



---

**Committee on the Peaceful  
Uses of Outer Space****Report on the United Nations/Austria symposium on the  
theme “Climate action: transforming space-based  
technology projects into sustainable services that support  
policy-making”**

(Graz, Austria (online), 17 and 18 July 2024)

**I. Introduction**

1. The United Nations/Austria symposium is one of the long-standing activities of the Office for Outer Space Affairs of the Secretariat under the United Nations Programme on Space Applications. The symposium of 2024 was the thirtieth in the series.
2. Over three decades, more than 5,000 participants from 119 countries have benefited from the symposium, which has evolved to reflect various developments in the space sector. The symposium has covered topics ranging from the role of small satellites, from the 1990s to the early 2000s, in advancing socioeconomic objectives to the accessibility of data that can be used to tackle potential space weather threats in the 2010s, to the more recent focus on the use of space applications in achieving the Sustainable Development Goals, in particular, climate action. A significant number of countries have been represented at the symposium, which has played a key role in strengthening international cooperation and facilitating exchanges among developing and developed countries.
3. In recognition of the importance of implementation and capacity-building in realizing the benefits of space for climate action, the symposium provided a multidisciplinary and multi-stakeholder platform that focused on raising awareness of the challenges in transitioning from a technical project to a sustainable service and facilitating knowledge exchange and the sharing of practical insights as to how to make that transition successfully. Following the symposiums held in 2020, 2022 and 2023, the 2024 symposium continued to provide additional inputs to the Office for Outer Space Affairs Space Climate Action initiative, which was launched in 2022.
4. The symposium included two days of presentations and discussions on the role of governmental support, financing, capacity-building and user engagement in enabling the successful transition of technical projects to sustainable long-term services with real impact. An Indonesian case study highlighted the importance of setting robust national policies and building ecosystems underpinned by a collaborative and transformative approach.



5. The symposium was held in a hybrid format, the majority of participants attending online and a limited number attending in Graz, Austria. The event was co-organized by the Government of Austria and supported by Joanneum Research as the local organizer, in cooperation with Graz University of Technology. It was co-sponsored by the Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology and the Federal Ministry for European and International Affairs of Austria, the region of Styria, the city of Graz and Austrospace. The European Space Agency (ESA) provided additional support.
6. The present report describes the objectives of the symposium, provides attendance details and summarizes the activities carried out.

## II. Background and objectives

7. The Office for Outer Space Affairs disseminates knowledge with respect to the added value of space applications in addressing societal issues, notably through events of the United Nations Programme on Space Applications held at the request of Member States and organized jointly.
8. Since 1994, the United Nations/Austria symposium has focused on innovative ways of responding to societal needs and has showcased the socioeconomic benefits of space applications in a wide range of areas. In 2024, the symposium had the following objectives:
  - (a) To demonstrate how initiatives based on space applications have been successfully developed and implemented in different countries;
  - (b) To promote the exchange of best practices in transforming technical projects into sustainable services that have measurable impact and that meet demand in and the needs of developing countries in mitigating and adapting to climate change;
  - (c) To share experiences and explore how space-based services can be used to ensure compliance with or support policies on climate action, according to national priorities;
  - (d) To present available toolboxes that have already been implemented through case studies or pilot projects at the country level in order to facilitate compliance with regulations related to climate action, with the aim of encouraging the adoption of tested tools and approaches;
  - (e) To raise awareness of the Space for Climate Observatory and relevant space-related activities, services and cooperation programmes among different user groups, in particular, government officials, the diplomatic community, the United Nations and other international agencies, and non-governmental organizations;
  - (f) To create opportunities for cooperation and collaboration with funding organizations and international organizations;
  - (g) To report to the Committee on the Peaceful Uses of Outer Space through the Scientific and Technical Subcommittee.

## III. Attendance

9. A total of 1,397 individuals registered to attend the symposium and were granted access to the web-based communication platform used for remote participation in the event. That figure represented an increase of 18 per cent compared with the symposium of 2023. Sixty per cent of all registered participants were men, and 70 per cent were from developing countries.
10. In-person participation was limited to 80 persons, the maximum seating capacity of the event venue. All but seven speakers were present at the venue; those seven gave their presentations online.

