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Long-term sustainability of outer space activities

Information and views for consideration by the Working Group on the Long-term Sustainability of Outer Space Activities

Note by the Secretariat

Addendum

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II. Replies received from States and organizations

Austria

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[30 November 2022]

Austria: input to the Working Group on the Long-term Sustainability of Outer Space Activities

Space activities – of both public and private actors – are steadily increasing, and that holds enormous economic potential. The continued growth, however, also poses a challenge to the safe and sustainable conduct of space activities. This causes an increasing need for common multilateral rules for safe and sustainable activities in outer space.

In this context, the adoption of the 21 Guidelines for the Long-term Sustainability of Outer Space Activities in 2019 was a great achievement on the part of the Committee on the Peaceful Uses of Outer Space. Austria very much welcomes the establishment of a second Working Group on the Long-term Sustainability of Outer Space Activities to further address the long-term sustainability of outer space activities at a multilateral level in the Scientific and Technical Subcommittee. The active engagement during the informal consultations in November 2022 showed that member States recognized the need for action and the necessity of addressing this issue at this level in order to generate practical guidance for current and emerging challenges in this context.

Austria fully supports the Committee's agreement on the three main working areas of the Working Group: (a) identifying and studying challenges and considering possible new guidelines for the long-term sustainability of outer space activities; (b) sharing experiences, practices and lessons learned from voluntary national implementation of the adopted Guidelines; and (c) raising awareness and building capacity, especially among emerging spacefaring nations and developing countries. We believe that this represents a balanced and comprehensive approach to encompassing this issue in its entirety.

Last year, Austria published its new Space Strategy 2030+, entitled "People, climate and economy: space is for everyone". The Strategy was developed under the guidance of the Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology, together with relevant stakeholders. It identifies six strategic goals and 30 measures to reach those goals. The primary goal of the Strategy is to support and strengthen the concept of sustainability both on Earth and in outer space. Two of the measures set out in the strategy explicitly address the sustainable use of outer space in the context of United Nations space diplomacy and sustainable international space law.

Section A. Policy and regulatory framework for space activities

Austria is a State party to all five United Nations treaties on outer space. In order to fulfil its international obligations under the treaties, Austria adopted a national outer space act in 2011. The Federal Act on the Authorization of Space Activities and the Establishment of a Space Registry (Outer Space Act; Federal Law Gazette I No. 132/2011) has the following elements: scope of application, definitions, authorization, conditions for authorization (liability insurance with a minimum insurance sum), mitigation of space debris, modification or termination of space activity, revocation and modification of authorizations, transfer, registry, registration and information for the registry, recourse, aspects to be detailed in a regulation, supervision and competent authorities, sanctions, a transitional provision and implementation. The Outer Space Act contains two explicit provisions to strengthen long-term sustainability: (a) space debris prevention (§ 4 (4) in conjunction with § 5 of the Outer Space Act); and (b) other harmful pollution of the environment and

outer space (§ 4 (5) of the Outer Space Act in conjunction with art. IX of the Outer Space Treaty).

Austria has been a member of the International Telecommunication Union (ITU) and its predecessor since 1866 and has ratified the Constitution and Convention of the International Telecommunication Union. This also includes the Radio Regulations, which are updated every three to four years at the World Radiocommunication Conference. Austrian frequency management is implemented in accordance with the Austrian Telecommunications Act and the Austrian Frequency Use Regulation in line with the interests of the State. As a State member of ITU, Austria is obliged to comply with its current regulations, in particular with regard to satellite filings with the Radiocommunication Bureau of ITU. This ensures frequency coordination, the efficient use of frequencies and avoidance of harmful interference.

Section B. Safety of space operations

Austria is actively involved in improving the monitoring of space debris and international cooperation on space weather with the actors mentioned below.

The Lustbühel Observatory, which belongs to the Austrian Academy of Sciences, has been an internationally well-recognized player for space debris monitoring through satellite laser ranging.

The following actors are actively involved in sharing operational space weather data and forecasts: (a) University of Graz, Kanzelhöhe Observatory (solar physics, predictions of solar activity and space weather); (b) Seibersdorf Laboratories (impact of cosmic rays and space weather on aircraft and personnel); and (c) Institute for Space Research of the Austrian Academy of Sciences (development of magnetometers for space weather measurements).

In addition, the University of Graz plays a key role in the International Space Weather Action Team initiated under the Committee on Space Research and is the national coordinator for the International Space Weather Initiative and the national contact point as well as the regional warning centre for the International Space Environment Service. In addition, the University of Graz, in collaboration with Graz University of Technology, is a member of the European Space Agency Space Situational Awareness Ionospheric Weather Expert Group (see <https://heliocast.space/>).

Section C. International cooperation, capacity-building and awareness

Since the 1960s, Austria has built up specific competencies and technological leadership in the field of space. Austria's space landscape is characterized by dynamic small and medium-sized enterprises, an increasing number of start-ups and established research institutions. The Austrian space sector has become a key member of the European and international space community through participation in European and international space programmes.

The Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology, which is responsible for space affairs in Austria, together with the Austrian Research Promotion Agency, develops and implements various awareness-raising activities for different user communities.

The Austria in Space website provides extensive information on Austrian space activities and current events for space professionals, talent, media and all enthusiasts (see <https://austria-in-space.at/en/>).

The BOOST platform within the Austria in Space website is a matchmaker aimed at bringing together Earth observation data/service providers and a broad range of actors, such as government agencies, research institutions/companies and private companies (see <https://boost.austria-in-space.at/>).

