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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-first session, the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space recommended that the Secretariat continue to invite Member States to submit annual reports on their space activities (A/AC.105/1065, para. 29).
2. In a note verbale dated 31 July 2014, the Secretary-General invited States members of the Committee on the Peaceful Uses of Outer Space to submit their reports, by 20 October 2014. The present note was prepared by the Secretariat on the basis of reports received in response to that invitation.

II. Replies received from Member States

Australia

[Original: English]
[20 October 2014]

In 2013-2014, Australian Government agencies were involved in the following key civil space activities as they relate to the principles set out under the Australian Space Utilisation Policy (ASUP):

ASUP principle 1: Focus on space applications of national significance

With respect to Earth observation from space (EOS), the Commonwealth Scientific and Industrial Research Organisation (CSIRO) noted that it invests approximately 15 million Australian dollars per annum in Earth observation capabilities. Earth observation-related activities at CSIRO are undertaken in nine National Regional Flagships by approximately 100 staff.

The Bureau of Meteorology is leading preparation for the design and implementation of a national rolling review of requirements for EOS information, an EOS backbone for enabling access to standardized and calibrated EOS information, and protection of the radiofrequency spectrum for EOS-related uses.

The first of two Ka-band satellites that the National Broadband Network (NBN) company will use for the NBN long-term satellite service is expected to be in operation by early 2016. These satellites will provide high-speed broadband coverage to eligible premises across mainland Australia and Tasmania as well as outback areas and Australia's islands.

ASUP principle 2: Assure access to space capability

The Bureau of Meteorology has commenced detailed planning and preparations for the data reception and dissemination of Japan's next-generation geostationary meteorological satellite, Himawari-8, as well as stakeholder training in the effective use of those data.

The Australian Maritime Safety Authority (AMSA) will undertake significant space procurement activity commencing in 2014-2015 by establishing a contract for a satellite receiving ground station in Western Australia, the Medium Earth Orbit

Local User Terminal (MEOLUT), and installing a central processing computer in Canberra over the next few years. Through a specialist service provider, AMSA will also seek to access synthetic aperture radar (SAR) imagery for an oil spill monitoring programme.

In 2014-2015, Geoscience Australia will prioritize updating the national assessments of the current and potential economic value of EOS to Australia, as well as Australia's future EOS data requirements and priorities. Beyond 2014-2015, Geoscience Australia will prioritize securing ongoing access to data from the European Commission Sentinel series of satellites and undertake the necessary development work to integrate that data into Geoscience Australia data processing and distribution systems.

The Department of Communications will maintain oversight of the process to renew 15-year spectrum licences to existing licence holders, if appropriate. This includes spectrum licences in satellite spectrum bands (27, 28 and 31 Gigahertz (GHz)), which have a tenure period of 15 years and expire between January 2014 and January 2016. The Australian Communications and Media Authority is responsible for managing the process throughout 2014 to 2016.

ASUP principle 3: Strengthen and increase international cooperation

CSIRO will coordinate the Committee on Earth Observation Satellites (CEOS) chairmanship in 2016, via a multi-agency secretariat, and support active participation by CSIRO experts in key CEOS working groups before and after the specific chairmanship period.

Geoscience Australia will support a strong "team Australia" approach to the CSIRO chair period, and will be increasing their contribution to the international EOS community through relevant CEOS groups and projects.

CSIRO radioastronomy will continue to epitomize international cooperation through its "open skies" policy of making radioastronomy assets available to researchers worldwide.

CSIRO hosted an event commemorating 50 years of space tracking cooperation with the National Aeronautics and Space Administration (NASA) of the United States of America on 19 March 2014, and, together with the Space Coordination Office and the Department of Foreign Affairs and Trade, extended the Bilateral Space Tracking Treaty with the United States on 24 February 2014 until 2018.

The Bureau successfully hosted the fourth Asia-Oceania Meteorological Satellite Users Conference in October 2013, with the attendance of 120 participants, including over 60 international guests.

ASUP principle 4: Contribute to a stable space environment

The Department of Foreign Affairs and Trade has invested a significant effort in supporting the European Union's efforts to progress its valuable initiative for a code of conduct to address the proliferation of space debris, which poses a risk to the critical space-enabled services of all nations.

In 2013-2014, the Space Coordination Office continued its role as co-chair of expert group D, assisting the Committee on the Peaceful Uses of Outer Space Working Group on the Long-term Sustainability of Outer Space Activities.

ASUP principle 5: Improve domestic coordination

The Space Coordination Office's key priority, as the central point of contact and coordination for all civil space activities, continued.