11. A number of participants were members of the diplomatic community. Also present were representatives of space agencies and relevant space-related organizations, including the Algerian Space Agency, the National Space Programme Management Office of Angola, the Center for Ecological-Noosphere Studies of the National Academy of Sciences of Armenia, the Belgian Science Policy Office, the China Academy of Sciences, the China National Space Administration, the National Commission for Space Activities of Argentina, the State Space Agency of the Republic of Azerbaijan, the National Space Science Agency of Bahrain, the Bolivarian Agency for Space Activities, the National Institute for Space Research of Brazil and the Brazilian Space Agency, the Canadian Space Agency, the Egyptian Space Agency, the Ethiopian Space Science and Technology Institute, the European Space Agency (ESA), the European Union Agency for the Space Programme (EUSPA), the National Centre for Space Studies (CNES) of France, the Gabonese Agency for Space Studies and Observation, the Indian Space Research Organisation, the National Research and Innovation Agency of Indonesia, the Indonesian Space Agency, the Italian Space Agency, the Iranian Space Research Centre, the Kenya Space Agency, the Korea Aerospace Research Institute, the Korea Aerospace Administration, the Mexican Space Agency, the Information and Research Institute of Meteorology, Hydrology and Environment of Mongolia, the Royal Centre for Remote Sensing of Morocco, the Islamic World Educational, Scientific and Cultural Organization, the National Space Research and Development Agency of Nigeria, the Norwegian Space Agency, the Pakistan Space and Upper Atmosphere Research Commission, the Paraguay Space Agency, the Senegalese Space Study Agency, the Singapore Office for Space Technology and Industry, the Swedish National Space Agency, the Geoinformatics and Space Technology Development Agency of Thailand, the Turkish Space Agency, the National Aeronautics and Space Administration of the United States of America, the Center for Space Monitoring and Geoinformation Technologies and the Space Technology and Research Agency of Uzbekistan and the Zimbabwe National Geospatial and Space Agency.

12. The following 135 countries and territories were represented: Afghanistan, Albania, Algeria, Andorra, Angola, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Benin, Bhutan, Bolivia (Plurinational State of), Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Central African Republic, Chad, Chile, China, Colombia, Comoros, Costa Rica, Côte d'Ivoire, Croatia, Cuba, Democratic Republic of the Congo, Denmark, Djibouti, Dominican Republic, Ecuador, Egypt, Eritrea, Ethiopia, Finland, France, Gabon, Gambia, Georgia, Germany, Ghana, Greece, Guatemala, Guinea, Honduras, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Ireland, Israel, Italy, Japan, Jordan, Kazakhstan, Kenya, Kosovo, Kuwait, Lao People's Democratic Republic, Latvia, Lesotho, Liberia, Libya, Madagascar, Malawi, Malaysia, Mauritius, Mexico, Mongolia, Morocco, Myanmar, Namibia, Nepal, Netherlands (Kingdom of the), Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Paraguay, Peru, Philippines, Poland, Portugal, Puerto Rico, Republic of Korea, Romania, Russian Federation, Rwanda, Saint Lucia, Saudi Arabia, Senegal, Serbia, Sierra Leone, Singapore, Slovakia, Slovenia, Somalia, South Africa, Spain, Sri Lanka, Sudan, Sweden, Syrian Arab Republic, Thailand, Timor-Leste, Trinidad and Tobago, Tunisia, Türkiye, Uganda, Ukraine, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland, United Republic of Tanzania, United States of America, Uruguay, Uzbekistan, Venezuela (Bolivarian Republic of), Viet Nam, Yemen, Zambia and Zimbabwe.

13. In terms of geographical distribution, 70 per cent of the registered participants were from developing countries. That high level of representation of developing countries demonstrates that the publicity campaign conducted before the symposium had been effective in attracting a worldwide audience. Of the total number of registered participants, 33 per cent were from African States, 33 per cent from Asian or Pacific States, 20 per cent from Western European and other States, 9 per cent from Latin American and Caribbean States, and 5 per cent from Eastern European States.

