

# Long-Term Sustainability of Outer Space: Role of Sustainable Development Goals and Its Legal Consequences

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## Abstract

Celestial phenomena have historically contributed to natural processes, but their collision paths and debris generation have increasingly threatened outer space. Human activities in space exacerbate these risks, prompting concerns over the preservation of the space environment. The United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) has responded by initiating sustainable space initiatives. In 2010, UNCOPUOS's Scientific and Technical Subcommittee established a Working Group on the Long-Term Sustainability of Outer Space Activities. This group aims to develop voluntary guidelines for states, international organizations, and private entities to ensure sustainable space practices. The collaboration between Avio, an Italian aerospace company,



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and the United Nations Office for Outer Space Affairs (UNOOSA), forged during the 74th Session of the United Nations General Assembly in September 2019, is a notable step towards enhancing space accessibility, particularly for developing nations. This paper examines various aspects of sustainable space practices, including their alignment with the Sustainable Development Goals (SDGs). Part one introduces sustainable development principles and the global imperative for environmental protection. Part two explores the role of space technologies in advancing the SDGs. Part three investigates whether the SDGs encompass space-related objectives and proposes strategies for achieving sustainable space practices. Finally, part four advocates for a robust regulatory framework for sustainable space activities, emphasizing the need to learn from past environmental mistakes and protect the integrity of outer space.

**KEYWORDS** *Outer Space, Sustainable Space, SDGs, Environment*

## Introduction

The World Economic Situation and Prospects (WESP) broadly divided States into three categories – developed economies, economies in transition, and developing economies on the basis of certain economic parameters.<sup>1</sup> Generally these groupings at the negotiating table is understood in two groups: developed countries and developing countries. Normally, in any international negotiations the divide in approach has been apparent between these two groups. Highlighting the reasons and emphasises on this divide, R. P. Anand states:

“Our world is dominated by a complex and tragic division. One part of mankind has undergone a revolution of modernization by making tremendous progress in the sphere of science and technology

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<sup>1</sup> The report is prepared by the United Nations (UN) Department of Economic and Social Affairs (DESA), with inputs from the UN Conference on Trade and Development (UNCTAD), and the five UN Regional Commissions, “Country Classification”

[https://www.un.org/en/development/desa/policy/wesp/wesp\\_current/2014wesp\\_country\\_classification.pdf](https://www.un.org/en/development/desa/policy/wesp/wesp_current/2014wesp_country_classification.pdf)

and presents a pattern of great and increasing wealth. Most of the rest of mankind, however, has benefitted little from the scientific and technological miracles and is yet to achieve economic and social momentum. Their old traditional world is dying; the new, radical world is not yet born; and the gap between the rich and the poor has become all the more evident and intolerable.”<sup>2</sup>

Such strain has special significance in environmental negotiations. Most of the international environmental law, in the form of “soft law” mechanism reflects on the face of it. Yet, it is clear from the natural calamities and catastrophes of recent past that the environmental impact and climate change can adversely affect across the boundaries irrespective of the fact of their developmental status.

There has been immense attempt to reconcile the strain of these levels of economic attainment in protecting the environment. In this regard a conceptual understanding has been built with the idea of “sustainable development.” The term has been consistently used in the contemporary “political and environmental discourses.”<sup>3</sup> Precisely speaking, the aim of the sustainable development “is the long-term stability of the economy and environment.”<sup>4</sup>

## Evolutionary Journey of the Concept of Sustainable Development

The problem in measuring the development based on economic growth and elements of sustainable development has been highlighted by various economic theorists namely; Adam Smith, Karl Marx,

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<sup>2</sup> Anand, R P. *Confrontation or Cooperation? International Law and the Developing Countries*. Hope India Publications, 2011.

<sup>3</sup> Barbosa, Gisele Silva, Patricia Regina Drach, and Oscar Daniel Corbella. "A conceptual review of the terms sustainable development and sustainability." *Journal of Social Sciences* 3.2 (2014): 1.