In 2013-2014, the Space Coordination Office undertook activities to improve the domestic coordination of civil space activities, including establishing and maintaining the Australian Government coordination framework for civilian space activities. This included the formation of the Space Coordination Committee and acting as the secretariat of the Committee.

ASUP principle 6: Support innovation, science and skills development

CSIRO currently has approximately 350 staff involved in space science activities, primarily focused on using space-based systems and data streams to perform research and deliver nationally significant outcomes where space provides the most effective and efficient means for delivering this impact.

Geoscience Australia and CSIRO will continue development of the Australian Geoscience Data Cube, a system that intends to enable government, industry and researchers to access and extract value from the nation's massive holdings of EOS data using high performance computing such as the National Computational Infrastructure.

CSIRO has developed extensive capability in space-related areas that include Earth observation, navigation and communication, advanced aerospace technologies, spacecraft tracking and radio astronomy.

The Department of Industry announced a Cooperative Research Centre on Space Environment Management on 21 February 2014. The Centre will monitor, analyse and mitigate space debris and develop new approaches to preserving the space environment.

ASUP principle 7: Enhance and protect national security and economic well-being

The Space Coordination Office and the Attorney-General's Department established a Space Community of Interest in the Trusted Information Sharing Network for Critical Infrastructure Resilience. The Space Community of Interest will work with other critical infrastructure sectors on a risk assessment to identify critical infrastructure dependencies on space infrastructure and propose options to mitigate identified risk.

The Department of Foreign Affairs and Trade made progress on inter-agency discussions on the transparency, oversight and compliance regime, which aims to create a regulatory framework for ground-based civil space infrastructure.

Airservices Australia has made a major capital investment in space infrastructure through the nationwide Automatic Dependent Surveillance-Broadcast (ADS-B) surveillance network. The Civil Aviation and

Safety Authority has put in place a number of global navigation satellite systems-based surveillance and navigation mandates that come into effect progressively from December 2013 until February 2017.

Austria

[Original: English]
[15 October 2014]

Projects with relevance to developmental aid and/or the United Nations Platform for Space-based Information for Disaster Management and Emergency Response

In the framework of the Austrian Space Applications Programme (ASAP) several projects with relevance to developmental aid and the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) have been funded in recent years.

Currently, the EO4HumEn Earth observation-based services support humanitarian operations, monitoring population and natural resources in refugee/internally displaced persons (IDP) camps. There is one ASAP project running that is particularly interesting in this context. The project background is that population displacement due to armed conflicts, regional crisis or natural disasters often leads to large-scale, highly dynamic settlements which challenge humanitarian relief operations. During crisis situations up-to-date, targeted and reliable information on (a) population numbers and densities, (b) potential groundwater reservoirs and (c) the impact on the local environment are required for mission planning as well as for the day-to-day operation of refugee and/or IDP camps. The acquisition of in situ spatial data in these often remotely located camp surroundings is challenging and sometimes even dangerous. Thus, the EO4HumEn project aims at developing operational services and products to support humanitarian operations during crisis situations by means of dedicated geospatial information products derived from Earth observation and geographic information system data. The developed products will be provided as maps, online web services and reports, and will be fully validated by the user in terms of their relevance and usability. The project had its kick-off in October 2013 and will end in March 2015.

Space weather

With respect to international space weather activities, Austria's role has increased in the recent past: as such, the University of Graz, represented by the Kanzelhöhe Observatory for Solar and Environmental Research, has joined the International Space Environment Service (ISES) as a new member.

ISES is a collaborative network of space weather service-providing organizations around the globe. The mission is to improve, coordinate and deliver operational space weather services. ISES is organized and operated for the benefit of the international space weather user community.

ISES currently includes 14 regional warning centres, four associate warning centres and one collaborative expert centre. ISES is a network member of the

International Council for Science World Data System (ICSU-WDS) and collaborates with the World Meteorological Organization and other international organizations.

ISES has been the primary organization engaged in the international coordination of space weather services since 1962. ISES members share data and forecasts and provide space weather services to users in their regions. ISES provides a broad range of services, including forecasts, warnings and alerts of solar, magnetospheric and ionospheric conditions; space environment data; customer-focused event analyses; and long-range predictions of the solar cycle.

TUGSAT-1/BRITE

BRITE-AUSTRIA/TUGSAT-1, the first Austrian nanosatellite, was successfully launched on 25 February 2013 by the Polar Satellite Launch Vehicle (PSLV) launcher of ISRO/ANTRIX from the Satish Dhawan Space Centre in Sriharikota, India. BRITE-AUSTRIA was launched together with the other Austrian BRITE satellite from the University of Vienna (UniBRITE). The in-orbit validation and optimization show a nominal and even better-than-specified behaviour of BRITE-AUSTRIA.

