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**Committee on the Peaceful
Uses of Outer Space**
Scientific and Technical Subcommittee
Sixtieth session
Vienna, 6–17 February 2023
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Long-term sustainability of outer space activities

**Austria: Report on the voluntary implementation of the
Guidelines for the Long-term Sustainability of Outer Space
Activities**

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Committee on the Peaceful Uses of Outer Space
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Austria: Report on the Voluntary Implementation of the Long-Term Sustainability Guidelines of Outer Space Activities

There is a steady increase in space activities by both public and private actors worldwide. This growth has enormous economic potential but it also has challenges for safety and space sustainability. This fact requires hence a clear response at multilateral level and common multilateral rules for safe and sustainable activities in outer space.

Against this background, the adoption of the 21 Guidelines on the Long-term Sustainability of Outer Space in 2019 was a great achievement of COPUOS. Austria welcomes this achievement and also very much welcomes the establishment of a Working Group LTS 2.0 to further address the long-term sustainability of outer space activities at multilateral level in the Scientific and Technical Subcommittee. The active engagement during the informal consultations in November 2022 showed that Member States recognize the need for action and the necessity to address this issue at this level in order to achieve practical guidance for current and emerging challenges in this context.

Austria fully supports COPUOS agreement on the three main working areas of the Working Group: 1) identifying and studying challenges and considering possible new guidelines for the long-term sustainability of space activities; 2) sharing experiences, practices and lessons learned from national implementation of adopted guidelines; and 3) raising awareness and building capacity, especially among emerging spacefaring nations and developing countries. We believe that this represents a balanced and comprehensive approach to encompass this issue in its entirety.

In 2021, Austria published its new Space Strategy 2030+ „People, Climate and Economy: Space is for EVERYONE“. The strategy was developed under the guidance of the Federal Ministry for Climate Action together with relevant stakeholders. It identifies six strategic goals and thirty measures to reach these goals. The primary goal of the Space Strategy 2030+ is to support and strengthen sustainability both on earth and in outer space. Two of the measures foreseen in the strategy explicitly address the sustainable use of outer space in the context of UN space diplomacy and sustainable international space law.

A. Policy and regulatory framework for space activities

A.1.	Adopt, revise and amend, as necessary, national regulatory frameworks for outer space activities	Austria
Thoughts or approach to implementation	<p>Austria is state party to all five UN Space Treaties. In order to fulfil its international obligations under the Treaties, Austria developed and adopted a national outer space act in 2011: The "Bundesgesetz über die Genehmigung von Weltraumaktivitäten und die Einrichtung eines Weltraumregisters (Weltraumgesetz) BGBl. I No. 132 / 2011].</p> <p>The act has the following elements: Scope of application; definitions; authorisation; conditions for authorisation (liability insurance with minimum insurance sum); mitigation of space debris; modification or termination of the space activity; revocation and modification of the authorisation; transfer, registry; registration and information for the registry; recourse; aspects to be detailed in a regulation; supervision and competent authorities; sanctions; transitional provision; implementation. The Austrian</p>	

	Outer Space Act contains two explicit provisions to strengthen long-term sustainability: 1) space debris prevention [§ 4 Z 4 in conjunction with § 5] and 2) other harmful pollution of the environment and outer space [§ 4 Z 5 in conjunction with Art. 9 of the Outer Space Treaty].
Current progress and/or proposed future activities	The Austrian Space Strategy 2030+ "People, Climate and Economy. Space is for EVERYONE" provides for an evaluation and, depending on the outcome, a possible adaptation of the Austrian Space Act to economic and sustainability relevant aspects.
Comments on specific needs for capacity building necessary to support implementation	<p>Exchange of information is becoming increasingly important. Therefore, it is very good that UNOOSA already has various national space laws on its website, also in English (national space law database).</p> <p>Austria is in favour of an easily accessible and searchable repository that could assist those looking to implement the 21 LTS-Guidelines in their own jurisdictions. Such a repository could serve as a tool for building transparency, confidence and capacity.</p> <p>Many practical legal questions arise in respect to licensing and respective licensing procedure. Therefore, it would be desirable to receive practical guidance on several topics, such as:</p> <ul style="list-style-type: none"> - Risk assessments for possible damage - Exemplary calculations of the minimum insurance sum required for specific missions for different satellite sizes - Incentives for sustainable design - Ongoing assessment necessary of orbital risks - An overview of insurance companies that insure satellites would be desirable