Further information is also disseminated through the European Space Education Resource Office for schools, the European Space Agency Business Incubation Centre Austria, the Austrian National Point of Contact for Space Law of the European Centre

for Space Law, the European Space Policy Institute and the newly established European Centre for Space Economy and Commerce.

Section D. Scientific and technical research and development

Austria supports the sustainable exploration and sustainable use of outer space. Since 1987, Austria has been a State member of the European Space Agency and participates in several of its programmes. Austria has a national space programme: the Austrian Space Applications Programme. Since 1994, Austria has been a co-host of the United Nations/Austria Symposium on Space Applications, which has a special focus on space for climate action, and since 2019, Austria and the Office for Outer Space Affairs have organized the World Space Forum, which focuses on sustainability in space and on Earth. Both jointly organized events are aimed at bringing together a broad range of actors to support the green and sustainable transition of our economies and society with the help of space assets and space-based data.

China

[Original: Chinese]
[14 November 2022]

Submission to the Working Group on the Long-term Sustainability of Outer Space Activities

The General Assembly, in its resolution [73/6](#), stressed the need to ensure the long-term sustainability of outer space activities and was convinced of the need to strengthen international cooperation through the Committee on the Peaceful Uses of Outer Space for the purpose of achieving these goals and contributing to the realization of the following vision of a community of a shared future: the exploration and use of outer space for peaceful purposes in furthering the benefits to and the interests of all humankind. China has always constructively participated in United Nations work on the long-term sustainability of outer space activities. To promote the work of the Working Group on the Long-term Sustainability of Outer Space Activities in an efficient and orderly manner, in compliance with its five-year workplan, China offers information and its views on the next three topics listed within the framework of the Working Group concerning its terms of reference, working methods and workplan.

Identifying and analysing emerging challenges and considering developing new guidelines for the long-term sustainability of outer space activities

China believes that, with the rapid development of space science and technology, outer space activities are constantly facing new challenges, and it is necessary to identify and analyse emerging challenges and consider formulating new regulatory rules.

With the increasing abundance of practice in outer space activities and gradual accumulation of the experience and problems related to its long-term sustainability, it might be possible to further improve the existing Guidelines through revision.

The Working Group should attach great importance to the task of formulating possible new guidelines, as a means of effectively countering the emerging challenges posed to current outer space activities and seeking solutions to the problems encountered in practice. The envisaged new guidelines should comply with the existing international legal framework for outer space and focus on those issues of shared concern, while taking into account the special needs and interests of developing countries and emerging spacefaring nations, with adequate exchange of information being conducted in the process.

Like many member States and international organizations, China also notices the challenges brought by low-orbit satellite megaconstellations, such as the surge of

close-encounter events and its impact on subsequent spacecraft launches as well as astronomical observations. We express our support for more targeted discussions by the Working Group on this new issue, including the formulation of any possible new guidelines.

Implementing the existing guidelines and sharing lessons learned

China supports all stakeholders in implementing the existing Guidelines to the greatest extent feasible and practicable, in accordance with their respective conditions and capabilities, and encourages them to voluntarily share their experiences and practices on an equal footing and with positive incentives. From China's perspective, the long-term sustainability of outer space activities could serve as a guide for us in promoting the further development of the space industry and international cooperation, and China is willing to share relevant experiences and information about the issues identified with all parties.

(a) Actively developing the legal and policy framework as well as national regulation

The Government of China is working on a draft regulation on satellite frequency and orbital resource management and is strengthening the declaration, coordination and registration of satellite frequency and orbital resources. Furthermore, China continues to enhance the licensing and authorization process for launches, satellite exports and the supervision of space activities in accordance with the Interim Measures on the Administration of Licences for Civil Space Launch Projects. To fulfil its obligations under the Convention on Registration of Objects Launched into Outer Space, the Chinese authorities have further clarified the process, requirements and time limits under the Measures for the Registration of Space Objects. In 2015, China revised its Measures for the Management of Space Debris Mitigation and Protection to implement and incorporate newly adopted international rules into domestic regulations. In 2021, China promulgated the Regulation on the Promotion of Orderly Development and Safety Management of Microsatellites, which, among other things, stipulates the safety requirements for orbital manoeuvres and collision avoidance for microsatellites. Since 2006, China has issued multiple editions of white papers on its space programme and its BeiDou Navigation Satellite System, which promote the long-term sustainability of outer space activities at the policy level and serve as overall guidance in practice.

(b) Seeking continuous optimization of technical solutions for space activities

With the improved design, manufacture and operation of spacecraft, better requirements regarding space debris mitigation and enhanced post-mission disposal and de-orbiting measures for carrier rockets and orbital satellites, the whole series of Chinese Long March rockets has been passivated after launch, and the Fengyun, Zhongxing and BeiDou satellites are capable of conducting de-orbiting operations to effectively prevent the increase of space debris. China has now established a space debris monitoring network, while continuing to improve the relevant database and expand capacities for collision warning and space events awareness, which provide solid technical support for the safety of spacecraft and satellites in orbit. Recently, the China Space Station has conducted two emergency collision avoidance measures with respect to Starlink satellites.

(c) Actively contributing to information-sharing on space activities

China has participated in the international entry prediction activities of dangerous objects for many years and continues to improve the accuracy of orbital data on space objects and to enhance the practice of data-sharing as well as its utility. China shares information on orbital events and space objects, such as the two-line orbital element set of the China Space Station, through the official website (en.cmse.gov.cn). China notifies relevant countries of its launch activities in advance through such cooperative mechanisms as those of civil aviation and maritime services. Since the launch of the Long March 5B launch vehicle in October 2022, the China Manned Space Agency

has been closely monitoring the orbital parameters of the last-stage debris of the launch vehicle and releasing information to the international community in a timely, open and transparent manner. At the same time, China recognizes the lack of coordination between different information-sharing platforms, which hinders operational efficiency and effectiveness. In addition, China has also established bilateral channels of communication with relevant countries.