## IV. Programme

14. In total, the symposium lasted for 13 hours over two days. It included 35 presentations, of which 17 were delivered by women and 18 by men. Of the speakers, 63 per cent were from developing countries. All moderators of technical sessions and panel discussions were women.

15. The following sessions were held on the first day:

(a) Session 1: User engagement: how meaningful dialogues lead to sustainable initiatives;

(b) Session 2: Support and funding opportunities for space for climate action;

(c) Panel discussion 1: User engagement: lessons learned and recommendations;

(d) Indonesia country case: Hotspot for climate action.

16. The following sessions were held on the second day:

(a) Panel discussion 2: Capacity-building: implementing new tools for widespread and effective use;

(b) Session 3: Funding and financing technical projects: show me the money;

(c) Session 4: Role of governments and intergovernmental organizations.

17. Technical sessions and panel discussions were interspersed with short presentations of no longer than five minutes, called “project pitch” presentations, to avoid monotony. Each of those presentations also provided an opportunity for young professionals and speakers to share information about their projects and benefit from exchanges with experts.

18. Two demonstrations of operational toolbox software used in projects accredited by the Space Climate Observatory were shown during the coffee breaks. A chat function was provided on the online platform to collect questions and enable some degree of exchange with the audience despite the lack of face-to-face interaction.

19. In-person participants were invited by the Mayor of Graz to a reception at Graz City Hall on 16 July to network in preparation for the first day of the symposium on 17 July.

20. During the welcome ceremony, opening remarks were made by the Director of the Office for Outer Space Affairs and representatives of Joanneum Research, Austrospace, the Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology of Austria, the city of Graz, the region of Styria and the Permanent Mission of Austria to the United Nations in Vienna. In addition, a keynote presentation was delivered by the ESA Director of Earth Observation Programmes.

21. An accordion performance by an award-winning Austrian musician added a measure of local culture to the symposium and a cake-cutting ceremony took place to commemorate the thirtieth anniversary of the symposium.

22. In-person participants were offered either a guided walking tour of the old city or a walking tour to the old clock tower to conclude the first day, prior to a reception organized by the region of Styria in the historical Orangery building of Graz castle.

## V. Summary of the discussions

23. Session 1 showcased a range of initiatives using space-based technologies and applications for climate action and highlighted the importance of continuous dialogue involving future end users, from inception of the project throughout the development phase. The representative of the Ministry for Environment of France presented the

Stockwater project, which involved satellite monitoring of water reservoirs at the national level. As success factors for the project, he highlighted the importance of the involvement of personnel with expertise in both space technology and public policy in addressing needs in both areas, in addition to continuous and stable governmental support for at least five years. The representative of the Information and Research Institute of Meteorology, Hydrology and Environment of Mongolia presented the Drought Watch project, a drought monitoring system developed with the assistance of the Economic and Social Commission for Asia and the Pacific (ESCAP) and the Chinese Academy of Sciences. The representative highlighted the commitment of all participating organizations throughout the duration of the project and close collaboration with local experts and end users at all stages from design to implementation, that commitment being key to the project's success. Following implementation, Mongolia had assumed full ownership of the project and had even been able to expand it to neighbouring countries with similar climatic conditions. The representative of the Royal Centre for Remote Sensing of Morocco, presenting a project that supports efforts to combat the desert locust through prevention, similarly emphasized that it was critical to understand the real needs of users and to design products that met those needs. It was also important to opt for products that could easily be integrated into the user's work tools and to foster a post-project relationship by offering "after-sales service" and establishing a feedback loop between users and providers with a view to future improvements. All projects highlighted the need for capacity-building and user training to ensure appropriate use of the applications concerned and achievement of the desired results.

24. Session 1 continued with a presentation by the representative of Leto Space, who explained that the economic benefit of space technologies and applications could be realized only through further user uptake in industries outside the space industry. However, there was insufficient awareness within the space community about challenges in non-space industries. Moreover, the lack of understanding among industrial players with regard to space capabilities could hamper the market's growth. Governments, businesses and consumers had different interests and space industry players underestimated how large those differences were. The presentation addressed the interdependence between key players and ways to bridge the gap between awareness and uses of relevant space technologies and applications, including through greater understanding of space value domains, the space value network and the space supply chain.

