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**Committee on the Peaceful
Uses of Outer Space**
Scientific and Technical Subcommittee
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**Report on the United Nations/Austria World Space Forum
'Access to Space4All'**

(Vienna, Austria, 18 to 22 November 2019)

I. Introduction

1. The United Nations/Austria World Space Forum 'Access to Space4All' was jointly organized by the Office for Outer Space Affairs of the Secretariat and the Government of Austria, through the Federal Ministry of the Republic of Austria Transport, Innovation and Technology (BMVIT), the Federal Ministry of the Republic of Austria for Europe, Integration and Foreign Affairs (BMEIA) The Forum was co-sponsored by the European Space Agency (ESA) and the International Committee on Global Navigation Satellite Systems (ICG).
2. In 2018 the United Nations Office for Outer Space Affairs hosted UNISPACE+50, which celebrated the 50th anniversary of the United Nations Conference on Exploration and Peaceful Uses of Outer Space (UNISPACE). The event brought over 800 participants from all over the world together in Vienna, including representatives from over 30 space agencies.
3. A key policy outcome of UNISPACE+50 was the international community's agreement, endorsed by the United Nations General Assembly (A/RES/73/91), to establish a Space2030 agenda. The Space2030 agenda is envisioned as a comprehensive strategy for reaffirming and strengthening the contribution of space activities and technologies to the achievement of global agendas such as the 2030 Agenda for Sustainable Development, the Paris Agreement and the Sendai Framework for Disaster Risk Reduction.
4. The "Space2030" Agenda and implementation plan, as a strategy for reaffirming and strengthening the contribution of space activities and space tools to the achievement of global agendas will be submitted by the Committee to the General Assembly in 2020.
5. The World Space Forum 2019 provided an opportunity for representatives of the collective space community to address international cooperation in the peaceful uses of outer space activities across the four pillars of UNISPACE+50 (space economy, space society, space accessibility and space diplomacy) and concluded with specific observations and



recommendations (see chapter III) which, inter alia, represented a valuable opportunity to elevate space as an important pillar of the global agenda.

6. The present report describes the background, objectives and programme of the Forum, as well as provides a summary of the sessions and concludes with observations and recommendations.

A. Background and objectives

7. Launched in Vienna in November 2019, the World Space Forum is a new event series hosted by the United Nations that is built on the recommendations generated at four High-Level Forums held from 2015 to 2018. The sequence of Forums demonstrated the growing interest of an increasing number of actors in discussing the future of space and international cooperation along the pillars of space economy, space society, space accessibility and space diplomacy.

8. Through the World Space Forum, the United Nations aims to leverage innovative solutions and technological developments to realise common sustainable development goals. Attention is increasingly placed on the unique potential of space technologies in this endeavour. Building on the outcomes of UNISPACE+50 and taking advantage of the momentum it generated the Forum sought to ensure that the current exchanges fully capture the political, legal and capacity building elements of international cooperation in space exploration.

9. The Office for Outer Space Affairs is in a unique position to bring together all relevant stakeholders to ensure that the benefits of space are available to the broadest possible user base, in all countries around the world.

10. As agreed in the United Nations/United Arab Emirates High-level Forum (see report A/AC.105/1165), held in 2017, the Forum, renamed in 2019 to World Space Forum, continued to serve as a driver for exchange to promote dialogue between governments, international organizations, industry, the private sector, academia and civil society, to connect the four pillars of UNISPACE+50 and “Space2030”.

11. The United Nations/Austria World Space Forum focussed on 'Access to Space4All', to leverage space technologies to their full potential to achieve sustainable economic and social development globally.

B. Attendance

12. The Forum brought together participants from national, regional and international public and private organizations and institutions, including decision-makers from government agencies, high-ranking officials from regional and international agencies, representatives and experts from the United Nations agencies, experts from the space community, experts from industry, business and academic communities and policymakers, experts from international centres of excellence, researchers involved in the use of space technologies, representatives of the private sector in the space and non-space fields, and civil society leaders.