China hosted the thirteenth meeting of the International Committee on Global Navigation Satellite Systems and recently co-hosted the United Nations/China Forum on Space Solutions, on the theme “Realizing the Sustainable Development Goals”, with the Office for Outer Space Affairs. China will host the second United Nations/China Global Partnership Workshop on Space Exploration and Innovation from 21 to 24 November in Haikou, China, allowing for further exchanges and interaction with various parties.

There is a need to strive for improving the awareness and capacity-building of emerging spacefaring nations and developing countries. The United Nations-affiliated Regional Centre for Space Science and Technology Education in Asia and the Pacific (China), established on the main campus of Beihang University, has trained nearly 1,000 aerospace trainees from more than 60 countries. The training programmes cover various fields, such as space law and policy, satellite communications, remote sensing and geographic information systems. In recent years, training activities on outer space environmental protection and the long-term sustainability of outer space activities and space debris mitigation have been added to the programme. China actively supports the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) and continues to provide financial support to ensure the daily operations and project implementation of the UN-SPIDER office in Beijing so as to help developing countries improve their ability to use space information for disaster management. In November 2021, China successfully launched Sustainable Development Science Satellite 1 (SDGSAT-1), the world’s first satellite dedicated to serving the 2030 Agenda for Sustainable Development. By providing observation data on the Earth’s surface, such as land and oceans, it contributes to monitoring, assessment and scientific research on the global Sustainable Development Goals. At present, satellite data have been made openly available to all users around the world, which benefits the conduct of research on the Goals by the international community, especially developing countries.

Enhancing awareness and capacity-building

China has always upheld the vision of a community with a shared future for humankind and contributes actively to international cooperation for awareness-raising and capacity-building in the field of the long-term sustainability of outer space activities. Since the establishment of the first Working Group on the Long-term Sustainability of Outer Space Activities in 2010, China has always actively participated in the discussions of the Working Group, offering its views and suggestions wherever necessary on the drafting of the Working Group’s report and guidelines, and holding in-depth exchanges on a wide range of issues with representatives and experts from all parties. China submitted multiple proposals and position papers individually or jointly in 2019, 2020 and 2021, which contributed constructively to raising awareness of the long-term sustainability of outer space activities among countries, intergovernmental international organizations and the general public, and to promoting international cooperation and capacity-building in developing countries and emerging spacefaring nations. China is ready to step up its dialogue and coordination with all stakeholders on the two aspects set out below.

(a) Advancing the functions of the Working Group in a balanced manner

China believes that awareness-raising and capacity-building are the prerequisites or foundations for achieving the long-term sustainability of outer space activities, and that sharing experiences on the implementation of the Guidelines is an effective way to improve implementation among all stakeholders. Furthermore, developing new

guidelines to reflect outer space developments is critical to properly addressing emerging challenges. These three pillars are similarly important and deserve equal treatment. In accordance with the decision made during the sixty-second session of the Committee on the Peaceful Uses of Outer Space and other relevant decisions, the Working Group should attach equal importance to, and promote in a balanced manner, all three pillars, including the formulation of new guidelines, the exchange of implementation experience, and awareness-raising and capacity-building. All stakeholders are encouraged to refrain from adopting a selective approach and to adhere to the mandate and terms of reference of the Working Group.

(b) Supporting capacity-building for developing countries and emerging spacefaring nations

The exploration and utilization of outer space is the province of all humankind, and the long-term sustainability of outer space activities cannot be achieved without joint efforts by all nations. China believes that the international community should prioritize assistance in boosting the capacity of developing countries and emerging spacefaring nations in order to promote the long-term sustainability of outer space activities. China calls on all stakeholders to provide them with more assistance and support within the framework of the Committee on the Peaceful Uses of Outer Space so as to achieve common development. China will also continue to engage in practical cooperation with other countries in the field of space and provide opportunities for more countries, especially developing countries and emerging spacefaring nations, to participate in China's space projects. China will continue to work with all other countries to support capacity-building and safeguard the long-term sustainability of outer space activities.

China believes that the United Nations, as represented by the Committee on the Peaceful Uses of Outer Space, should play a central role in awareness-raising and capacity-building, while its regional affiliates, such as the regional centres for space science and technology education, affiliated to the United Nations, could provide further support in terms of networking. We support strengthening exchange and cooperation among regional centres. Furthermore, we are aware of the growing clout of the private sector in space endeavours, especially their rapid advancement in science and technology, and we agree with the idea of inviting commercial space entities to actively participate in awareness-raising and capacity-building, as appropriate, and providing incentives for encouraging their greater contribution to capacity-building and relevant international cooperation. China suggests that the Working Group should assess the effectiveness and shortcomings of current awareness-raising and capacity-building efforts and gather recommendations from all stakeholders on how to enhance international cooperation mechanisms in this regard. The above-mentioned information should be incorporated into the report of the Working Group as an annex for the consideration of the Scientific and Technical Subcommittee.

Looking forward, China will endeavour to continue to build institutional communication channels and exchange platforms under the relevant frameworks, such as the China Space Conference, with the aim of promoting information-sharing and international cooperation on awareness-raising and capacity-building. China believes that the symposium scheduled to be held during the session of the Scientific and Technical Subcommittee in 2024 can further stimulate the exchange of views on assistance in awareness-raising and capacity-building activities in developing countries.