A.2.	Consider a number of elements when developing, revising or amending, as necessary, national regulatory frameworks for outer space activities	Austria
Thoughts or approach to implementation	The review so far has shown that the Austrian Outer Space Act is in line with the provisions of this Guideline so far. The Austrian Outer Space Act fulfils the international obligations arising from the five UN Space Treaties to which it is party.	
Current progress and/or proposed future activities	Some framework conditions have changed since the enactment of the Austrian Outer Space Act and the Austrian Outer Space Regulation, e.g. adoption of the UN LTS Guidelines, initiatives of Austrian actors, space laws and initiatives of other European countries. Therefore, the necessity of adapting the Austrian Outer Space Act shall be analysed and necessary adjustments shall be made subsequently.	

A.3.	Supervise national space activities	Austria
Thoughts or approach to implementation	Paragraph 13 of the Austrian Outer Space Act and paragraph 5 (4) of the Austrian Outer Space Regulation stipulate the duty of supervision of the Austrian Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology, responsible for space affairs, which includes, for example, access to all operating premises, inspection of documents and the duty to provide information.	
Current progress and/or proposed future activities	Austria up to now has registered two satellites. The decisions foresee an annual written report as a supervisory tool.	
Experiences, challenges and lessons learnt	A permanent dialogue between operators and authorities is sensible and creates confidence. It helps to solve problems in advance and ensures that swift action is taken.	
Comments on	Exchange of information on best practice measures would be very useful.	

specific needs for capacity building necessary to support implementation	
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A.4.	Ensure the equitable, rational and efficient use of the radio frequency spectrum and the various orbital regions used by satellites	Austria
Thoughts or approach to implementation	Austria has been a member of the International Telecommunication Union (ITU) and its predecessor since 1866 and has ratified the International Telecommunication Treaty. This also contains the Radio Regulations, which are updated every 3-4 years at the World Radiocommunication Conference. Austrian frequency management is implemented in accordance with the Telecommunications Act and the Frequency Use Regulation in line with the interests of the state	
Current progress and/or proposed future activities	As a member state of the ITU, Austria is obliged to comply with its current regulations, in particular with regard to satellite filing with the Radiocommunication Bureau of the ITU. This ensures frequency coordination, efficient use of frequencies and avoidance of harmful interference.	

A.5.	Enhance the practice of registering space objects	Austria
Thoughts or approach to implementation	<p>The obligation to report certain parameters (position, launcher, launching state, function of the satellite) to the UN Space Office has been in place since Austria acceded to the Outer Space Registration Convention in 1980. According to § 9 of the Austrian Outer Space Act, a national space registry exists and thus § 1 Art. 1 of the Outer Space Registration Convention is implemented by Austria.</p> <p>Excerpts from this register can be viewed on the website of th Federal Ministry for Climate Action (responsible for Space Affairs) https://www.bmk.gv.at/innovation/themen/weltraum/weltraumregister.html.</p> <p>The Austrian Space Regulation § 6 para. 4 regulates the Ministry's obligation to issue a registration certificate for a space activity.</p> <p>Austria thus has an effective and transparent registration procedure that complies with international treaties, conventions and recommendations.</p>	
Current progress and/or proposed future activities	The existing Austrian practice of transmitting extended registration data to the UN is continued under the condition that no sensitive and no personal data are transmitted.	
Comments on specific needs for capacity building necessary to support implementation	<p>Austria supports that registration information on changes in the operating status and change of operator information are also submitted to UNOOSA. This should also be a practise lived by all Member States.</p> <p>Ad A.5.8.: The practical implementation of this guideline on future separation and independent orbital flights should be clarified.</p> <p>Ad A.5.9.: Austria will not use nuclear energy sources in space due to the Federal Constitutional Law for a Nuclear-Free Austria.</p> <p>For the following topics/ points further clarification is needed:</p> <ul style="list-style-type: none"> - Jurisdiction and control (Art. VIII Outer Space Treaty) of the registering state results from the registration. Jurisdiction means the application of national law. Control means "legal control". 	

	- The connection between "legal control" (Art. VIII Outer Space Treaty) and "continued supervision" (Art. VI Outer Space Treaty) is not clear. How do these two rights relate when different states are involved?
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B. Safety of space operations

Austria has built up expertise in certain areas addressed here (e.g. small satellite development), in other areas we cooperate with other actors (e.g. orbit tracking). As a member of the European Union EU and the European Space Agency (ESA), Austria can use the jointly developed resources.