13. Funds provided by the United Nations, the Government of Austria and the co-sponsors were used to defray the costs of air travel and accommodation for 26 (11 female / 15 male) participants. A total of 299 participants (104 female / 195 male) from the broader space community attended the Forum.

14. Participants from the following 66 Member States attended the Forum: Algeria, Argentina, Australia, Austria, Bangladesh, Belgium, Bhutan, Bolivia, Brazil, Bulgaria, Cameroon, Canada, Chile, China, Costa Rica, Croatia, Czech Republic, Ecuador, Egypt, Finland, France, Germany, Greece, Hungary, India, Iran, Ireland, Israel, Italy, Japan, Jordan, Kazakhstan, Kingdom of Bahrain, Libya, Luxembourg, Malaysia, Mexico, Mongolia, Myanmar, Nepal, Netherland, New Zealand, Nigeria, Norway, Pakistan, Paraguay, Philippines, Poland, Qatar, Republic of Armenia, Romania, Russian Federation, Saudi Arabia, Senegal, Serbia, Slovakia, Slovenia, South Africa, Spain, Switzerland, Tajikistan, Thailand, Tunisia, Ukraine, United Kingdom and the United States of America.

15. Representatives of the following United Nations Organisations were also present at the Forum: the Comprehensive Nuclear-Test-Ban Treaty Organization, the International Atomic Energy Agency, United Nations Conference on Trade and Development, the United Nations Industrial Development Organization, United Nations Office on Drugs and Crime, the World Health Organisation, the United Nations Office for Disarmament Affairs and the Office for Outer Space Affairs.

C. Programme

16. The programme of the Forum was developed by the Office for Outer Space Affairs in cooperation with representatives from the Federal Ministry of the Republic of Austria Transport, Innovation and Technology (BMVIT) and the Federal Ministry of the Republic of Austria for Europe, Integration and Foreign Affairs (BMEIA).

17. The Forum was opened during a welcoming reception hosted by the Mayor of Vienna in the Vienna City Hall on 18 November 2019 and heard welcoming remarks on behalf of the Mayor and Governor City of Vienna, Federal Ministry of the Republic of Austria Transport, Innovation and Technology (BMVIT), the Federal Ministry of the Republic of Austria for Europe, Integration and Foreign Affairs (BMEIA) and the Office for Outer Space Affairs.

18. In the first part of the Forum on 19 and 20 November 2019 four moderated sessions gathered technical experts to present their views, work as well as lessons learned and new ideas on: 1. Space Economy for All, 2. The Benefits of Space for All, 3. Access to Space for All, 4. Secure Space environment for All. A dedicated open panel on the United Nations Interagency Mechanism “UN-Space”, a focus session on artificial intelligence on image interpretation, as well as a poster session were also integrated into this part.

19. The following two days, 21 and 22 November 2019 additionally brought together decision-makers from governments, space agencies, and other stakeholders to discuss and exchange of views and recommendations in the four moderated panel discussions on various aspects of space economy, space society, space accessibility and space diplomacy.

20. The hosts of the World Space Forum also organized on 21 November 2019 two field trips to RUAG Space Austria and the Planetarium Austria as well as invited for a dinner reception.

21. All presentations and panel discussion interventions can be found on the website of the Office for Outer Space Affairs (www.unoosa.org).