The mission's objective is to collect in-orbit data on variations in the brightness of massive luminous stars by using the two Austrian nanosatellites, each observing in a different wavelength. Observation of the subtle pulsation of stars over a long period of time allows for conclusions about their structure, their chemical composition and their age. The scientists attempt to clarify contradictions in the origin of stars.

The scientific operation has been nominally ongoing since May 2013, with the successful observation of different star fields. The nominal lifetime of the satellite is two years, with a good probability of being further extended.

Microgravity research

The Technical University of Vienna is scientifically involved in the Japanese and European Research Experiment on Marangoni Instabilities (JEREMI), consisting of two activities: "Dynamics of suspended particles in periodic vortex flows" and "Thermocapillary oscillatory motion and interfacial heat exchange", led by Belgium. The experiment with the European Space Agency (ESA) and the Japan Aerospace Exploration Agency (JAXA) will be performed on the International Space Station (ISS) in the area of fluid dynamics research. The instrument for the cooperative JEREMI project is being implemented by JAXA as an insert in the Fluid Physics Experiment Facility in the Japanese Experiment Module Kibo of ISS. The target launch to ISS is in 2015.

The Technical University of Graz is scientifically involved in the experiment "Electrical resistivity measurement of high temperature metallic melts (RESISTIVITY)", to be performed on the International Space Station.

The University of Leoben is scientifically involved in the experiment "Metastable solidification of composites: novel peritectic structures and in situ composites (METCOMP)", to be performed on the International Space Station.

Summer School Alpbach 2014: “Geophysics of the terrestrial planets”

Sixty young, highly qualified European science and engineering students converged from 15 to 24 July 2014 for a stimulating 10 days of work in the Austrian Alps. The Summer School addressed those aspects of geophysics that use space-based systems, satellites and planetary probes to investigate the interiors and surface processes of the four terrestrial planets.

The students conceived and designed space missions that might help to better understand the geophysics of the solid planets: their cores, their mantles and the characteristic structures and dynamics of the solid planetary bodies. The Summer School also provided the opportunity for the student teams to design what will be effectively first generation geophysics missions to the other three planets.

The Summer School provided expert guidance and support by renowned European scientists and engineers, together with top lecturers from a diverse international mix of universities. Student teams competed to design a space mission judged by a jury of experts. Students learned how to approach the design of a satellite mission and explored new and startling ideas supported by experts. The aim of the Summer School is to offer advanced training and working experience to selected European students on subjects which are not usually part of the academic curricula. The Summer School features both lectures and concentrated work in self-organized working groups.

National research on space debris

Since 1982, the Institute for Space Research of the Austrian Academy of Sciences has operated a satellite laser ranging station at the Observatory Lustbühel in Graz. This station measures — day and night, seven days a week — distances to retroreflector-equipped satellites (more than 60 satellites), such as geodetic satellites, global navigation satellite system satellites (Galileo, global positioning systems, Global Navigation Satellite System (GLONASS), Compass etc.), Earth observation satellites, and various scientific and research satellites. The single-shot accuracy of the Graz measurements is about 2-3 millimetres (mm); distance differences down to 0.2 mm can be distinguished. With these results, the Graz satellite laser ranging station is considered to be one of the most accurate in the world.

Since 2012, the laser station in Graz has started to test laser ranging to space debris objects; new specialized single photon detectors were developed, and the laser ranging software for space debris tracking was adapted. For the first time, measurements were made of photons that had been diffusely reflected from space debris objects, thus determining the distance to these objects. Although the accuracy of these measurements is not in the millimetre range — the selected debris objects are 1 metre to a few meters in size — this allows significantly better orbit determination of these objects.

Additional improvements of orbit determinations are possible if other satellite laser ranging stations are able to detect the diffusely reflected Graz photons. In 2012, for the first time, such an experiment was successful: the photons transmitted in Graz were diffusely reflected by the satellite and detected at the satellite laser ranging station in Zimmerwald, Switzerland, which had to be synchronized with the

Graz station. This method can be extended without problems to include several other “receive-only” stations.

Since 2013, the laser station at Graz has been involved in the European Space Agency’s Space Situational Awareness programme. In the next years, cooperation shall be increased at the European and international levels.

Belarus

[Original: Russian]
[20 October 2014]

Annual report of the Republic of Belarus on its international cooperation in the peaceful uses of outer space

The Republic of Belarus is ready and willing to participate in the processes of international integration and cooperation for the peaceful uses of outer space. The policy of peaceful exploration and use of outer space is fully in line with our national interests and is being pursued within the framework of the development of our country’s space activities.