B.1.	Provide updated contact information and share information on space objects and orbital events	Austria
Thoughts or approach to implementation	Austria does not have an operations centre that generates information on on-orbit spacecraft operations, conjunction assessments and the monitoring of objects and events in outer space.	

B.2	Improve accuracy of orbital data on space objects and enhance the practice and utility of sharing orbital information on space objects	Austria
Thoughts or approach to implementation	<p>B.2.2: Since 1982, the Space Research Institute of the Austrian Academy of Sciences has operated one of the world-leading Satellite Laser Ranging (SLR) stations at the Lustbühel Observatory near Graz.</p> <p>The Graz SLR station measures the distance to satellites up to an orbital height of 36.000 kilometers. By using statistical analysis, it is possible to reach an accuracy of less than one millimeter. Currently, the station routinely measures the distances to more than 140 targets and uploads the data to various analysis centers within the International Laser Ranging Service (ILRS). The measurements are the starting point for determining e.g. the rotational parameters, gravitation or the center of the Earth. As a result of the reliability and accuracy of its data the Graz SLR station was selected by ILRS (International Laser Ranging Service) as one of the five core stations worldwide.</p> <p>Besides measuring satellites, the scientific emphasis of the Graz SLR station currently is on distance measurements to space debris. Such measurements deliver valuable data to improve orbit predictions to space debris, which could significantly reduce the amount of necessary collision avoidance maneuvers.</p>	

B.3	Promote the collection, sharing and dissemination of space debris monitoring information	Austria
Thoughts or approach to implementation	<p>Austria is actively involved in improving the monitoring of space debris and international cooperation on space weather with the following actors:</p> <p>The Observatory Lustbühel (belonging to the Austrian Academy of Sciences) has been an internationally well-recognized player for space debris monitoring through satellite laser ranging.</p> <p>The following actors are actively involved in sharing operational space weather data and forecasts:</p> <ul style="list-style-type: none"> - University of Graz, Kanzelhöhe Observatory: Solar physics, predictions of solar activity and space weather; 	

	<ul style="list-style-type: none"> - Seibersdorf Laboratories; Impact of cosmic rays and space weather on aircraft and personnel; - Institute for Space Research of the Austrian Academy of Sciences: Development of magnetometers for space weather measurements.
Current progress and/or proposed future activities	<p><u>Satellite Laser Ranging:</u></p> <p>The Graz SLR station has an international leading position concerning space debris research. Currently, it concentrates on the following research topics:</p> <p>In multi-static space debris laser ranging Graz sends photons to a space debris target. In a unique joint experiment, Graz sent photons with a green laser and the Observatory Wettzell (Germany) sent photons with an infrared laser, simultaneously. Data analysis proved a significant increase in orbital prediction accuracy of space debris targets.</p> <p>In the Stare & Chase method a low cost camera system records the stellar background. From the position of stars in the background the accurate pointing direction of the camera is calculated. As soon as a sunlit space debris particle passes through this field of view, its celestial coordinates as referenced to the background stars are determined and stored. Using only the pointing information – without a-priori orbital information – an orbit is calculated and immediately used to track ("chase") the target with laser-based distance measurements.</p> <p>For the spin period and attitude determination of space debris laser measurements are combined with light curves. Knowing the retro-reflector geometry on the satellite, it is possible to determine spin period and spin attitude parameters of the target.</p> <p><u>Optical Telescopes:</u></p> <p>ASA Astrosystems is a company based in Austria that develops and operates telescopes in the m-range that are able to monitor space debris. A key asset of ASA is that all relevant competencies have been established in-house: Research and Development, Engineering, Optics, Direct Drive Technology, Electronics, Software, Manufacturing, Custom Solutions and Customer Services.</p> <p>Both the Graz SLR station as well as ASA Astrosystems are involved in various international programmes and activities, including ESA's Space Safety Programme.</p>

B.4	Perform conjunction assessment during all orbital phases of controlled flight	Austria
Thoughts or approach to implementation	B4.2. Austria is part of the EU-Space Surveillance and Tracking (SST). Improvements in collision analyses are goals of the EU-SST Partnership as well as of the ESA Space Safety Programme. Austria contributes to both.	
Current progress and/or proposed future activities	<p>As part of the EU Space Programme, a dedicated Space Situational Awareness programme component has been set up. It consists of sub-components addressing Space Surveillance & Tracking (EU SST Partnership), Space Weather, and Near Earth Objects.</p> <p>A consortium of now fifteen EU Member States, including Austria, leads EU SST Partnership. Austria plans to contribute with its specific competence in satellite laser ranging and optical telescopes.</p>	