II. Summary of the Forum programme

22. The technical sessions during the first two days enabled participants to learn about the value of space technology for a variety of applications and stimulated discussions on numerous international initiatives existing in the field of promoting the use of space technology. Presentations delivered during the thematic sessions summarized below.
23. The session on space economy for all provided the opportunity to examine, analyse and present the topic through various angles. During the session, the presenters touched on topics ranging from presenting the entrepreneurs and start-ups point of view, presented a potential mechanism to improve the financing and funding landscape of the space sector, discussed possibilities for collaborations and partnerships with pre-existing programmes and introduced a system to improve compliance with sustainability.
24. The session provided the opportunity to exchange on topics ranging from the impact of tolerance for risk in the context of sustainable use of space to the support which could be established for space companies and start-ups, as well as on the motivation of the increase of venture capital for space start-ups.
25. Furthermore, the session allowed to present national and international partnership programmes and permitted and in-depth elaboration about the importance of responsible behaviour in space and what the private sector can contribute to improving international cooperation in outer space.
26. The Space Economy panel highlighted several issues that should be considered priorities when discussing space economy and how global space economic activities can be supported at the United Nations level. The participants addressed the need to support actions to lower the entry costs for start-up space activities as well as facilitating public-private partnerships as a key way to reduce stakeholder risk. Additionally, export control should also be considered by the international community as an important mechanism to provide a level playing field for international trade in the space economy sector.
27. Furthermore, the promotion of innovation in the space industry, as a way of reducing barriers to accessing space was highlighted and the importance to ensure downstream space economy activities was stressed especially underlining that space infrastructure is only part of the picture of the space economy.
28. In the session on the benefits of space for all the role of space activities and how this was intertwined with all the other themes- economy, accessibility, and diplomacy were highlighted. During the presentations a wealth of options and arguments why space was important for a society were presented and also the necessity to come up with a mechanism for cooperation and cooperative behaviour to ensure the benefits of space for societies was stressed.
29. The panellists also underlined the need for better awareness-raising tools to improve the understanding and promotion of the benefits of space for society to increase knowledge about the importance of space for sustainable development to space. In this regard, it was emphasized that the benefits of space exploration are achievements of and for humanity which could have only be accomplished through international cooperation.
30. The restrictive data access policies, the costs, the frequency of observations which are insufficient to track changes and developments over time, the need for continuity and sustainability of observations and long-term Earth Observation programs have been

highlighted as potential constraints in using satellite applications for the implementation of the Sustainable Development Goals.

31. The participants to the Forum stressed that the benefits that space bring to society are not obvious to people and that people are not able to identify services of their everyday life that are related to the space sector. It was therefore stressed that there is a need to better communicate space benefits because today it is only communicated within the existing communities.

32. To approach and convince citizens about the importance of space to achieve the sustainable development goals it was underlined that innovative, proactive and potential radical ideas could be necessary to approach the potential beneficiaries through a more empathic and emotional approach. As an example, the meaningful ties between art, technology and society have been presented and the importance of the promotion and exploration of how space technology influences our daily life to be able to speak through tangible and comprehensible stories.

33. Based on previous Office for Outer Space Affairs workshop observations and recommendations the sessions allowed to draw attention on the potential of the combination of artificial intelligence applied for satellite data interpretation in support of the implementation of the Sustainable Development Goals.

34. Participants expressed the view that solutions offered through new technology developments, such as artificial intelligence, blockchain or cloud computing, could provide very useful tools to tackle a variety of issues currently on the agenda of the Committee, and consequently proposed that the Committee could consider including exchanges on these developments in the future.

35. The Office for Outer Space Affairs was commended for this outstanding effort in providing space accessibility ranging from the use of Space-based data to actual in-orbit opportunities.

36. The participants noted with appreciation the work taken place across Member States – both space-faring and non-space faring nations – and highlighted the initiatives taken by the Office for Outer Space Affairs to support countries in their efforts to harness space for sustainable development.

37. During the technical sessions, the greater range of capabilities of CubeSats and the following increasing opportunities, as well as the increasing prospects through more sustainable, flexible and affordable micro-launchers for small satellites, have been highlighted.

38. The discussion in the session on Secure Space environment for All focused on the need for the Committee to regulate in the area of space safety and particular active space debris removal. This would on the one hand support commercial activities in this field and on the other hand ensure the sustainability of the space environment in the long term.

39. Furthermore, regulation in the area of safety, security and sustainability could also enhance transparency which is particularly important due to the dual-use nature of debris removal technologies.

40. It was stressed that a high level of space situational awareness and increased sharing of information on space activities can enhance transparency and thus the peaceful use of outer

space. The participants promoted the access to this information for all and therefore stressed that the development of international regulatory frameworks in this field is regarded as urgent.

41. Participants to the Forum noted that a centralized mechanism to track space debris could enhance transparency and the Preparatory Committee of the Comprehensive Nuclear Test-ban Treaty Organization was mentioned as an example that demonstrates the feasibility of such an international observation system.