With the launch of the Belarusian BKA space apparatus on 22 July 2012, Belarus joined the ranks of the world’s spacefaring nations. At the sixty-eighth session of the General Assembly, on 1 November 2013, Belarus became a member of the Committee on the Peaceful Uses of Outer Space.

Belarus has signed and ratified intergovernmental agreements on exploration and the peaceful use of outer space with the Russian Federation and Ukraine. A similar agreement with Kazakhstan has been prepared for signing.

Our main strategic foreign partner is the Russian Federal Space Agency (Roskosmos). Together with the Russian Federation, Belarus is implementing a Union State scientific and technical programme entitled “Development of space- and ground-based means for supplying customers in the Russian Federation and Belarus with Earth remote sensing data” (“Monitoring-SG programme”). Cooperation has been under way to establish and distribute high-resolution Earth remote sensing satellite systems in the commercial market for space data, gathered by the Belarusian space apparatus. Belarus and the Russian Federation have jointly created and are successfully operating a constellation of Earth remote sensing satellites with a two-metre resolution. Joint projects are being undertaken to create new, more technically advanced Earth remote sensing satellites and the associated ground infrastructure. An agreement has been reached with Roskosmos to represent the interests of Belarus as a member of the International Charter on Space and Major Disasters.

The achievements of the Belarusian space sector are the result of activities carried out under the National Programme for the Exploration and Use of Space for Peaceful Purposes (National Space Programme) for 2008-2012.

Under the National Space Programme project to set up the Belarusian Space System for Remote Earth Sensing, a space cluster consisting of the Belarusian BKA

space apparatus, the ground control facility and infrastructure for receiving, processing and disseminating space information is in operation.

Thanks to the Belarusian space system, Belarus has demonstrated its advanced technical level in this field and has been able to develop its space infrastructure for commercial purposes. The technical capabilities acquired in setting up the Belarusian Space System for Remote Earth Sensing have allowed national enterprises to launch new and unique products. The space infrastructure in place provides services to sell satellite images and related products (navigational charts, orthophoto images, topographic maps and thematic mapping) and is the basis for the supply of special software for export.

The National Academy of Sciences of Belarus, in collaboration with interested organizations, has prepared a draft framework for the National Programme for the exploration and peaceful use of space for the period 2014-2018, to provide a basis for formulating a national space programme aimed at focusing scientific and technological capacities on addressing the key challenges in guaranteeing national security and the socioeconomic development of national economic sectors and in developing the productive sector of the space industry.

It is envisaged that our national space activities in the immediate future will continue along the following main lines with respect to further development of the Belarusian Space System for Earth Remote Sensing:

- (a) Establishment of a national satellite communication and geostationary satellite broadcasting system;
- (b) Further development of navigation, geodetic and cartographic projects using space technologies;
- (c) Creation and development of personnel, scientific and technical, organizational and legislative support for space activity.

Germany

[Original: English]
[27 October 2014]

The German election of the Bundestag in late 2013 confirmed once more through the coalition agreement the Space Strategy of the German Federal Government, through the statement that "...aerospace plays an important strategic role for our business location and is a cornerstone of European collaboration. It is a pioneer for the development...of technology and...acts through transfer of technology as a strong driver of innovation for other business areas". This strategy, published by the Federal Ministry of Economics and Technology, orientates the national space policy towards benefits and demand, bases it on the principle of sustainability, and aspires to intensify international cooperation.

During the reporting period, several milestones for implementing the strategy were achieved. In line with the topic of technology as a strong driver of innovation, the German Aerospace Centre (DLR) conducted, on behalf of the Federal Ministry for Economic Affairs and Energy, its 2014 conference within the "INNOSpace Initiative", dealing with aerospace and maritime economy and industry. The

objective of the overall initiative is to bring together space and non-space communities to enhance new markets and to support technology transfer and innovation. These federal activities strengthen the continuous and stable development of space affairs in Germany and pave the way for future engagements at the national, European and international levels.

One of the milestones in the European space landscape is the meeting of the ESA Council at the ministerial level to be held in Luxembourg in December 2014. The focus is on three strategic topics: further progress on launchers, next financial commitment to the International Space Station and the enhancement of the relation between ESA and the European Union. Germany, as one of the main financial contributors to ESA activities, continues its ISS support at Toulouse and is convinced that negotiations on the launchers Ariane 5 and 6 will be fruitful.

For the time period 2014-2020, the three European flagship programmes Copernicus, Galileo and the European research programme Horizon 2020 (H2020) are important milestones.