Germany

[Original: English]
[29 November 2022]

Implementation of the Guidelines for the Long-term Sustainability of Outer Space Activities in Germany¹

Germany attaches great importance to the long-term sustainability of outer space activities. The orientation towards the principle of sustainability is one of the overarching guidelines of the Federal Government's space strategy. It identifies "ensuring the sustainability of space activities" as a major space policy area. The Federal Government also committed to developing a new space strategy in the current legislative period, with specific consideration of the mitigation and remediation of space debris.

Achieving long-term sustainability in space requires international cooperation and internationally implemented guidelines. For Germany, international cooperation in space forms the technical and financial foundation for every major space project and is therefore indispensable. Germany has in the past worked through the Committee on the Peaceful Uses of Outer Space to advance the goal of maintaining the long-term sustainability of outer space activities.

Germany welcomes the adoption of the preamble and 21 Guidelines for the Long-term Sustainability of Outer Space Activities by the Committee on the Peaceful Uses of Outer Space in 2019 and has since worked towards their implementation. The following is a brief characterization of these efforts.

On the policy and regulatory framework for space activities, the German Space Agency is awarding grants and contracts for space mission projects in the National Programme for Space and Innovation and places specific project requirements on them, in particular for the mitigation of space debris. Those requirements are in line with the Space Debris Mitigation Guidelines of the Committee on the Peaceful Uses of Outer Space and of the Inter-Agency Space Debris Coordination Committee (IADC). They are also applied to small satellite projects at universities that receive funding support from the German Space Agency. Germany is also currently working on a national space law.

Germany is a member of the International Telecommunication Union and awards frequency rights according to the applicable requirements, which are implemented in national law by the Telecommunications Act. Frequency assignments are managed by the Federal Network Agency, which also operates a measurement centre for space radio services to monitor space radio traffic and to locate and eliminate radio interference.

The Federal Aviation Office maintains the national register for space objects. Registration cases are prepared by the German Space Agency and, where necessary, coordinated with other launching States. After national registration, the Federal Foreign Office submits the information to the Office for Outer Space Affairs. Ninety-one space objects are currently carried in the national register.

On the safety of space operations, the German Space Situational Awareness Centre is tasked with the creation of operational space situational awareness information. The Centre provides space situational awareness information as well as operational services for government recipients. Germany participates in the European Union space surveillance and tracking (EU SST) programme and shares sensor data with its members.

¹ The full text of the submission by Germany is available to members of the Working Group on the Long-term Sustainability of Outer Space Activities on the dedicated web page of the Working Group.

The German Space Operations Centre operates a large number of German satellites. It shares data with conjunction assessment service providers and harmonizes collision avoidance measures with other satellite operators. German academic and commercial satellite operators usually use their own infrastructure, with some making use of EU SST services.

The newly developed German Experimental Space Surveillance and Tracking Radar represents an essential element in the area of space situational awareness. It allows monitoring of the low Earth orbit and generates orbital data on space objects for the German Space Situational Awareness Centre. The Tracking and Imaging Radar is another element of the German space situational awareness infrastructure that can track and characterize individual objects with high precision. The German Space Operations Centre also operates the Small Aperture Robotic Telescope Network for monitoring objects in geostationary orbit.

The German Space Situational Awareness Centre is setting up a national object and orbit data catalogue, into which detected objects will be added and updated regularly. It will serve as a basis for products and services for the Centre to protect national space systems. Within the EU SST programme, Germany will build and maintain the object and orbital data catalogue.

Germany contributes sensor data to the collision avoidance service of the EU SST programme, which had 140 registered users and 270 registered satellites in March 2022. The service is freely available to all European operators and, in the future, also to non-European users. The Centre maintains a database with satellite and mission-specific contact information from German satellite operators, including those who are not users of EU SST services, in order to reach out in high-risk events.

Germany has a broad scientific community studying space weather. Some institutions, such as the German Aerospace Center (DLR) Institute for Solar-Terrestrial Physics, provide pre-operational services, including space weather data and products. The Federal Government is also building up services and capacities that could contribute to efforts at the European level. This includes the establishment of a national space weather service. Various entities in Germany are also operating ground-based space weather sensors. The impacts of space weather, as well as national space weather demands, are being studied.

The space community in Germany is undertaking efforts to ensure that satellites are trackable and to limit their orbital lifetime in order to reduce the creation of space debris. German satellites mostly carry global navigation satellite system receivers and are larger than 1U in order to allow active and passive tracking. Satellites funded by the German Space Agency are required to be disposed from orbit at the latest after 25 years. The German space community is also developing technologies to limit the residence time of objects in protected orbits, such as drag sails or propulsion mechanisms.

Germany communicated to the public the uncontrolled re-entry of the ROSAT satellite in 2011 long in advance of the event. The German Space Agency regularly participates in the re-entry test campaigns of IADC, as well as in the EU SST re-entry analysis service.

When using laser instruments on its space missions, Germany aims to ensure that those instruments do not pose a risk to other space objects or to on-ground astronomical sites. For the French-German Methane Remote Sensing Lidar Mission (MERLIN), the project partners analysed the probability of accidental illumination during the development process.

International cooperation is a major theme in German space activities, which are deeply embedded in European and international collaboration, in particular with the European Space Agency (ESA) and the European Union.

German experts are actively involved in international forums and bodies whose activities support the long-term sustainability of space activities, including the

International Debris Coordination Committee, which the German Space Agency chaired from April 2020 to October 2021, the EU SST programme, the International Organization for Standardization, and the European Cooperation for Space Standardization initiative. The German Space Agency also exchanges with industry on space sustainability through its working group on product and quality assurance and has initiated a dialogue on space sustainability with German universities operating small satellites.