<sup>4</sup> Emas, Rachel. "The Concept of Sustainable Development: Definition and Defining Principles", *Brief for GSDR*, 2015. Available: [https://sustainabledevelopment.un.org/content/documents/5839GSDR%202015\\_SD\\_concept\\_definiton\\_rev.pdf](https://sustainabledevelopment.un.org/content/documents/5839GSDR%202015_SD_concept_definiton_rev.pdf)

Malthus, Ricardo, and Mill.<sup>5</sup> Mainly after 1950s onwards, population residing in the north and west of the planet earth started questioning the model of development guided by technology and their harmful effects were becoming visible.<sup>6</sup> This concern led the formation of peoples' movement to maintain balance between development and pristine environment.<sup>7</sup> Whence the idea of "sustainable development" getting mentioned in the areas of forestry, measures of afforestation, and "harvesting of interconnected forests which should not undermine the biological renewal of forests."<sup>8</sup> The International Union for Conservation of Nature (IUCN) in 1980 published the Nature Conservation and Natural Resources Strategy which used the term "sustainable development."<sup>9</sup>

In 1983, the World Commission on Environment and Development (WCED) was established which came up with report in 1987 titled "Our Common Future", popularly known as the "Brundtland Report" after the name of the Commission's Chairperson Gro Harlem Brundtland. The report suggested the guiding principles for sustainable development.<sup>10</sup> It also took note of emerging global environmental problems that "were primarily the result of the enormous poverty of the South and the non-sustainable patterns of consumption and production in the North."<sup>11</sup> The report also asserted three basic components of the sustainable development: environment;

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<sup>5</sup> Tomislav, Klarin. "The concept of sustainable development: From its beginning to the contemporary issues." *Zagreb International Review of Economics & Business* 21.1 (2018): 67-94.

<sup>6</sup> Barbosa, et.al. A conceptual review of the terms sustainable development and sustainability."

<sup>7</sup> Carson, Rachel. *Silent Spring* (1962). Houghton Mifflin Company.

<sup>8</sup> Tomislav, Klarin. "The concept of sustainable development: From its beginning to the contemporary issues." *Zagreb International Review of Economics & Business* 21.1 (2018): 67-94.

<sup>9</sup> Tomislav.

<sup>10</sup> The report was transmitted to the UN General Assembly as an Annex to the document A/42/427 – Development and International Cooperation: Environment.

<sup>11</sup> Federal Office for Spatial Development ARE, Brundtland Report 1987. Available: <https://www.are.admin.ch/are/en/home/media/publications/sustainable-development/brundtland-report.html>

economy; and the society.<sup>12</sup> In order to protect environment, we shall “conserve and enhance our resource base by gradually changing the ways in which we develop and use technologies.”<sup>13</sup> The report is divided into three parts namely: part one highlights the “common concerns” which threatens the future. Part two of the report explains on various “common challenges” that we face on planet earth in terms of environmental significance and development. Part three talks about “common endeavours” that is required in “managing the commons”. One of the “commons” mentioned is “space” and the report suggest that managing space is key to managing the planet earth.

Today outer space technologies contribute positively in various activities on earth (inward uses). Satellites have helped us in enhanced telecommunication, navigation, remote sensing, meteorology.<sup>14</sup> The satellite technologies are also being used in various military and security related concerns as well. There are various upward uses of these technologies too, such as tourists launches, exploratory missions, mining of celestial bodies, colonies and bases outside the earth atmosphere. Mainly the inwards uses of such technologies has helped and has potential to significantly contribute in the preservation and protection of the earth environment. It can, thereby, help us in achieving the concept of sustainable development. The concept has become the core of the developmental/economic policies of the states in the contemporary time. The preservation of natural resources for the succeeding generations is key philosophy in guiding the global and national legal frameworks. The concept has positively impacted the environmental governance especially.

In this connection, to enhance and strengthen the sustainable growth, the United Nations General Assembly (UNGA) adopted resolution titled “United Nations Millennium Declaration” in the year

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<sup>12</sup> Wealth, Linus. “The Brundtland Report”, *Sustainable Environment* (2018). Available: [https://www.sustainable-environment.org.uk/Action/Brundtland\\_Report.php](https://www.sustainable-environment.org.uk/Action/Brundtland_Report.php)

<sup>13</sup> Wealth.

<sup>14</sup> Leepuengtham, Tosaporn. *The Protection of Intellectual Property Rights in Outer Space Activities*. Edward Elgar Publishing, 2017.