42. The session further emphasized the importance of having a robust space situational awareness in place and put forward the question how the United Nations can help advance this by further developing a regulative framework and discussing policy dimensions in this area. It was evident that the secure space environment is in the interest of all stakeholders and that further measures to improve space situational awareness at the international level could be a way forward, providing that the regulative and policy dimensions trickle down to include all stakeholders in this fast-growing new-space environment.

43. Participants to the Forum mentioned the importance of treating space as a finite resource and the importance of finding technical solutions to prevent the over-consumption. In this regard, it was stressed that all current and future operators need to be supported in understanding that we have a common goal of the long-term sustainability of the environment.

44. During the Forum it was stressed that accuracy of information about space objects today is not sufficient and should be improved. It was underlined that the current situation is a threat to both the sustainability and the peaceful use of our space environment as uncontrolled objects are not accurately tracked.

45. Consequently, collision avoidance has already become a reality and necessity and also constitutes a potential business case. It was stressed that the future will bring accelerating launch rates and deployments of smaller satellites and constellations which will also be observable through more and improved space surveillance networks. In this regard, it is estimated that the objects tracked will increase from less than 30 000 to over 500 000. Precision forecasting will allow valid collision warnings and potentially reducing the overall number to less than 100 000 collision warnings (per year) and improve the precision of the predicted location of uncontrolled objects by an order of magnitude.

46. Participants to the Forum noted that increased transparency, brought by better information, is an important factor to maintaining peace in space and ensure the sustainability of space operations while also contributing to confidence-building measures.

47. During the UN-Space panel, the common aspiration of participating United Nations entities was stressed to strengthen the capacities of Member States for sustainable development, which could be achieved through the increased integration of space science, technology and their applications and relevant regulatory frameworks, in national development strategies.

48. Furthermore, the need for an integrated and coordinated approach based on the principles of equality and inclusiveness to ensure that the benefits of outer space shall be accessible to all States irrespective of their level of economic, social, scientific or technical development were recognized.

III. Observations and recommendations

49. The following observations and recommendations were proposed during the World Space Forum under the discussion of the four sessions on Space Economy, Space Society, Space Accessibility, Space Diplomacy.

50. To foster a stronger and more sustainable space economy the discussions at the Forum underlined the importance of education, training and development as well as stressed the need for strategic and increased financial, administrative and start-up support of entrepreneurs in the space sector.

51. International, as well as public-private partnerships, have been promoted as space economy can only grow by strategic partnerships, cooperation and coordination between state and non-state actors.

52. It was furthermore recommended to incentivise sustainable and responsible behaviour in space activities instead of utilising punitive or prohibitive elements supported by transparency and confidence-building measures of the private sector through measuring activities and publishing the results as well as considering and recognising data from other actors.

53. The international community has an important role in fostering the space economy, as the development of sustainable, future-oriented and strong space economy depends significantly on the success of cooperation, coordination and initiatives taken in and by the international community.

54. The importance of close cooperation between states was stressed and it was highlighted that especially the risk of fragmentation of space law and the necessity of consultation between states to aim at harmonisation of national space laws have a strong impact on space economy developments. It was noted that the same rules are not sensible for all States, but harmonisation would consider national situations and the Committee could offer the appropriate framework to initiate these discussions as cooperation when enacting national legislation would enable a level playing field.

55. International symposia, workshops and networking events are important platforms for exchanges to increase awareness on the importance of space for the entire society. The Office for Outer Space Affairs was commended for its efforts to bring together the entire space community and in that regard, it was stressed that at the 2020 World Space Forum concrete project ideas, proposals and cooperation opportunities addressing the implementation of the Sustainable Development Goals should be presented.

56. Participants to the Forum recommended that the international community should consider exchanges on a multilateral mechanism for the effective sharing of space derived data, digital assets, and derived geospatial products as well as continue to contribute to multilateral cooperation in scientific research and development of space technologies and collaborating in global education and capacity-building programmes.