Germany supports a wide range of capacity-building measures, including the United Nations Programme on Space Applications, in which German entities organize the Drop Tower Experiment Series, enabling research teams from developing countries to carry out microgravity experiments. Germany also supports the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) programme and the Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters (also called the International Charter on Space and Major Disasters). In the area of space law, Germany supported and chaired the Working Group on the Status and Application of the Five United Nations Treaties on Outer Space of the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space in developing the guidance document on the legal framework for space activities. The Cologne Commentary on Space Law represents a contribution to the uniform interpretation and application of space law.

Through various media, such as publications, campaigns or exhibitions, German space actors aim to raise awareness among the general public regarding the benefits of space applications for life on Earth. The DLR School Labs programme allows school groups to experience technological phenomena in space activities in an interactive manner and conveys knowledge about space applications and their significance for modern society.

Germany supports the Committee on Space Research in the development of guidelines for the protection of the Earth and space from harmful contamination and applies those guidelines in its national space missions. Germany also supports the development of sustainable space technologies, such as propulsion systems or the in-orbit assembly of space infrastructure.

The German Space Agency is monitoring research into space debris and the development of mitigation measures to dynamically adapt its product assurance, safety and sustainability requirements for DLR space projects. New developments, such as design-for-demise approaches, satellite constellations or space cybersecurity, are also taken into consideration.

At the ESA level, Germany is supporting the first space debris removal mission (ClearSpace-1) to remove an ESA-owned space debris object from low Earth orbit. The mission could prepare further space debris removal missions as well as commercial services for maintenance in orbit.

Italy

[Original: English]
[30 November 2022]

Submission by Italy on the voluntary implementation of the Guidelines for the Long-term Sustainability of Outer Space Activities²

Italy was fully engaged in the process leading to the adoption of the preamble and 21 Guidelines for the Long-term Sustainability of Outer Space Activities in 2019. It

² The full text of the submission by Italy is available to members of the Working Group on the Long-term Sustainability of Outer Space Activities on the dedicated web page of the Working Group.

is now pleased to submit a report on the voluntary implementation of the Guidelines for consideration by the Scientific and Technical Subcommittee at its sixtieth session. Following the years of excellent work performed in developing the Guidelines, it is now time for them to be practically applied and tested. By compiling and reviewing the experiences and lessons learned of all member States in the implementation of the Guidelines, there will be a much better understanding of the practical steps that can be taken by the Committee on the Peaceful Uses of Outer Space.

Section A. Policy and regulatory framework for space activities

Italy is a party to four of the United Nations space treaties, namely, the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, the Convention on International Liability for Damage Caused by Space Objects and the Convention on Registration of Objects Launched into Outer Space, and has implemented them in the form of laws or decrees, depending on their content. Subsequent internal legislation has regulated related issues, such as liability for damage to third parties, the registration of space objects and the operation of satellite telecommunication systems. With a view to fulfilling its obligations in a sustainable way, Italy is currently developing a more comprehensive legal framework for the authorization of private operators. The ongoing legislative process will include new assessment criteria to ensure the supervision of private space activities.

The Italian practice concerning the registration of space objects has always complied with obligations deriving from the applicable United Nations treaties and has also taken into consideration the recommendations contained in General Assembly resolution 62/101 as far as additional non-mandatory information is concerned. Italy believes that there is still room for further improving the coordination of registration practices.

The allocation of radio frequencies is covered by licences for the operation of telecommunications systems and oriented towards enhancing openness and sustainability.

Section B. Safety of space operations

Italy implements the Guidelines partly through improvement of its access to capabilities for space situational awareness and space surveillance and tracking. While the national scientific, institutional and industrial space community has developed important know-how in space situational awareness, Italy also plays an important role in the European framework of cooperation in developing infrastructures and delivering space surveillance and tracking services for the European Union, while being engaged in the European Space Agency (ESA) with regard to near-Earth objects and space weather activities.

Italy shares orbital information on space objects and notifies, in a timely manner and to the greatest extent practicable, potentially affected States of scheduled manoeuvres when a modification of trajectory is needed to perform collision avoidance.

At the same time, the Italian scientific and technological communities have long-standing expertise in the fields of hazards posed by man-made space objects and orbital debris, as shown by the advances in the realization and deployment of the Flyeye telescopes devoted to surveying the space debris population. Italy also supports ESA efforts to facilitate collaboration among member States by promoting interoperability and standardization with regard to conjunction assessments.

The Heliospheric Space Weather Centre project, carried out in synergy between the Aerospace Logistics Technology Engineering Company and the Astrophysical Observatory of Turin of the Italian National Institute for Astrophysics, is aimed at providing medium- and short-term space weather forecasts by combining remote sensing and in situ open data with novel data analysis technologies.

Since the BeppoSAX re-entry in 2002, Italy has developed a set of good practices concerning predicted high-risk re-entry events in which the impact of a space object or residual material could potentially cause significant damage or radioactive contamination. Besides, Italy contributes with national sensors to the re-entry analysis service provided by the European Union space surveillance and tracking (EU SST) partnership.

Section C. International cooperation, capacity-building and awareness

Italy actively participates in various international and national forums conducting research on the sustainability of space activities and recognizes the paramount importance of international cooperation as a basis for all States to develop and strengthen their capacity to undertake, and/or derive benefits from, space activities. Furthermore, international cooperation on scientific and technical projects between both spacefaring and non-spacefaring nations can contribute to capacity- and confidence-building.