2000.<sup>15</sup> The Declaration contained eight Millennium Development Goals (MDGs), six indicators, and twenty-one targets to monitor the progress made thereon.<sup>16</sup> These eight goals were: eradicate extreme poverty and hunger; achieve universal primary education; promote gender equality and empower women; reduce child mortality; improve maternal health; combat HIV/AIDS, Malaria and other diseases; ensure environmental sustainability; and develop a global partnership for development.

One-eighty nine states undertook the task to eliminate extreme poverty by 2015. Though the goals could not be achieved completely, a substantial progress were made by the end of 2015.<sup>17</sup> To accelerate the implementation of the unfinished agendas of MDGs and to deal more comprehensively and holistically, the UNGA adopted new resolution which replaces the MDGs in 2015.<sup>18</sup> The resolution conceptualised the idea of “sustainable development” concretely.<sup>19</sup> It was titled “Transforming our world: the 2030 Agenda for Sustainable Development” contained seventeen goals [Sustainable Development Goals (SDGs) also called as ‘Global Goals’] composed of one-sixty nine targets and two-thirty two indicators. These goals are as follows:<sup>20</sup>

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<sup>15</sup> General Assembly Resolution 55/2 of 18 September 2000 “United Nations Millennium Declaration”, Fifty-fifth Session, pp. 1-9.

<sup>16</sup> International Labour Organization, Millennium Development Goals. Available: <https://www.ilo.org/global/topics/millennium-development-goals/lang-en/index.htm>

<sup>17</sup> United Nations Report on Millennium Development Goals 2015. Available: [https://www.unoosa.org/res/oosadoc/data/documents/2015/mdg/mdg2015rev\\_0\\_html/MDG\\_2015\\_rev\\_July\\_1.pdf](https://www.unoosa.org/res/oosadoc/data/documents/2015/mdg/mdg2015rev_0_html/MDG_2015_rev_July_1.pdf) See also: MDG Monitor, Millennium Development Goals. Available: <https://www.mdgmonitor.org/millennium-development-goals/>

<sup>18</sup> Lu, Yonglong, et al. "Policy: Five priorities for the UN sustainable development goals." *Nature* 520.7548 (2015): 432-433.

<sup>19</sup> General Assembly Resolution 70/1 of 21 October 2015, “Transforming our world: the 2030 Agenda for Sustainable Development”, Seventieth Session Agenda items 15 and 116, pp. 1-35.

<sup>20</sup> General Assembly Resolution 70/1 of 21 October 2015, “Transforming our world: the 2030 Agenda for Sustainable Development”, Seventieth Session Agenda items 15 and 116, pp. 1-35.

1. End poverty in all its forms everywhere;
2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture;
3. Ensure healthy lives and promote well-being for all at all ages;
4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all;
5. Achieve gender equality and empower all women and girls;
6. Ensure availability and sustainable management of water and sanitation for all;
7. Ensure access to affordable, reliable, sustainable and modern energy for all;
8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all;
9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation;
10. Reduce inequality within and among countries;
11. Make cities and human settlements inclusive, safe, resilient and sustainable;
12. Ensure sustainable consumption and production patterns;
13. Take urgent action to combat climate change and its impacts;
14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development;
15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss;
16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels; and
17. Strengthen the means of implementation and revitalize the global partnership for sustainable development.

The commitment is set to achieve the SDGs by 2030. It has become now the major guiding force of policy making of economic and environmental aspects of various countries. The SDGs are “an

integrated framework of human, social, and environmental development objectives.”<sup>21</sup>

## Space for SDGs

Since the early days of space activities, the UN has understood and recognised the importance of space technologies that can play significant role in improving the lives on earth.<sup>22</sup> The history of this recognition goes back to first UNISPACE I Conference 1968 held from 14 to 27 August that focused on “raising awareness of the vast potential of space benefits for all humankind.”<sup>23</sup> The Conference suggested to create an Expert on Space Applications within United Nations Office for Outer Space Affairs (UNOOSA), which laid the foundation of the UNOOSA Programme on Space Applications in 1971. The Programme planned for trainings and workshops of usage of space technology in areas of “telecommunications, environmental monitoring and weather forecasting, remote sensing for disaster mitigation and management, agricultural and forestry development, cartography, geology and other resource development applications.”<sup>24</sup> Subsequently, the UNISPACE II was called on 9 to 21 August 1982 which was attended by 94 Member States and 45 intergovernmental and non-governmental organisations. The UNISPACE II led to strengthening of the UNOOSA Programme on Space Applications focusing on “opportunities for developing countries to participate in educational and training activities in space science and technology and to develop their indigenous capabilities in the use of space technology applications.”<sup>25</sup>