Since April 2014, the Copernicus regulation has been adopted, and the multi-annual financial framework is secured. Following its launch on 3 April, Sentinel-1A delivers data globally, predominantly for maritime and marine applications. Among others, Germany, as part of a Europe-wide network, prepared the data processing, archiving and distribution for the masses of data from Sentinel-1A at the processing and archiving centre (PAC). With the Laser Communication Terminal, Sentinel-1A continues the test usage of the communication link started with the German TerraSAR-X, also implemented on Alphasat I-XL, launched in 2013, and planned as well for the upcoming European Data Relay Satellite (EDRS) of ESA. Sentinel-1A will be the first customer for EDRS, the planned European data highway in space.

Since January 2014, the Global Navigation Satellite System (GNSS) Regulation has established the rules in relation to the implementation and exploitation of European satellite navigation systems. Unfortunately, during the last launch of two Galileo satellites, a failure occurred. The European ground teams deployed at the ESA control centre, the European Space Operations Centre, in Darmstadt, Germany, in cooperation with the satellite manufacturer OHB System, confirm that both satellites are in a safe state despite having been released in a lower and elliptical orbit instead of the expected circular orbit, on 22 August 2014. An independent inquiry board was created.

H2020, the new European Union Framework Programme for Research and Innovation for the period 2014-2020, has started successfully with the first calls. Being part of the leadership in enabling and industrial technologies space relates to the development of technologies in order to strengthen the competitiveness of the European Space Sector in the fields of technology and science and contributes to research and development of services and applications in the field of European Global Navigation Satellite System (EGNSS) and Copernicus. The first space call for 2014 has been evaluated. The significant oversubscription in the field of services for Earth observation is remarkable. Despite this, the German contribution is significantly represented in several projects. The European Commission, in conjunction with States members of the European Union, is preparing the next work programme for 2016 and 2017.

The comet chaser Rosetta with its lander Philae is one of the outstanding current missions under the responsibility of ESA and with contributions by member states and NASA. Philae was developed and built by the consortium consisting of the Centre national d'études spatiales, DLR, the Italian Space Agency (ASI) and the Max Planck Institute for Solar System Research, under the lead of DLR. After the wake-up procedure in January and the reactivation of Philae in March 2014, Rosetta approached the comet 67P/Churyumov-Gerasimenko, at a distance of 100 kilometres, at the beginning of August. During the escort phase of the comet's path towards the sun, Rosetta gathers unique data of outstanding quality for scientists. The landing place for the deployment of Philae was identified in September 2014. The deployment of Philae on the rough terrain of the comet is planned for 12 November 2014. For the first time ever humankind will experience and monitor the development of the comet during the heating process when approaching the sun. It will be first ever landing on a comet. The research will provide insight into the earliest history of our solar system.

The high-resolution camera on Rosetta, developed by DLR, became a central element of the FireWatch system. This early warning system is able to automatically monitor areas of several hundred square kilometres of forest and detect fires with a reliability of more than 99 per cent. Owing to the success of the system in Germany, foreign forest services implemented up to 280 FireWatch systems in several European countries, as well as in Mexico, Kazakhstan and the United States.

In addition to that outstanding international mission, the International Space Station is the most prominent example of the strengthening of peaceful relations and intensification of international cooperation. For 15 years now, the partners — the United States, the Russian Federation, Japan, Canada and Europe — have jointly conducted research and development projects, as well as long-lasting maintenance work. Germany is the main supporter of the European contribution to the International Space Station. In May 2014, the mission "Blue dot — shaping the future", with Alexander Gerst, was started. The ESA astronaut of German nationality was a crew member for six months in 2014. He was involved in more than 140 experiments dealing, among other things, with technology demonstration, radiobiology and astrophysics. The docking of the Automated Transfer Vehicle 5 (ATV-5) in August 2014, the last vehicle in that series, was successfully conducted by him as the responsible flight engineer. Like all other previous ATVs, ATV-5 was assembled by German industry.

The Stratospheric Observatory for Infrared Astronomy (SOFIA), is one of the most important ongoing bilateral projects in the 50-year period of fruitful collaboration with the United States. SOFIA is used to explore astronomic objects such as the Milky Way or the Magellanic Clouds. After the far-infrared spectrometer German Receiver for Astronomy at Terahertz Frequencies (GREAT), the new far-infrared spectrometer Field-Imaging Far-Infrared Line Spectrometer (FIFI-LS) is the second instrument developed and built by German research institutions. The data retrieved from measurement flights over the northern and southern hemispheres deliver data for a first map of unique quality showing the background radiation. The German contributions are financed by the Federal Ministry of Economic Affairs and Energy through DLR.