Italy implements measures in this field at both the governmental and agency levels. In particular, the Italian Space Agency (ASI) operates in the framework of bilateral and multilateral relations and space cooperation agreements and coordinates the participation of Italy in European and international space projects.

Italy is deeply engaged in international and regional initiatives, international academic committees and other entities, non-governmental organizations and industries, addressing long-term sustainability issues and allowing the exchange of information, expertise and experience relating to the long-term sustainability of outer space activities between the members of these entities. Italy promotes conversations on the sustainability of the space environment and strongly supports this methodology and the maximum use of multi-stakeholder dialogue for enhancing the exchange of information.

Italy has been promoting and supporting capacity-building in the space sector for emerging space countries. Since 2019, ASI, Sapienza University and the Kenya Space Agency have been carrying out capacity-building activities through the Outer Space Law for International Cooperation and Sustainable Development project, which focuses on legal and policy instruments, also relating to the sustainability of space activities, including the 21 Guidelines for the Long-term Sustainability of Outer Space Activities. Activities include training courses, webinars and joint participation in international conferences.

Italy promotes several initiatives that contribute to raising awareness of space activities and their benefit for society, as well as of the need to preserve the space environment for future generations.

Furthermore, Italy is a strong supporter of the Space Economy Leaders Meeting initiative, which was launched in 2020 by the Saudi Space Commission on the margins of the meeting of the Group of 20 (G20) and aims to raise awareness of the importance of the space economy for the global economy and to promote the inclusion of the topic in the agendas of the G20. Italy, through ASI, organized the second edition of the initiative on the margins of the G20 under the Italian presidency and promoted the adoption of a final recommendation in support of the implementation of the Guidelines for the Long-term Sustainability of Outer Space Activities.

Section D. Scientific and technical research and development

Italy considers actions in the field of the space debris mitigation to be of outstanding importance. As a founding member of the Inter-Agency Space Debris Coordination Committee, ASI actively participates in the ongoing work on monitoring the space debris population.

Main challenges

Italy wishes also to underline some of the outstanding new challenges for consideration by the Working Group on the Long-term Sustainability of Outer Space Activities, in particular the improvement and harmonization of space practices with regard to the registration of large constellations of small satellites and objects manufactured in space or on celestial bodies, the sustainability of lunar surface missions in view of the upcoming proliferation of activities and potential close proximity of operations, and the active debris removal missions and their implications for the long-term sustainability of outer space activities.

European Union

[Original: English]
[29 November 2022]

European Union joint contribution on the implementation of the Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee on the Peaceful Uses of Outer Space³

Introduction

In June 2019, the Guidelines for the Long-term Sustainability of Outer Space Activities were adopted by the Committee on the Peaceful Uses of Outer Space (A/74/20, para. 163 and annex II). The Committee encouraged States and international intergovernmental organizations to voluntarily take measures to ensure that the Guidelines are implemented to the greatest extent feasible and practicable.

In view of this, the European Union, together with its Member States, wishes to present the implementation status vis-à-vis some of the Guidelines.

Since the European Union and its member States are co-sponsors of the 21 Guidelines for the Long-term Sustainability of Outer Space Activities, and in order to actively contribute to the Working Group on the Long-term Sustainability of Outer Space Activities, the European Union and its member States have prepared a joint contribution on the implementation of the Guidelines structured along the 21 Guidelines, which are recalled by their titles in the order of their appearance in document A/74/20.

The European Union joint contribution consists of the contribution of the European Union and of individual contributions of the respective member States, which have provided information on how they have implemented the Guidelines or what their intention is to do so, taking into consideration the level of the development of space activities at the European Union level and at the national level.

The present contribution provides information on the implementation of the following Guidelines:

Section A. Policy and regulatory framework for space activities

Guideline A.1: Adopt, revise and amend, as necessary, national regulatory frameworks for outer space activities

Guideline A.4: Ensure the equitable, rational and efficient use of the radio frequency spectrum and the various orbital regions used by satellites

³ The full text of the submission by the European Union is available to members of the Working Group on the Long-term Sustainability of Outer Space Activities on the dedicated web page of the Working Group.

Section B. Safety of space operations

Guideline B.1: Provide updated contact information and share information on space objects and orbital events

Guideline B.2: Improve accuracy of orbital data on space objects and enhance the practice and utility of sharing orbital information on space objects

Guideline B.3: Promote the collection, sharing and dissemination of space debris monitoring information

Guideline B.4: Perform conjunction assessment during all orbital phases of controlled flight

Guideline B.5: Develop practical approaches for pre-launch conjunction assessment

Guideline B.6: Share operational space weather data and forecasts

Guideline B.7: Develop space weather models and tools and collect established practices on the mitigation of space weather effects

Guideline B.8: Design and operation of space objects regardless of their physical and operational characteristics

Guideline B.9: Take measures to address risks associated with the uncontrolled re-entry of space objects

Section C. International cooperation, capacity-building and awareness

Guideline C.1: Promote and facilitate international cooperation in support of the long-term sustainability of outer space activities

Guideline C.2: Share experience related to the long-term sustainability of outer space activities and develop new procedures, as appropriate, for information exchange

Guideline C.3: Promote and support capacity-building

Guideline C.4: Raise awareness of space activities

Section D. Scientific and technical research and development

Guideline D.1: Promote and support research into and the development of ways to support sustainable exploration and use of outer space

Guideline D.2: Investigate and consider new measures to manage the space debris population in the long term

CANEUS International

[Original: English]
[29 November 2022]

Brief of CANEUS input: Working Group on the Long-term Sustainability of Outer Space Activities of the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space

CANEUS welcomes this opportunity to present a brief of our input on the information and views on the topics listed in document [A/AC.105/1258](#), annex II and appendix.