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<sup>21</sup> Moyer, Jonathan D., and Steve Hedden. "Are we on the right path to achieve the sustainable development goals?." *World Development* 127 (2020): 104749.

<sup>22</sup> UNOOSA, UN-Space. Available: <https://www.unoosa.org/oosa/en/ourwork/un-space/index.html>

<sup>23</sup> United Nations General Assembly A/7285, Official Records Twenty-third Session Agenda item 24 of 15-18 October 1968 “Report of the Committee on the Peaceful Uses of Outer Space”. Available [https://www.unoosa.org/pdf/gadocs/A\\_7285E.pdf](https://www.unoosa.org/pdf/gadocs/A_7285E.pdf)

<sup>24</sup> United Nations General Assembly A/7285.

<sup>25</sup> United Nations General Assembly A/7285.

The UNISAPCE III – most apt conference with regard to the concept of sustainable development was held on 19 to 30 July 1999. The conference was attended by 97 Member States, 9 UN specialised agencies and 15 intergovernmental organisations. The highlights of the conference is constructive for the protection of earth and space environment. It was themed “Space benefits for humanity in the twenty-first century.” These primary objectives were to:<sup>26</sup>

1. protect the global environment and manage natural resources;
2. increase the use of space applications for human security, development and welfare;
3. protect the space environment; and
4. increase developing countries’ access to space science and its benefits.

The UNISPACE III conference adopted the “Space Millennium: Vienna Declaration on Space and Human Development” (Vienna Declaration) containing 33 recommendations as strategy to address the emerging challenges in space activities.

After five years of UNISPACE III, the COPUOS reviewed the implementation of the 33 recommendations of the Vienna Declaration. It was anticipated and expected that the recommendations of UNISPACE III will support in achieving the MDGs of the UN. Part III and IV of the Review Report 2004 highlighted the progress made in implementing the recommendations. Part IV specifically highlighted the synergy between recommendations of UNISPACE III and the UN MDGs. It was stressed that the Vienna Declaration holds the “nucleus of a strategy to address global challenges in the future.”<sup>27</sup> Many recommendations of the Declaration were key in achieving the objectives of MDGs.<sup>28</sup> The detailed analysis of the UNGA resolution titled “Review of the implementation of the recommendations of the

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<sup>26</sup> United Nations General Assembly A/7285.

<sup>27</sup> General Assembly Resolution A/59/174 of 23 July 2004 “Review of the implementation of the recommendations of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space”, Fifty-ninth Session, Item 23 of the provisional agenda. Available: [https://www.unoosa.org/pdf/reports/unispace/A\\_59\\_174E.pdf](https://www.unoosa.org/pdf/reports/unispace/A_59_174E.pdf)

<sup>28</sup> General Assembly Resolution A/59/174.

Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space” makes intrinsically clear that the emphasis on space technologies has been much relied in order to achieve various aspects of sustainable development.

Again, with the replacement of MDGs with new global goals (SDGs) of the UN has been reemphasised by the UNOOSA. Various initiatives were taken by the Office to realign with the SDGs. The UN also confirmed that the role of Earth Observations (EO) and geolocation play significant role in achieving the SDGs.<sup>29</sup> The space technologies has immense role in understanding the earth environment and climate change. Early warnings with regard to weather has proved blessings in saving lives and properties comes from the satellite systems only. The space technologies also helps in obtaining and accessing the data about earth which helps policy-makers to “to understand trends, evaluate needs, and create sustainable development policies and programmes in the best interest of all populations.”<sup>30</sup> Much before the SDGs were set by the UN, the Committee to the Commission on Sustainable Developments (CSD) has recognised the contribution of the UNCOPUOS in supporting the CSD objectives of the sustainable development.<sup>31</sup> Likewise the UN Conference on Sustainable Development (Rio+20) and other High-Level Political Forum before 2015, has highlighted the role of space technologies that is/are important for sustainable development.<sup>32</sup>