With Japan, Germany also holds a very stable and longstanding relationship in science and research. After the opening of the German Aerospace Centre office in

Tokyo in February 2013, the test phase has been so impressively successful that the office is being continuously maintained to strengthen future cooperation. Two main joint space collaboration projects are the Japanese asteroid mission Hayabusa 2 and space-based radar. The Mobile Asteroid Surface Scout (MASCOT), the landing package, was developed and built under the leadership of the German Aerospace Centre, jointly with France. In that five-year sample return mission, MASCOT will provide in situ measurements.

DLR has been carrying on a cooperation framework agreement with the China National Space Administration since 1994. To accommodate the latest developments in space and technology worldwide, the two signed an updated agreement during the intergovernmental consultations in October 2014.

The compendium on space debris mitigation standards adopted by States and international organizations, an initiative of Canada, the Czech Republic and Germany, is one milestone to protect Earth and its environment. Since the fifty-seventh session of the Committee on the Peaceful Uses of Outer Space, it has been maintained and is to be developed further as a live document by the Office of Outer Space Affairs of the Secretariat via a dedicated, publicly available website.

As Germany considers the benefit of space-based technology for disaster management and reduction to be very high, the Federal Ministry for Economic Affairs and Energy extended the financial support for the UN-SPIDER office in Bonn, and DLR extended the staff secondment to the office. The international meeting in 2014, the United Nations/Germany Expert Meeting on the Use of Space-based Information for Flood and Drought Risk Reduction, successfully prepared certain issues for the upcoming third World Conference on Disaster Risk Reduction, to be held in Sendai, Japan, in 2015. These efforts, together with other activities, such as the technical advisory missions, are highly appreciated, mainly by so-called developing and emerging countries.

In addition, the DLR Centre for Satellite-based Crisis Information (ZKI) has completed more than one and a half years of operational satellite mapping service for the Federal Government of Germany and its respective civil protection and humanitarian relief actors. ZKI also fulfils international requests.

Experience has shown once again that space-based emergency mapping can be achieved effectively only in close cooperation with international mechanisms such as UN-SPIDER, the International Charter on Space and Major Disasters and the International Working Group on Satellite-based Emergency Mapping (IWG-SEM). The very positive experiences with the international space and emergency mapping community, e.g., in the aftermath of the typhoon Haiyan, encouraged the German Aerospace Centre to continue its support for the International Charter on Space and Major Disasters and the International Working Group on Satellite-based Emergency Mapping. Germany delivered 116 images for 34 Charter activations, and RapidEye data was delivered eight times.

In February 2014, Germany attended, as one of 18 members, the inaugural event of the Space Mission Planning Advisory Group (SMPAG) to prepare for an international response to a near-Earth object (NEO) threat through the exchange of information and the development of options for collaborative research and mission opportunities, and to conduct NEO threat mitigation planning activities. Germany is

also member of the virtual International Asteroid Warning Network (IAWN) to monitor NEOs worldwide.

The NEOShield project, financed by the European Union and carried out under the leadership of DLR and Astrium of Germany, analyses open questions relating to realistic options for preventing the collision of a NEO with the Earth. Involved partners come from France, Switzerland, Spain, the United Kingdom of Great Britain and Northern Ireland, the Russian Federation and the United States.

Scientists from DLR have recently discovered a new and potentially very useful means of identifying metal-rich asteroids from their heat signatures. This is important as metal-rich asteroids can cause far more damage during impact with Earth than other asteroid types. It is also good news for commercial enterprises planning to mine asteroids.

Finally, the detection of the second solar system of seven planets that circle the star KOI-351, although packed together more tightly, is an outstanding example for international research collaboration. The work of a group of European researchers, including the ones from the German Aerospace Centre, provides an interesting comparison to our cosmic home and is considered as an important step in the search for a so-called twin solar system.

Latvia

[Original: English]

[8 October 2014]

The Institute of Astronomy University of Latvia is upgrading the existing operating satellite laser ranging (SLR) station and researching the possibility of adding space debris laser ranging capability, which will improve the determination of the orbit of space debris.

The International Radio Astronomy Centre of Ventspils University College of the State investigated, together with its collaboration partners (the National Space Facilities Control and Testing Centre of the State Space Agency of Ukraine (Yevpatoria), the Radiophysical Research Institute (NIRFI) of the Ministry of Education and Science of the Russian Federation (Nizhny Novgorod), the Radioastronomy Institute of the National Institute for Astrophysics of Italy and the Institute of Radioastronomy of the National Academy of Sciences of Ukraine (Kharkov)) the possibilities of using very-long-baseline interferometry capabilities and in combination with radio location in order to specify the coordinates and orbital speeds of space debris, asteroids and satellites. The expected results may provide additional possibilities to determine their orbital parameters in comparison with single dish radar methods.