57. Inspiration and motivation to the next generation are key to the success of maintaining space a peaceful environment for all. It was therefore recommended to start awareness-raising projects as early as possible through organizing hands-on activities, the support of role models, the offering of mentoring programmes as well as through practical space exploration, technology and application development at the university level.

58. The Committee, as the only committee in the United Nations dealing with this subject matter, was seen as instrumental not only for awareness-raising but also for bridging the gap between the user and provider community. Efforts should be made for a better connection to other existing platforms to strengthening cooperation but also to increase awareness on a very unique and stand-alone subject matter as it was stressed that concrete user awareness will foster innovation and not the producer beliefs of the needs of the beneficiaries.

59. The importance of the promotion of inclusiveness and equality in the space sector was highlighted by several participants and the Office for Outer Space Affairs was highlighted as an entity to facilitate access to space for all through its various initiatives and activities. Especially, the upcoming Space for Women conference in Brazil in 2020 was highlighted as an important future occasion in this regard.

60. To make the maximum use of space applications for sustainable development panelists recommended the inclusion of technology developments, such as artificial intelligence, blockchain, cloud computing in the capacity-building activities of the Office for Outer Space to support innovative ways and means for data extraction services, data preparation and data provision.

61. To overcome some of the constraints highlighted in the application of Space technology for the implementation of the Sustainable Development Goals participants recommended closer cooperation of space agencies with global, regional, national and local actors to maximize benefits of the use of Earth Observation. Potential collaborations could be facilitated through the creation of global datasets, good practise guidance, joint capacity building initiatives, Earth Observation enabling infrastructure, tools and platforms, and using Earth Observation knowledge via Sharing Hubs.

62. Participants to the Forum recommended the inclusion of rural, remote and poor areas in plans to provide internet access to all via space technology in line with the efforts of the Secretary-General's High-level Panel on Digital Cooperation and its recommendation I.A that "every adult should have affordable access to digital networks, as well as digitally-enabled financial and health services, as a means to make a substantial contribution to achieving the Sustainable Development Goals".

63. The success of the Committee in adopting meaningful politically binding instruments in the areas of space debris and the long-term sustainability of outer space activities was commented. Participants furthermore stressed that the issue of space debris is not solely a safety, but also a security concern and shall be pursued by the Committee also in coordination with other concerned bodies of the United Nations.

64. Participants also highlighted the importance of an enhanced understanding and consequently utilization of the benefits of space technology and therefore stressed the importance to merge existing available space data and make them accessible to the general public in a transparent manner to provide an affordable and sustainable entry point to space for the larger scientific community and the general public.

65. The participants to the Forum underlined that the current regulatory framework of outer space activities does not provide for deterrence for the deterioration of the space environment and stressed that due to the absence of space traffic and safety rules there is a lack of transparency, responsibility and accountability of space actors.

66. Therefore, the need for regulation in the fields of active space debris removal and space traffic management, including increased sharing of space situational awareness information and space safety provisions was highlighted. Additionally, this could also include rules for regulating and managing risk as well as for regulating access, availability and use of space-based data, since risk probabilities are rising due to the increase in space traffic, the lack of space sustainability and growth of the amount of space debris and the increased dependencies of society on space-based services.

67. It was stressed that for access to space a functioning international regime is essential, and that accessibility is defined by access to technology, access to funding but also the importance of the political will was highlighted.

68. The importance of the elaboration of well-defined Space Traffic Management structure was noted as an important mechanism to support space accessibility. Such exchanges would need to address legal, technical and policy-related topics and it was stressed that the Committee would present the appropriate forum for these discussions.

69. The importance of international cooperation for the development of Space traffic management was stressed, as global engagement in this domain is a key aspect. To facilitate space accessibility, the involvement of the private sector, the special role of the Committee in capacity-building as well as efficient communication on space flight safety as well as its awareness-raising was highlighted.

70. Therefore, capacity-building was regarded as a key role for the Committee to facilitate the development of basic standards, open data repositories, data collection and its analysis to be able to foster an international space flight safety coordination.