CANEUS has been cooperating with the Office for Outer Space Affairs and several States members of the Committee on the Peaceful Uses of Outer Space in undertaking specific measures in the implementation of the 21 Guidelines for the Long-term Sustainability of Outer Space Activities.

(a) Identifying and studying challenges and considering possible new guidelines for the long-term sustainability of outer space activities

Our focus for this submission includes two major issues:

(i) Addressing multi-satellite low Earth orbit constellations and their interference with routine space activities and astronomical observations.

There is a need to create an international centre for the protection of Earth's ecosystems under the auspices of the Committee on the Peaceful Uses of Outer Space, to complement the Centre for the Protection of the Dark and Quiet Sky of the International Astronomical Union.

Megaconstellations require a shift in perspectives and policies from looking at single satellites to evaluating systems of thousands of satellites, and doing so within an understanding of the limitations of Earth's environment, including its orbits.

Thus, CANEUS proposes exploring new guidelines to address the problem of the influence of multi-satellite low-orbit constellations on traditional tasks in space and from space.

(ii) How traditional Indigenous knowledge is understood or approached in space frameworks. Indigenous knowledge and practices are vital to preserving food systems and ecosystems and contribute to climate and disaster resilience. This role needs to be recognized and documented by integrating Indigenous knowledge into space science and technologies to achieve the Sustainable Development Goals.

One of the key advantages of integrating Indigenous knowledge into space frameworks is that it would provide a degree of protection and harmonization. While near-Earth space impacts Indigenous communities, Indigenous knowledge is crucial for space-based governance.

Thus, the new guidelines will further help in unifying the basic principles embedded in existing United Nations frameworks such as those in article 31 of the United Nations Declaration on the Rights of Indigenous Peoples or article 8 (j) of the Convention on Biological Diversity.

(b) Sharing experiences, practices and lessons learned from voluntary implementation of the adopted Guidelines

Section A. Policy and regulatory framework for space activities

Experience

CANEUS has been working with several partners from Africa, Asia and Latin America and the Caribbean to ensure the equitable and efficient use of various orbital regions used by satellites.

Lessons learned

There is a lack of efficient use of such resources for those countries that do not have technical and economic capabilities. Coordination at the upcoming World Radiocommunication Conference may be complementary and useful.

Section B. Safety of space operations

Experience

CANEUS contributed to national research on space debris and the ways in which mitigation guidelines are being implemented.

Lessons learned

The problem of interference and long-term threats with the emergence of multi-satellite constellations in low orbit remains challenging. Relevant modifications to

the agenda item of the Scientific and Technical Subcommittee on space debris may help to address this issue.

Section C. International cooperation, capacity-building and awareness

Experience

CANEUS cooperates with more than 58 countries in the Americas, Europe, Asia and Africa through its established and proven collaborative network. CANEUS is also a partner of the United Nations Forum on Sustainability Standards, UN-Oceans, the Global Platform for Disaster Risk Reduction, the United Nations Framework Convention on Climate Change Resilience Frontiers, the United Nations Conference on the Least Developed Countries, the Convention on Biological Diversity and the United Nations Development Programme, contributing space solutions. CANEUS funded the Office for Outer Space Affairs to explore the creation of a global satellite partnership to help advance international cooperation.

Over the years, CANEUS has developed accelerated solutions for Indigenous peoples' 2030 agendas using Earth observation-based solutions, through several pilot projects, training programmes and focused initiatives covering the integration of space technology for climate change, food security and disaster resilience, among others.

These initiatives are being pursued through the five-year (2021–2025) cooperation agreement between CANEUS and the Fund for the Development of Indigenous Peoples of Latin America and the Caribbean, supported formally by the Office for Outer Space Affairs. CANEUS is also contributing to the Group of 20 (G20) biodiversity initiative using space technology.

Lessons learned

The lessons learned in the development and implementation of Indigenous peoples' culturally relevant novel space-based solutions, enabling a widespread impact on sustainability, climate change and food security, have been summarized in the 2021 and 2022 reports of the United Nations inter-agency task team on science, technology and innovation for the Sustainable Development Goals.

Over 1,000 participants benefited from the capacity-building programme led by CANEUS with the United Nations Institute for Training and Research, the Office for Outer Space Affairs and the Fund for the Development of the Indigenous Peoples of Latin America and the Caribbean at the high-level political forums on sustainable development in 2021 and 2022.

Section D. Scientific and technical research and development

Experience

CANEUS, in partnership with the Office for Outer Space Affairs, the Fund for the Development of the Indigenous Peoples of Latin America and the Caribbean, the Food and Agriculture Organization of the United Nations, the International Fund for Agricultural Development, the United Nations Educational, Scientific and Cultural Organization and several other global stakeholders, created a unique global research and knowledge repository initiative known as the Indigenous Knowledge Research Infrastructure, aimed at integrating Indigenous knowledge with geospatial intelligence to achieve the Sustainable Development Goals.

The Indigenous Knowledge Research Infrastructure is a dynamic global digital collaborative research tool that uses space technologies to capture, process, analyse and present Indigenous knowledge from multiple sources. A CANEUS Indigenous Knowledge Research Infrastructure partner is the official United Nations spokesperson for Sustainable Development Goal 10 (Reduce inequality).