25. Session 1 concluded with a presentation by the representative of CNES about the integration of TropiSCO data into the Gabon natural resource and forest observation system in collaboration with local partners in order to create an open and operational system for detecting forest loss. The representative noted that the project's success was due to three main factors: the fact that it was adapted to users' needs; the maintenance of a continuous relationship with users and partners for the purposes of user feedback, validation and capacity-building; and funding received from CNES. TropiSCO products could also be integrated easily into other products or platforms in other countries. Both the Stockwater project and the TropiSCO project had been accredited by the Space for Climate Observatory.

26. Panel discussion 1, on the topic "User engagement: lessons learned and recommendations", provided insights and recommendations from users who had adopted a new technical solution, and from solution developers, as to how to conduct discussions with user communities throughout the development of an initiative. The five speakers came from varied backgrounds, including academia, businesses, trade associations, government agencies and the diplomatic community. It was noted that the diversity of end users often made it difficult to decide which was more representative of the wider end user group. In discussing the role of intermediaries in facilitating discussions with end users, one speaker expressed the view that it was sometimes more effective to reach out directly to the public to encourage their participation in workshops rather than through the Government, which might designate high-level civil servants to attend. Moreover, the use of consultation groups

encouraged user communities in different market sectors to express their requirements openly and on an equal footing. Another speaker described a top-down approach starting with local authorities, while a third speaker suggested that an intergovernmental organization might act as a bridge to such authorities. The speakers agreed that inclusivity and user engagement throughout a project were critical to the project's success. There should be common objectives from the beginning, and strong trust between the partners involved in co-creating the project. However, the exact mode of implementation depended on the context, user requirements and stakeholders, as there was no one-size-fits-all approach.

27. The panellists also discussed scaling up from projects to long-term sustainable services. During the project phase, funding for development was likely to be relatively secure owing to the provision of grants. However, a funding gap tended to open up as the project progressed to operational deployment. The panellists concurred that it was ultimately active user engagement that made it possible to retain users, ensured the user-friendliness of the product and service and would lead to continued usage and possibly revenue generation in the long term.

28. The Indonesian "country case", entitled "Hotspot for climate action", showed the ways in which Indonesia supports its national policy on combating climate change, namely through the practical implementation of space-based projects and the establishment of initiatives that support the transition of technical projects to sustainable services at the national, regional and local levels. Indonesia is an archipelago comprising more than 17,000 islands. Owing to its location on the equator between Asia and Australia, the country has experienced unique climatic conditions and has suffered from serious forest fires during the dry season every year. The haze caused by the forest fires has posed respiratory health risks to the public both in Indonesia and in surrounding countries, and the fires have threatened the country's rainforest, the world's third largest after the Amazon and the Congo Basin rainforest.

29. Indonesia is highly dependent on space technologies for telecommunications and for climate-related Earth observation. Presidential Decree No. 45 of 2017 concerning the National Plan on Space Activities for 2016–2040 highlighted the Government's commitment to, and space-related regulations aimed at, supporting a sustainable space programme that enhances national services. It is recognized that the policy, infrastructure and data provided by the national space programme for research in satellite technology for climate forms the basis for the establishment of robust methods and applications. The research results are subsequently adopted as the standards to be applied in the production of climate-related products for use by end users such as ministries, local government authorities and communities. Feedback from end users is then analysed in order to further improve on research and development. The Government also supports local talent management through research mobility programmes and research funding. In order to develop the space economy, the Government actively engages private entities in long-term product utilization and platform operation. Through presentations from the National Research and Innovation Agency of Indonesia, the Ministry of Environment and Forestry and Nusantara CompNet Integrator, the country team showed how Indonesia had developed and implemented a holistic and cohesive mapping of burned areas, haze monitoring and fire-fighting response systems that cuts across government silos and effectively engages local communities and private entities in reducing the occurrence and impact of forest fires in Indonesia.