B.6	Share operational space weather data and forecasts	Austria
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<p>Thoughts or approach to implementation</p>	<p>Austria contributes to the improvement of space weather data and forecasts and to the dissemination of respective data through its specific competences.</p> <p>Austria participates through the Space Safety programme of ESA with the following bodies:</p> <ul style="list-style-type: none"> - University of Graz, Kanzelhöhe Observatory: Solar physics, predictions of solar activity and space weather - Seibersdorf Laboratories: Impact of cosmic rays and space weather on aircraft and personnel - Institute for Space Research of the Austrian Academy of Sciences: Development of magnetometers for space weather measurements
<p>Current progress and/or proposed future activities</p>	<p>The University of Graz plays a key role in the International Space Weather Action Team (iSWAT), initiated under COSPAR and is the national coordinator of ISWI (International Space Weather Initiative) and the national contact point and regional warning center of the International Space Environment Service.</p> <p>The research groups on Solar- and Heliospheric physics maintain groups for the ESA SSA Expert Service Centers on Solar and Heliospheric Weather providing data and tools for forecasting and nowcasting space weather events from the Sun.</p> <p>In addition, the University of Graz in collaboration with the University of Technology Graz, are a member of the ESA SSA Ionospheric Weather expert group. https://swe.ssa.esa.int/ionospheric-weather</p>

<p>B.7</p>	<p>Develop space weather models and tools and collect established practices on the mitigation of space weather effects</p>	<p>Austria</p>
<p>Thoughts or approach to implementation</p>	<p><u>Helio4Cast:</u> A group of Austrian scientists works on basic and applied space weather research ("Helio4Cast"). Helio4Cast goal is a better physical understanding and modeling of the evolution of solar storms and high-speed solar wind streams, and showing how these fundamental results may enhance real-time space weather forecasts. Emphasis is placed on investigations from heliophysics to real-time solar wind prediction, as well as data and catalogs provision for the research community.</p> <p>The research activities cover the following topics:</p> <ul style="list-style-type: none"> • Magnetic structure of Coronal Mass Ejections (CMEs) • Heliospheric Imaging • Solar wind modeling • Real time solar wind prediction • Geomagnetically induced currents (GICs) • Exoplanetary space weather <p>Helio4Cast is collaborating with many international teams, among them the Rutherford Appleton Laboratory (UK), the University of New Hampshire, the NASA Goddard Space Flight Center, the University of California in Berkeley, Predictive Science San Diego, and the University of Reading (UK) https://helioforecast.space/</p> <p><u>AVIDOS - Aviation Dosimetry:</u> AVIDOS is a web service provided by Seibersdorf Laboratories and federated with ESA's Space Weather portal, accessible under: http://swe.ssa.esa.int/web/guest/avidos-federated.</p> <p>AVIDOS is an informational and educational online software for the assessment of cosmic radiation exposure at flight altitudes during quiet and extraordinary solar conditions. It estimates route doses for flights between any two locations and</p>	

	<p>calculates now-cast exposure during solar storms. It also provides a comparison of assessed exposure with natural background radiation on earth.</p> <p><u>Austrian Space Weather Platform:</u> Austrian researchers and (end) users of space weather created a national competence group. The initiative is funded by the Austrian Space Applications Programme (ASAP). The aim is to create an Austrian Space Weather Platform that provides an overview of the content and makes it easily accessible. This platform will not replace existing international "space weather warning tools", but it will bundle existing information with latest research results and information prepared according to national user needs. In addition, based on the latest research on extreme events and the needs of national stakeholders, an action plan will be developed describing the national response in case of an extreme space weather event.</p>
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B.8	Design and operation of space objects regardless of their physical and operational characteristics	Austria
Thoughts or approach to implementation	Any space object developed in Austria has to comply with the Austrian Space Act which means that the international practice is respected.	

B.9	Take measures to address risks associated with the uncontrolled re-entry of space objects	Austria
Thoughts or approach to implementation	Austria develops and operates small satellites. Currently, no satellites relevant for risks associated with uncontrolled reentry are planned.	
Current progress and/or proposed future activities	Individual Austrian companies are developing demisable products for certain types of satellites.	