Netherlands

[Original: English]

[5 November 2014]

Annual report of the Netherlands on outer space affairs for 2013

National activities

The most important highlights with respect to the activities of the Netherlands in outer space in 2013 are the evaluation of the Netherlands Space Office, the preparations of the Dutch company, Space Expedition Corporation, to offer commercial spaceflights in 2015, the successful launch of three Dutch CubeSats and the start of the process to modify the Dutch Space Act so that non-steerable satellites (e.g., CubeSats) will be subject to the Space Act.

Netherlands Space Office

The Ministry of Economic Affairs, the Ministry of Education, Culture and Science, the Ministry of Infrastructure and the Environment and the Netherlands Organization for Scientific Research (NWO) signed an agreement in October 2008 for the establishment of the Netherlands Space Office (www.spaceoffice.nl). The Netherlands Space Office (NSO) acts as the Dutch agency for space affairs. When it was founded in 2009, it was agreed that NSO would be evaluated after three years. Consulting firm Ecorys B.V. carried out the evaluation and presented its report in 2013. The Minister of Economic Affairs submitted the report to the Parliament's House of Representatives. The general conclusion is that NSO is successful in carrying out its mission. The mission of NSO is to develop and realize the Dutch space programme and to act internationally as the Dutch space agency.

Space Expedition Corporation

Suborbital aeroplane projects and commercial spaceflight projects are imminent. Commercial spaceflights create a unique opportunity to enable individuals to explore the outer space and to facilitate and accelerate the development of related projects for the European industry. In the Netherlands, the Dutch company Space Expedition Corporation (SXC) (www.spacexc.com), founded in 2008, intends to offer suborbital space tourism flights and scientific research missions from the Caribbean island of Curaçao.

XCOR Aerospace announced in June 2014 that it had closed the acquisition of all operational subsidiaries of SXC, the previously independent Dutch company. SXC served as the XCOR general sales agent for XCOR Lynx flight sales and as their lead wet lease customer. The new sales entity, XCOR Space Expeditions, will continue to focus on sales, commercial partnerships and participant (customer) training at the global level, and will serve as an open sales channel available for all future XCOR Lynx wet lease clients.

CubeSat launch

Launch service provider International Space Company (ISC Kosmotras) successfully launched, on 21 November 2013, three Dutch CubeSats (Triton-1,

FUNcube-1 and Delfi-n3Xt). The launches were commissioned by Innovative Solutions in Space Delft (ISIS), Delft University of Technology, and by Radio Amateur Satellites AMSAT-NL.

The Radiocommunications Agency Netherlands, in its role of notifying administration for the three CubeSat operators, has internationally coordinated and notified the orbits and frequencies used by these satellites. This means that information was exchanged with administrations regarding possible interference between these CubeSats and communication networks of such administrations.

National legislation

As mentioned in the previous report, the preparations to modify the Space Act is in full progress and will be ready by the end of 2014. Hereafter non-steerable satellites (e.g., CubeSats) shall be subject to the Space Act.

At the end of 2013, there were 14 satellites under Dutch jurisdiction, 10 geostationary communication satellites and 4 CubeSats.

International exchange and cooperation

Space surveillance and tracking

The current discussion about the proliferation of space debris and the increased possibilities of collisions and interference with the operation of space objects raise concerns about the long-term sustainability of space activities. The Netherlands underlines this concern but has no national space debris mitigation mechanism because space policy in the Netherlands is primarily focused on international cooperation in European contexts within ESA, the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT) and the European Union. As a State member of the Committee on the Peaceful Uses of Outer Space, the Netherlands fully adheres to the Space Debris Mitigation Guidelines of the United Nations and the European Code of Conduct for Space Debris Mitigation.

The Netherlands supports the European Union initiative of developing a framework for a European Space Situational Awareness system in order to avoid collisions by space surveillance and tracking activities.

World Radiocommunication Conference 2015

In the frame of the discussions for identifying new frequencies for terrestrial broadband mobile systems, the United States Administration recently proposed to extend the current Radio Local Area Network (RLAN) allocation to the frequency range 5,350-5,470 MHz. This extension is part of a national United States plan that could be adopted worldwide by making this new allocation part of the International Telecommunication Union (ITU) Radio Regulations at the World Radiocommunication Conference 2015 (WRC-15).