30. The Indonesian team also introduced other ongoing projects such as the Nusantara satellite constellation, which consists of 18 satellites providing high-resolution and very high-resolution remote sensing (optical and synthetic aperture radar) images and Internet of Things communication missions for sustainable development; the Geoinformatics Multi-Input Multi-Output (GEOMINO) model; and the One Map Geoportal, which will enable government agencies to use a single map, achieve speedier Government responses to critical events and accelerate the national development process.

31. Session 2, entitled “Support and funding opportunities for space for climate action”, featured presentations on various technical, financial and capacity-building opportunities offered by major institutions in support of space for climate action. The Space for Climate Observatory highlighted the benefits of joining the Observatory and obtaining Observatory accreditation. The Islamic World Educational, Scientific and Cultural Organization described its capacity-building workshops and symposiums and its Hub Accelerator Programme, which is aimed at the development of future business icons. EUSPA focused on its Horizon Europe funding programme, which is implemented in collaboration with international partners, and the European Union Space Academy, which provides an online, customizable learning platform to support innovators in understanding the potential of European Union space resources and facilitates investment readiness and entrepreneurship. Finally, the representative of the Earth Observation System and Data Centre of the China National Space Administration presented data sharing and international cooperation opportunities afforded by the China Platform of Earth Observation System.

32. Panel discussion 2, on the topic “Capacity-building: implementing new tools for widespread and effective use”, dealt with successful methods for integrating new tools into the daily activities of various end user communities. The panellists presented best practices and discussed their experiences in replicating successful capacity-building initiatives in different contexts. They also highlighted the need to properly assess the needs of end users and beneficiaries. That could be done through interviews and pre-training surveys focusing on the key elements to be imparted during the training and aimed at assessing participants’ level of understanding of the subject matter, and through the use of other channels to analyse participants’ demonstrated experience and potential knowledge gaps. The panellists agreed unanimously that capacity-building activities should be tailored to the type, needs and current level of knowledge of users and to common objectives; aimed at increasing the self-confidence and autonomy of users; and inclusive of women and minority groups. Rigorous follow-up to training was also needed in order to assess the learning curve of the trainees. In addition, the creation of a community of practice was a useful method for ensuring that learning was reinforced and that knowledge and technology transfer were sustainable. Finally, the panellists agreed that establishing clear two-way communication between provider and user was essential to ensure that both providers and users were owners of the initiative and could develop and learn together with the objective of co-creating and scaling up the project.

33. Session 3, entitled “Funding and financing technical projects: show me the money”, featured presentations by successful start-ups and financial insights provided by investors and international financial institutions, and dealt with the challenges of raising capital and the importance of diversity in funding and financial support at various stages of a company’s life cycle with the aim of scaling up pilot projects to create viable business models. Presenters from start-ups agriBORA and Visual and AI Solutions emphasized the importance of networking opportunities, business mentoring and access to funding sources provided by incubators, accelerators and venture capitalists, as well as the importance of aligning the business with the right investor type and diversifying types of investors at the different life stages of the company as key success factors, while noting that stable policies and avoidance of unnecessary regulation would enable long-term planning and investment. The presenter from The Catalyst Fund explained that funding for start-ups in the area of climate technology in Africa was growing, and that such funding chiefly involved later stage financing and was focused on climate change mitigation. In that context, he presented solutions for funding early-stage climate adaptation innovations in order to enable such projects to scale up sustainably. The presenter also provided practical advice for climate technology entrepreneurs on fundraising. The presenter from the European Bank for Reconstruction and Development (EBRD) highlighted the role of international financial institutions such as EBRD in catalysing systemic change by using relevant instruments and policy dialogue to create an enabling environment for investments to flourish and empower the private sector. The presenter also introduced the Star Venture Programme, which is aimed at supporting local accelerators and

high-potential start-ups and at fostering the broader entrepreneurial ecosystem. Visual and AI Solutions was an example of a start-up supported by that programme.

