Annex on Sustainable Space Connectivity Resources

Introduction

This White Paper[1] aims to describe a possible common and current perspective of sustainable space connectivity resources[2] to BRICS countries, a brief overview of challenges, key aspects to be addressed, and considerations for current and future approaches. Bearing in mind the mandate of this Group, the paper focuses more towards ITU's coordination and is without prejudice to positions and negotiations in that forum. The formal positions for the ITU shall remain based on the ITU's formal procedures and any relevant meetings.

Space Sustainability

The COPUOS definition of space sustainability corresponds to "*the ability to maintain the conduct of space activities indefinitely into the future in a manner that realizes the objectives of equitable access to the benefits of the exploration and use of outer space for peaceful purposes, in order to meet the needs of the present generations while preserving the outer space environment for future generations"* (UNOOSA, 2021).

Those activities include the provision of communication, scientific exploration and observation, as well as defense purposes which all rely on the use of scarce resources, namely the radio-frequency spectrum and associated satellite orbits, whose collective management is under ITU's mandate (ITU, 2010). This is the reason why the recent high-level ITU Resolution on the matter associates the concept of sustainability with these limited resources, even in its title (ITU, 2022). The same attitude is reflected in the technical ITU Resolution that organizes and instructs the Union's work (ITU, 2023).

Considering that space connectivity resources are limited and should be fairly shared among all nations, BRICS countries favor a general perspective of addressing them collectively.

Rapidly Growing Challenges

Due to the recent increase in space activities, outer space is becoming increasingly congested with satellites and debris thereof, significantly raising the risk of collisions. The deployment of mega-constellations of non-geostationary satellites (non-GSO systems) can add to the proliferation of space debris, which is an additional reason to highlight the urgent need for improved governance in this aspect.

Considering the limited nature of space connectivity resources, the continued launch and operation of those non-GSO systems has added pressure to updates of international regulations. These largely specialized processes require great coordination effort among countries, and cover the need to review all technologies used in satellite networks, while upholding current regulations and procedures in geostationary orbits (GSO), as well as considering possible amendments of

[1] This non-binding document was elaborated by the Brazilian Presidency of BRICS countries 2025.

[2] For the purposes of this document sustainable space connectivity resources corresponds exclusively to radiofrequency spectrum and associated satellite-orbits.

globally binding, established frameworks, such as the ITU Radio Regulations. Even bureaucratic procedures of frequency assignments by the ITU may actually have to change.

The quick pace of non-GSO technology development thus demands complex and stratified levels of thorough international assessments, over several work cycles. In parallel, national regulators are also called to reflect on the need to update their own framework of licensing in a way to capture the positive aspects of bridging the digital gap, but without undermining long-lasting principles of sovereignty. This rapid deployment of LEO satellites, especially those with inter-satellite links (ISL), also raises new concerns about information security risks, often not already addressed by current regulations.

In the international arena, a lack of or even a delay in consensus to advance a new international regime might affect a reasonable, balanced response to ensure space sustainability. There are similar prospects within national borders related to adverse outcomes, such as telecommunications market disruptions and declining enforcement of administrative constraints essential to the sound functioning of a wide range of services.

Aspects to Be Addressed

Given the aforementioned challenges, policymakers, regulators, and other stakeholders in the public and private sectors are encouraged to reflect on the following topics with a view to achieving space sustainability:

1. Identification and institutional monitoring of trends and developments in space connectivity;

2. Creation of an enabling policy and regulatory environment for space connectivity at national, regional, and global levels, considering accessibility, affordability, resilience, and the complementarities between different space-based systems and terrestrial networks, enabling viable business models and preventing market distortions;

3. Implementation of policy and regulatory measures in a timely manner to ensure data sovereignty, security, and privacy protection for space-based services, and the international standardization of these measures;