C. International cooperation, capacity-building and awareness

C.1	Promote and facilitate international cooperation in support of the long-term sustainability of outer space activities	Austria
Thoughts or approach to implementation	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. Austria's space sector has become a key member of the European and international space community through the participation in European and International Space programs.	
Current progress and/or proposed future activities	The Austrian Space Strategy 2030+: "People, Climate, Economy: Space is for everyone" has a strong focus on sustainability on earth and in space.	

C.2	Share experience related to the long-term sustainability of outer space activities and develop new procedures, as appropriate, for information exchange	Austria
Thoughts or approach to implementation	Austria supports the exchange of experience and the development of new ways for the exchange of information.	

C.3	Promote and support capacity-building	Austria
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Thoughts or approach to implementation	Austria has built up expertise in certain areas addressed here (e.g. small satellite development), in other areas we cooperate with other actors (e.g. orbit tracking). As a member of the European Union EU, the European Space Agency ESA), Austria can use the jointly developed resources.
Current progress and/or proposed future activities	Austria actively supports capacity-building activities and initiatives of the EU and of ESA, as part of their position as permanent observers at the UNCOPUOS.

C.4	Raise awareness of space activities	Austria
Thoughts or approach to implementation	The Austrian Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology responsible for Space Affairs in Austria and the Austrian Research Promotion Agency develop and implement various awareness raising activities for different user communities.	
Current progress and/or proposed future activities	<p>The "Austria in Space" website provides extensive information on Austrian space activities and current events for space professionals, talent, media and all enthusiasts. https://austria-in-space.at/en/</p> <p>The BOOST platform within the „Austria in Space" Website is a matchmaker for Earth Observation data/service providers and a broad range of clients, from government agencies to research and private companies. https://boost.austria-in-space.at/</p> <p>Further information is also disseminated through ESERO European Space Education Resource Office for schools, ESA Business Incubation Centers in Austria about Space Startups, the Austrian NPOC National Point of Contact for Space Law of the European Center for Space Law and ESPI European Space Policy Institute für space policy related information and events.</p>	

D. Scientific and technical research and development

D.1	Promote and support research into and the development of ways to support sustainable exploration and use of outer space	Austria
Thoughts or approach to implementation	<p>Austria supports research into and development of ways to support sustainable exploration and use of outer space.</p> <p>Since 1987, Austria is a member state of the European Space Agency and participates in the different programmes. Austria has a national space programme, the Austrian Space Applications Programme (ASAP). It is a bottom up research funding programme. ASAP is funding applications for satellite-based technologies, space sciences and exploration and also technologies for space flights.</p> <p>The Austrian government's Strategy for Research, Technology and Innovation 2030 emphasizes the use of research, technology and innovation (RTI) to achieve climate targets. In order to implement these objectives, the Austrian Ministry for Climate Action has defined four focus areas essential to face the climate crisis and foster the green and digital transition of our society and economy: energy and mMobility transition, circular economy and climate neutral cities. The space sector can make a key contribution to all focus areas.</p> <p>Since 1994, Austria co-hosts the UN/Austria Symposium on Space Applications, with a focus on Space for Climate Action and since 2019 the UN/Austria World Space Forum, with a focus on "Sustainability in Space for Sustainability on Earth". Both event series focus on bringing different actors together to boost green and sustainable transition with space assets.</p>	

Current progress and/or proposed future activities	The development of sustainable space technologies should be included in space programmes. The environmental footprint of the space engineering sector should be enhanced.
Experiences, challenges and lessons learnt	Potential users of space data are often unaware of its benefits. Therefore an active exchange between the space sector and sectors striving for sustainable development such as energy, mobility, cities, etc. is needed to define user requirements and come up with new space solutions that foster the green transition.
Comments on specific needs for capacity building necessary to support implementation	Austria supports efforts to increase the participation of developing countries in space activities specifically relevant for sustainable development and climate action by organizing the annual UN/Austria Symposium in Graz (since 1994). https://www.unoosa.org/oosa/en/ourwork/psa/schedule/2022/un-austria-symposium-2022.html

D.2	Investigate and consider new measures to manage the space debris population in the long term	Austria
Thoughts or approach to implementation	Austria supports continued engagement in this area.	
Current progress and/or proposed future activities	Ad.D.2.1: A distinction should be made between detection, prevention and active removal of space debris.	
Comments on specific needs for capacity building necessary to support implementation	Overall, the innovative and economic potential in the engagement in space sustainability should be strengthened.	