34. Session 4, entitled “Role of governments and intergovernmental organizations”, covered the multifaceted roles played by governments and intergovernmental organizations in promoting cooperation between technology providers and users, and opportunities for sharing knowledge and fostering best practices in using space applications for climate action. The presenter from the Norwegian Space Agency introduced various international programmes for climate action led by Norway, including the Satellite Data Programme of the country’s International Climate and Forests Initiative and the Blue Justice initiative, and underscored the importance of international cooperation in exploiting synergies. The presenter from the Korea Aerospace Research Institute highlighted that the Republic of Korea was a densely populated country with a great need for high-resolution remote sensing imagery in order to be able to respond rapidly to emergencies and monitor infrastructure development and environmental changes. However, the current high-resolution Korea Multi-Purpose Satellites (KOMPSAT) operated on the basis of user-request-based image acquisition, as a result of which data availability for monitoring purposes was limited. The increasing uncertainty of climate conditions also necessitated a short revisit time for data acquisition. Therefore, the Republic of Korea was currently developing the New Space Earth Observation Satellite Constellation for National Safety (NEONSAT) to address those issues. Lastly, the presenter from the Environment Agency of Austria presented the greenhouse gas monitoring project GHG-KIT as an example of how to stimulate the further development of national Earth observation know-how and skills in both science and industry and to lay the foundations for the future uptake of Earth observation data by public sector stakeholders.

35. Session 4 continued with an introduction, by the presenter from ESA, to ESA Business Applications and Space Solutions, which supports European companies, including start-ups and small and medium-sized enterprises, in developing businesses by utilizing space assets such as Earth observation and satellite navigation, potentially coupled with terrestrial assets such as artificial intelligence and the Internet of things, to serve users and markets for the benefit of life on Earth. The presenter noted that the creation of a commercially sustainable service typically began with an assessment of user needs and a feasibility study (technical and commercial de-risking) followed by a demonstration project (service validation) and a pilot project trial before the service became fully operational. ESA had launched task forces bringing together major stakeholders in various markets to identify key priority areas in each market, and had developed indicators for measuring the economic and environmental impact of start-ups.

36. During the following presentation, the representative of ESCAP explained that the regional commission was implementing the Asia-Pacific Plan of Action on Space Applications for Sustainable Development (2018–2030), including by building institutional capacity to use artificial intelligence and spatio-temporal data for Sustainable Development Goal monitoring and assessment. In 2023, it had started working on the SatGPT application, an innovative tool that uses artificial intelligence for mapping flood hotspots in real time, empowering users with coding knowledge to produce geospatial insights into disaster resilience.

37. “Project pitch” presentations showcasing projects that make use of space-based technologies for climate action were presented in small segments over the two days of the symposium. On the first day, the presentations showcased the Meghalaya project in India, an initiative that motivates villagers to conserve the forest through financial incentives, and a “blue spot” mapping project in Bhanu municipality in Nepal aimed at building resilience to floods. On the second day, the presentations showcased: (a) Maps Earth Observation Satellite Services (MEOSS), a water management platform supported by the Space for Climate Observatory; (b) a comprehensive agricultural database tracking crop health and soil condition in Bahrain to support precision agriculture; (c) a risk management tool for rural water



utilities in Costa Rica; (d) the Switzerland-Armenia joint initiative Earth Observation Data Cube, which enables data aggregation and informed decision-making in Armenia; and (e) a project in Algeria aimed at combating land degradation and desertification. The final presentation concerned a doctoral thesis on integrating climate science into space policies.

38. The Office for Outer Space Affairs and the Austrian co-organizers concluded the symposium by expressing appreciation to all those involved in preparing for the event.

## **VI. Feedback**

39. Participants were encouraged to provide written feedback using a dedicated online form, and the feedback received was overwhelmingly positive. On average, participants gave the event a rating of 4.6 out of a maximum rating of 5, and those who attended in person gave an average rating of 4.7. In providing their feedback, speakers and other attendees welcomed the interdisciplinary nature of the discussions and, in particular, the panel discussions and the “country case”, which had provided concrete information on successful initiatives and strategies undertaken by various countries. Those who had participated in person considered that the event had provided a very valuable opportunity to meet like-minded individuals and discuss opportunities to collaborate. Participants also commented on the balanced geographical and gender representation among speakers.

40. As in the case of previous symposiums held since 2020, remote attendance enabled the participation of a much larger number of participants than would have been possible at the event venue. Use of the hybrid format through an online platform will continue to be considered for symposiums in the future.

---