Soon after adoption of the SDGs, the realignment and reemphasis were made on the space technologies in achieving the goals. The

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<sup>29</sup> UNOOSA – Space4SDGs, Space Supporting the Sustainable Development Goals. Available: <https://www.unoosa.org/oosa/en/ourwork/space4sdgs/index.html>

<sup>30</sup> UNOOSA, Benefits of Space: Sustainable Development. Available: <https://www.unoosa.org/oosa/en/benefits-of-space/sustainable-development.html>

<sup>31</sup> There are numerous resolutions in the year 2006, 2007 and 2009 to accept that role. See for detail: <https://www.unoosa.org/oosa/en/ourwork/copuos/sust-dev.html#oosaacts>

<sup>32</sup> For detail see, UNOOSA, Documents relating to Space and Socioeconomic Development in the context of Rio+20 and the Post-2015 development Agenda. Available: <https://www.unoosa.org/oosa/en/ourwork/copuos/sust-dev.html#oosaacts>

backdrop report of the Expert on Space Applications canvases the role that space will play to achieve 2030 goals. The report was adopted by the UNGA in 2014.<sup>33</sup> The major focus of the report was on the application of space science and technologies in environmental monitoring and management of natural resources. In post 2015 developmental agenda, the role of space science and technologies were reiterated. The sustainable development became the voice of global community and pervasively guides the policy-making of almost all countries in the world. It was well understood that the economic development cannot remain the key of enhancing the standards of living of people. The concept of sustainable development cannot remain in the theory only and in the reports. The global goals by way of SDGs got recognition as a voice of international community to achieve. States gave promise and undertaking to achieve sustainable development factoring economic development, social development, and environmental protection all together.

In this regard, the COPUOS also adopted various resolutions to prioritise the agendas of the SDGs. The Committee adopted a resolution titled “Rio+20 and beyond: towards the Post-2015 Development Agenda” on 2-13 February 2015.<sup>34</sup> The resolution was adopted on agenda “[S]pace technology for socioeconomic development in the context of the United Nations Conference on Sustainable Development and the post-2015 development agenda”.<sup>35</sup> Taking into consideration of the SDGs and targets, the Committee also adopted resolution on Work Plan to develop cooperative mechanism on space for sustainable development. The resolution was titled “Revised Draft Proposed Work Plan for a mechanism of cooperative deliberation for “Space and Sustainable Development: Bridging

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<sup>33</sup> UNCOPUOS, – Report of the Expert on Space Applications to the United Nations General Assembly, A/AC.105/1085 on 23 December 2014. Available: [https://www.unoosa.org/pdf/reports/ac105/AC105\\_1085E.pdf](https://www.unoosa.org/pdf/reports/ac105/AC105_1085E.pdf)

<sup>34</sup> UNCOPUOS STSC, A/AC.105/C.1/2015/CRP.26 of 4 February 2015, Fifty-second Session, Note by the Secretariat. Available: [https://www.unoosa.org/pdf/limited/c1/AC105\\_C1\\_2015\\_CRP26E.pdf](https://www.unoosa.org/pdf/limited/c1/AC105_C1_2015_CRP26E.pdf)

<sup>35</sup> UNCOPUOS STSC, A/AC.105/C.1/2015/CRP.26

COPUOS and STSC.”<sup>36</sup> The resolution presented the “Draft Proposed Work Plan” in line with the UN conviction of “the need to promote the use of space technology towards implementing the United Nations Millennium Declaration and contributing to the post-2015 development agenda process.”<sup>37</sup> The Work Plan for this phase 2014-2015 was devoted “to promote the reflection of the contribution of space technology in the documents relating to the follow-up to Rio+20 and the formulation of the post-2015 development agenda.”<sup>38</sup> The phase two 2016-2017 were kept by the Work Plan for analysis of the contribution made by the Member States. The Member States are supposed to consider the “new global agenda” placed under the “Scientific and Technical Subcommittee on Space technology for socioeconomic development in the context of the United Nations Conference on Sustainable Development and the post-2015 development agenda, and the agenda item of the Committee on the Peaceful Uses of Outer Space on Space and sustainable development.”<sup>39</sup> Member States are also encouraged “to provide, during the sessions of the Committee and the Subcommittee, information regarding the contributions of space technologies to implementing global development processes and the international mechanisms being used for cooperation among States and international organizations.”<sup>40</sup> Phase 3 (2018-2019) is set for drafting recommendations on harnessing space technology for the attainment of the new global development agenda.<sup>41</sup>