71. The role of the international community was mainly highlighted in connection with the adoption by the Committee of the Guidelines for the Long-term Sustainability of Outer Space Activities (A/74/20, Annex II); the establishment of a new working group under the agenda item long-term sustainability of outer space activities of the Scientific and Technical Subcommittee; and the need for regulation in the fields of active space debris removal and space traffic management, including increased sharing of space situational awareness information and space safety provisions.

72. Participants noted that the adoption of the Guidelines for the Long-term Sustainability of Outer Space Activities is a great success of the Committee. However, the risk that private players do not see themselves bound by the non-binding guidelines and that they are not enforced by States at the national level was also observed. Consequently, it was stressed to enhance consistency in the monitoring and enforcement at the national level as well as to ensure that the industry plays a role in the implementation of the guidelines.

73. It was recommended to establish a bridge between the different United Nations offices based in Vienna and Geneva, as sustainability and safety in space now intersect with traditional security concerns, particularly around the substantive issues of launch, space debris mitigation, space situational awareness, and on-orbit servicing, rendezvous, and active debris removal. It was noted that this could also include the institutionalization of cooperation through a common roadmap for the international community.

74. The need for better communication also on the weakness of the existing global space regulations and the need for more proactive promotion of responsible behaviours among and

between institutional, public, and private space actors in a common effort to preserve our limited space resources was recommended.

75. Participants to the Forum underlined the need for responsible behaviour in outer space as it is the interest of commercial space operators of states and also the international community to preserve space. It was noted that the establishment of national standards for space situational awareness constitutes the beginning of a trend which is similar to the trend involved in regulating space traffic.

76. Participants to the Forum reminded all Space actors of the importance of taking responsibility for sustainability in outer space and commended the Committee for the adoption of the 21 Guidelines for the Long-term Sustainability of Outer Space Activities, which is seen as an important step forward towards a stable and orderly space environment. Furthermore, it was stressed that the Guidelines, which have been developed in the Committee, are also beneficial for other discussions within the United Nations, as they would, for example, support transparency and confidence-building measures benefitting the discussions in the Conference on Disarmament.

IV. Conclusions

77. The United Nations/Austria World Space Forum: 'Access to Space4All' provided an opportunity to advance the debate in the context of discussing the future of space and of international cooperation within space economy, space society, space accessibility and space diplomacy.

78. The World Space Forum demonstrated the importance of continued and proactive action to raise awareness of the existing normative structure to promote the consistency of global space governance as a rule-based international order is important to influence national space law, which in turn will influence non-state actors.

79. Given the rapidly evolving space sector and the current developments, the World Space Forum provided an important platform to contribute to the importance that diplomatic community has have the skills, knowledge, and experience that are needed to advance the international, interdisciplinary discussions associated with space diplomacy.

80. Furthermore, the World Space Forum offered an additional Forum for the diplomatic community to engage with the broader space community and see the international space context through a different lens and to provide cross-cutting knowledge that builds bridges to international cooperation.

81. At the World Space Forum, the importance of space technology for human development – of space-faring and non-space faring nations – was demonstrated and that this common understanding would provide the essential basis for future exchanges within the Committee on the Peaceful Uses of Outer Space as well as upcoming World Space Forums.

82. The Forum demonstrated the increasing interest of the broader space community to contribute to the exchange and to collectively address international cooperation in the peaceful uses of outer space across to appeal to the need for a proactive solution that preserves space. Furthermore, the Forum uniquely highlighted the importance of international cooperation as well as the broadest possible inclusion of the various space actors to commonly address the potential future challenges in the outer space domain.

83. Building on the results from the series of High-level Forums the 2019 World Space Forum offered a unique occasion to facilitate constructive dialogue between a wide range of stakeholders and to exchange on key initiatives, policies and projects.

84. Austria announced its continued support for the World Space Forum until 2024 and committed to hosting the Forum every other year until 2024. The Office invited all Member States and the community at large to express their interest for additional support for the preparation, administration and implementation of the World Space Forum. Member States are also invited to present their proposals to host upcoming World Space Forums, 2022 and 2024.