Lessons learned

The Economic and Social Council has highlighted the Indigenous Knowledge Research Infrastructure as one of the five key global partnerships to advance the Sustainable Development Goals. The Indigenous Knowledge Research Infrastructure leverages the power of Earth observation to contribute to advancing the implementation of all of the Sustainable Development Goals.

The Indigenous Knowledge Research Infrastructure will leverage diverse efforts worldwide, creating a structured framework and partnerships through a new development model that will inspire the engagement of Indigenous youth to develop entrepreneurship tools using space technology and technology transfer.

The Indigenous Knowledge Research Infrastructure will restore and preserve Indigenous knowledge to bring long-term socioeconomic returns to society, especially given the rapid pace of development, which has motivated Indigenous youth to migrate to economic growth centres and threatens the physical, sociological and economic set-up of Indigenous communities.

(c) Raising awareness and building capacity, in particular among emerging space nations and developing countries

Experience

With the challenges of accelerated inequalities in space technology among the least developed countries and especially Indigenous peoples, there is an urgent need to bridge the gap with these imbalances, including language barriers and gender inclusion in the space community.

CANEUS has therefore partnered with several Indigenous funds and organizations representing the seven global regions, such as the Fund for the Development of the Indigenous Peoples of Latin America and the Caribbean, the Pawanka Fund and others, to undertake capacity-building initiatives, specifically hands-on training, and demonstration projects using emerging space science and technologies.

Furthermore, CANEUS and the Pawanka Fund, supported by several local and regional stakeholders, plan to undertake a series of awareness-raising programmes worldwide during 2023.

Lessons learned

The least developed countries and Indigenous peoples want sustainable solutions from the perspective of their traditional science and knowledge, possibly through their own institutional and organizational mechanisms.

Therefore, the global space community needs to integrate the least developed countries and Indigenous knowledge and practices into the process, and at the same time Indigenous peoples need to adapt emerging space technologies.

There is a need to: (a) examine and identify challenges and barriers for Indigenous communities to implement workable and replicable space-based solutions; (b) reduce the sense that the space technology sector has been overlooking Indigenous peoples as active participants in attaining the Sustainable Development Goals, as opposed to mere recipients; and (c) convert the regional collaborative effort using the lessons learned during the coronavirus disease (COVID-19) pandemic, as scalable and replicable worldwide.

CANEUS further intends to present a detailed report at the sixtieth session of the Scientific and Technical Subcommittee in February 2023.

CANEUS very much appreciates the leadership of Umamaheswaran R. in steering the Working Group on the Long-term Sustainability of Outer Space Activities and remains keen and committed to contribute to its work ahead.

Moon Village Association

[Original: English]
[29 November 2022]

Input from the Moon Village Association on the invitation to submit information and views to the Working Group on the Long-term Sustainability of Outer Space Activities

The Moon Village Association was created in 2017 as a non-governmental organization based in Vienna. The Association acts as a permanent global informal forum for stakeholders like Governments, industry, academia and the public interested in the development of the Moon Village. The Association fosters cooperation among existing or planned public or private global Moon exploration programmes. It comprises more than 600 participants in Association activities and 33 institutional members from more than 50 countries, representing a diverse array of technical, scientific, cultural and interdisciplinary fields.

In 2021, the Moon Village Association decided to promote the development of a neutral forum for multi-stakeholder discussions on lunar exploration and utilization: the Global Expert Group on Sustainable Lunar Activities. The current lack of coordination mechanisms for lunar activities presents challenges to future missions and could lead to unintentional harmful interference, especially in the light of the increased global interest in specific areas like the lunar south pole. The need to preserve the peaceful uses of space, together with the desire to begin a new era of sustainable space exploration, urges the consideration of approaches that promote future lunar sustainability and recommended practices for upcoming lunar activities.

Although the Guidelines for the Long-term Sustainability of Outer Space Activities mostly refer, as can be seen from the first words of the text, to the Earth's orbital space environment, it is essential to remember that sustainability is a critical matter that extends well beyond the same.

For this reason, the Global Expert Group on Sustainable Lunar Activities has been operating since 2021 with the following objectives:

- (a) Leverage contributions from major stakeholders of the space community, including space agencies, private companies, academia and international organizations;
- (b) Involve the public by promoting outreach efforts regarding the activities of the Group through the involvement of local actors at the global level;
- (c) Serve as a platform to exchange information and views within the space community on key issues for the peaceful and sustainable conduct of lunar activities.

The Global Expert Group on Sustainable Lunar Activities aims to provide distinct and new directions for international cooperation to encourage the sustainability of lunar activities. The Group has established subgroups to facilitate its work and tackle the most pressing issues in the future of lunar exploration: information-sharing, safe operations and lunar environmental protection, interoperability and lunar governance. Its main deliverable is the recommended framework and key elements for peaceful and sustainable lunar activities, which will be published and distributed in early 2023. The document will also be presented to the Committee on the Peaceful Uses of Outer Space during the sixtieth session of its Scientific and Technical Subcommittee.

Given the possibility of providing information and views on the topics in paragraphs 4 and 6 of the terms of reference, methods of work and workplan of the Working Group on the Long-term Sustainability of Outer Space Activities, the Moon Village Association would like to encourage discussions on the implications of current and future lunar activities in the context of the long-term sustainable use of outer space, in particular in response to item (a), on identifying and studying challenges and

considering possible new guidelines for the long-term sustainability of outer space activities.

The peaceful future of lunar exploration also depends on the sustainability of the activities conducted there and on the possibility of sharing experiences, practices and lessons learned and of raising awareness and building capacity. Therefore, the Working Group could be a good forum for identifying challenges and defining guidelines for the long-term sustainability of lunar activities.