4. Encouraging the rationale for harmonizing regulatory frameworks across countries;

5. Improvement of international coordination and collaboration for managing radio-frequency spectrum and associated satellite-orbit resources allocations and usage for space-based services, ensuring fair access for all countries and minimizing interferences, particularly within the ITU mandate, as well strengthening human resource development and advancing digital transformation;

6. Implementation of regulatory frameworks for effective Space Traffic Management (STM) and development of collaborative space traffic coordination systems;

7. Identification and minimization of the environmental impact of satellite launches and operations, addressing space debris through regulations, policies, and international cooperation, and recognizing the respective mandates of different United Nations entities, while exploring innovative approaches for environmental sustainability in space activities; and

8. Support for ongoing innovation and research in space connectivity technologies to ensure advancements benefit all sectors of society.

Considerations for Current and Future Approaches

BRICS countries have been major players in the space sustainability debate. Their collaboration and leadership are critical to the envisioned revision of the definition of space sustainability into an effective *ability*, within reach of all countries.

In this context, the following actions might help to accelerate BRICS advances and prominence on this agenda:

1. Support international regulatory efforts, **in a timely and coordinated manner**, in the ITU, **advocating for equal access to space connectivity resources**, including:

1.1. Active participation in the ongoing work of the ITU Council Expert Group on the World Telecommunication/Information and Communication Technology Policy Forum (WTPF), which presently considers an Opinion on Space Connectivity, and in the WTPF event, scheduled for 2026;

1.2. Efforts towards the implementation and the evaluation of the need to update ITU PP Resolution 219 (Bucharest, 2022), *Sustainability of the radio-frequency spectrum and associated satellite-orbit resources used by space services* in the next Plenipotentiary Conference, scheduled for 2026;

1.3. Efforts towards the implementation and the evaluation of the need to update the Resolution ITU-R 74 (Dubai, 2023) *Activities related to the sustainable use of radio-frequency spectrum and associated satellite-orbit resources used by space services* in the next ITU Radiocommunication Assembly, scheduled for 2027; and

1.4. Active participation in the relevant ITU Radiocommunication study groups to provide guidance on issues related to space sustainability.

2. Support other international regulatory efforts within other United Nations organizations and fora dealing with space activities, including the United Nations Office for Outer Space Affairs (UNOOSA) and COPUOS.

3. exchanges within BRICS countries regarding national regulations related to space sustainability, particularly in aspects pertinent to sovereignty, security, and alignment with efforts to achieve universal broadband connectivity.

4. Joint Development and contributions to tools and studies related to space sustainability as inputs to national, regional, and international policies and regulatory approaches, such as the ongoing Joint Space Sustainability Study promoted by the Communications, Space and Technology Commission (CST) – Saudi Arabia and the National Telecommunication Agency (Anatel) – Brazil, that aims to contribute with tangible deliverables, involving simulations and projections, using Artificial Intelligence (AI) to predict the future behavior of satellites and optimize the management of space connectivity resources.

5. Wide cooperation and experiences sharing related to space sustainability among

enterprises and research institutions, such as in advanced technologies of frequency sharing, interference prevention, space situational awareness, collisions avoidance and application services, then to promote the development and utilization of space connectivity resources.

Conclusion

The burgeoning relevance of space sustainability demands concerted international efforts, and the BRICS nations are well-positioned to drive meaningful progress in international fora. By fostering deeper international cooperation, particularly within ITU processes, exploring regulatory harmonization, and supporting initiatives across other United Nations bodies, BRICS can help shape a fairer, secure, and sustainable future for outer space activities. Their active leadership in promoting fair access to radio-frequency spectrum and satellite orbits, encouraging innovation, and reinforcing environmental protections could be the key to ensuring that space remains a shared and enduring resource for present and future generations.

Looking ahead, it is crucial that BRICS continue to prioritize the integration of sovereignty, security, and universal connectivity goals into their space sustainability strategies. Through sustained collaboration and engagement with international fora, the bloc can not only safeguard its collective interests but also set a more balanced global regime for space stewardship.