The European Union and ESA expressed their concerns about the proposed new allocation for RLAN in view of the need to protect the large investments made by ESA Member States and by the European Union in space systems exploiting the above-mentioned frequency band for the Global Monitoring for Environment and

Security (GMES) programme, as well as for other future missions. The Netherlands supports the concerns expressed by the European Union and by ESA.

Nanosatellites

The main purpose of building and developing nanosatellites is that they form an inexpensive alternative to the existing expensive large telecommunications satellites. In the international context, there is no specific frequency spectrum and regulations for the use of nanosatellites in space. At the World Radiocommunication Conference held in February 2012, at the initiative of the Netherlands, it was agreed to have this subject on the agendas of the next World Radiocommunication Conferences in order to achieve internationally agreed regulations (WRC-15) and frequency bands (WRC-18) for nanosatellites. Discussion continued at the international level in 2013. Some ITU Member States have expressed doubts about the need to allocate a specific spectrum for nanosatellite operations. However, the Radiocommunications Agency has strongly pushed the necessity of allocating such spectrum. According to the Radiocommunications Agency, amateur frequency bands get congested with nanosatellite usage in the longer term, and, because it is not allowed to use amateur bands for purposes other than experiments and testing, commercializing nanosatellite services would not be possible.

Radiocommunications Agency Netherlands

Satellite communications

The Radiocommunications Agency (www.agentschaptelcom.nl) supervises a large number of activities in the satellite communications field on behalf of the Minister of Economic Affairs (notably, compliance with the Radio Spectrum Policy). The Radiocommunications Agency is responsible for obtaining and allocating frequency space and orbits and monitoring its use.

Dutch satellite operators

Satellite operators themselves cannot conclude formal international agreements regarding their space operations; this right is reserved for national Governments only. In the Netherlands, this role is fulfilled by the Radiocommunications Agency. The Radiocommunications Agency claims for Dutch satellite operators rights for orbital positions, frequency bands and technical parameters through the so-called "ITU filing" procedure. This task is named "Notifying administration". Before the Radiocommunications Agency decides to perform this task for a Dutch satellite operator, the Radiocommunications Agency concludes an agreement in which the mutual rights and obligations are written down. In 2013, the Radiocommunications Agency had agreements with New Skies Satellites B.V. (SES), Spectrum Five B.V., Radio Amateur Satellites AMSAT-NL, Innovative Solutions In Space Delft and Delft University of Technology.

Satellite policy regarding foreign satellite operators

Since several foreign satellite operators requested information regarding a role of the Radiocommunications Agency as notifying administration (see previous item), it was agreed to develop guidelines regarding the conditions under which such a role can be accepted for a satellite operator by the Radiocommunications

Agency. During 2013 a draft policy was developed. In 2014 this policy will be finished and formally implemented and create a framework for the work of the Radiocommunications Agency for satellite operators.

Geostationary satellite operators

On 3 December 2013, the SES-8 satellite was successfully launched from Cape Canaveral in the United States by the private launch company SpaceX. SES-8 will operate at the orbital position 95 degrees East. It was the first time that a large communications satellite had been launched by a private launch company.

Some Netherlands-registered geostationary satellites drifted from one to another orbital position in 2013, which was the result of the launch of new satellites or changed market opportunities.

Satellite operator Spectrum Five ordered their first (geostationary) satellite, which will be launched in 2016 and operationalized at the orbital position 95 degrees West.

03b (the "Other 3 billion")

03b is a satellite project with the objective of providing broadband Internet via satellite in the developing world or, in other words, the other 3 billion people on Earth who do not have broadband Internet access available. The system will be operational in 2015. The operational headquarters of 03b is located in the Netherlands, in premises shared with satellite operator New Skies Satellites B.V. in The Hague. In 2013, a licence was granted to 03b for a satellite Earth station at their office in The Hague. The station will be used for experiments and demonstrations.

Mobile satellite services (2GHz)

In recent years the European Commission has worked on a pan-European frequency allocation for mobile satellite services. The European Commission decided that Member States should grant rights of use for providers selected by the European Commission. As a result of the selection procedure, the Commission granted the frequency rights to satellite operators Inmarsat and Solaris Mobile. On the basis of a European Commission decision, a timeline and milestones have been developed, which the operators have to take into account in developing their networks. Unfortunately, the development of these systems has not matured in the past years. Because of that, three European Commission member States (the United Kingdom, Germany and the Netherlands) developed a so-called roadmap, a list of milestones that the operators have to comply with within a certain time frame, which should result in operational satellite systems before May 2016. The roadmap is accepted as a way forward by member States, the European Commission and operators. Both operators have proved to be compliant with the first milestone (deadline of December 2013) related to contracting a satellite construction company and providing the evidence of such contract. Further developments will follow and be monitored in 2014.