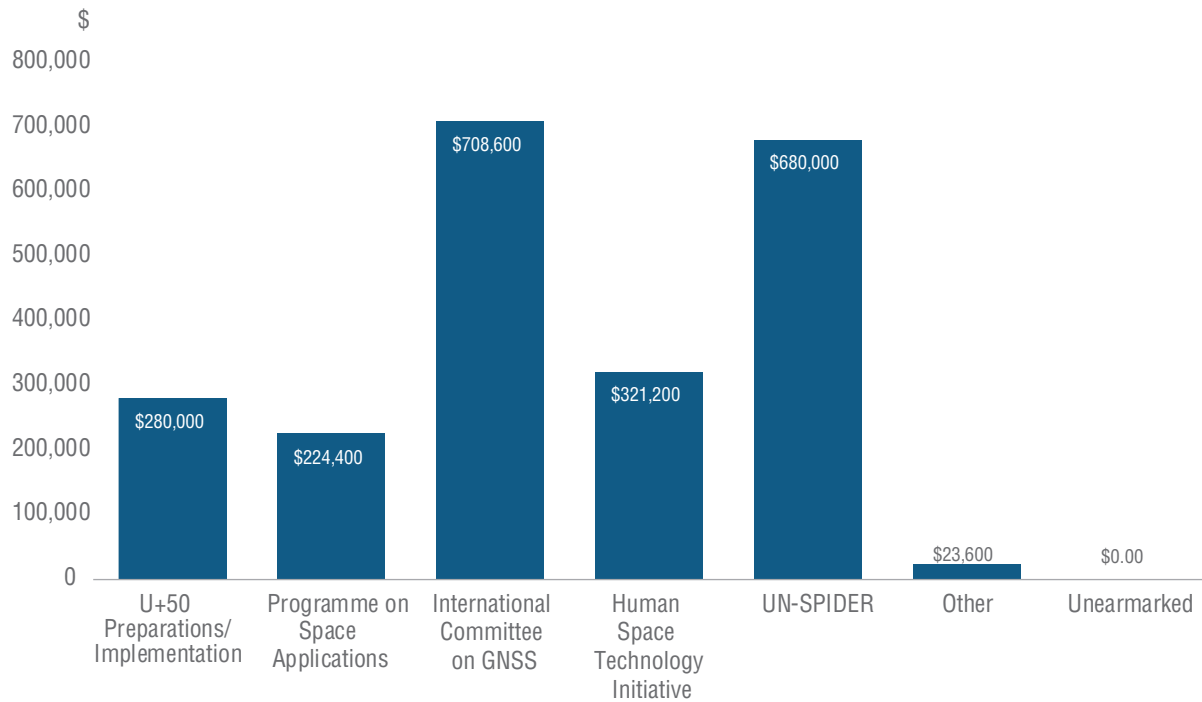


\*Extrabudgetary resources are utilized to implement the Office's capacity-building activities

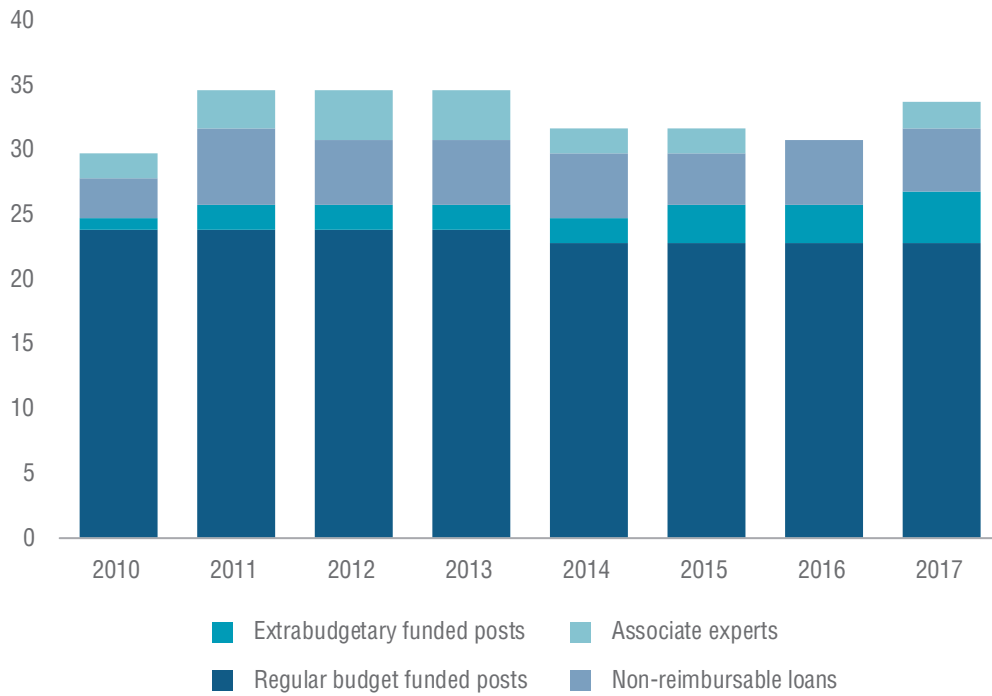
Voluntary cash contributions, 2016–2017—donors



Voluntary cash contributions, 2016–2017—thematic areas supported



## Staff







■ The United Nations Office for Outer Space Affairs (OOSA) is responsible for promoting international cooperation in the peaceful uses of outer space and assisting developing countries in using space science and technology.