In addition to these resolutions, the Committee also adopted two more resolutions on the same issue of SDGs on 10 June 2015. One titled “The United Nations/Germany International Conference on Earth Observation – Global Solutions for the Challenges of Sustainable

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<sup>36</sup> UNCOPUOS STSC, A/AC.105/C.1/2015/CRP.15 of 2 February 2015, Fifty-second Note by the Secretariat. Available: [https://www.unoosa.org/pdf/limited/c1/AC105\\_C1\\_2015\\_CRP15E.pdf](https://www.unoosa.org/pdf/limited/c1/AC105_C1_2015_CRP15E.pdf)

<sup>37</sup> UNCOPUOS STSC, A/AC.105/C.1/2015/CRP.15

<sup>38</sup> UNCOPUOS STSC, A/AC.105/C.1/2015/CRP.15

<sup>39</sup> UNCOPUOS STSC, A/AC.105/C.1/2015/CRP.15

<sup>40</sup> UNCOPUOS STSC, A/AC.105/C.1/2015/CRP.15

<sup>41</sup> UNCOPUOS STSC, A/AC.105/C.1/2015/CRP.15

Development in Societies at Risk.”<sup>42</sup> Another titled “Update on the recent developments in the context of the United Nations Conference on Sustainable Development and the Post-2015 Development Agenda – Zero draft of the outcome document for the United Nations Summit to adopt the Post-2015 Development Agenda.”<sup>43</sup> The first resolution was also adopted by the UNGA as a resolution on 28 August 2015 with the same title.<sup>44</sup> The resolution retained the outcome of the conference to enable participants:<sup>45</sup>

“(a) To learn about space-based applications and solutions developed in recent years to contribute to disaster risk reduction, sustainable development and climate change mitigation and adaptation; (b) To network and exchange views and lessons learned with representatives of a variety of countries, regional and international institutions and the private sector; and (c) To explore how best to take advantage of the opportunities offered by the space community to contribute to its activities.”

In addition, the Conference enabled the UNOOSA and DLR [German Aerospace Center]:

“(a) To collect a variety of suggestions and recommendations made by experts with regard to the use of space-based applications and solutions aimed at disaster risk reduction, sustainable development and climate change mitigation and adaptation; (b) To facilitate the coordination of global efforts undertaken by the space community to

<sup>42</sup> UNCOPUOS, A/AC.105/2015/CRP.9, of 10 June 2015, Fifty-eighth Session, Note by the Secretariat. Available: [https://www.unoosa.org/res/oosadoc/data/documents/2015/aac\\_1052015crp/aac\\_1052015crp\\_9\\_0\\_html/AC105\\_2015\\_CRP09E.pdf](https://www.unoosa.org/res/oosadoc/data/documents/2015/aac_1052015crp/aac_1052015crp_9_0_html/AC105_2015_CRP09E.pdf)

<sup>43</sup> UNCOPUOS, A/AC.105/2015/CRP.13 of 10 June 201, Fifty-eighth Session, Note by the Secretariat. Available: [https://www.unoosa.org/res/oosadoc/data/documents/2015/aac\\_1052015crp/aac\\_1052015crp\\_13\\_0\\_html/AC105\\_2015\\_CRP13E.pdf](https://www.unoosa.org/res/oosadoc/data/documents/2015/aac_1052015crp/aac_1052015crp_13_0_html/AC105_2015_CRP13E.pdf)

<sup>44</sup> UNCOPUOS, A/AC.105/1097 of 28 August 2015, Fifty-ninth Session, Report on the United Nations/Germany International Conference on Earth Observation: global solutions for the challenges of sustainable development in societies at risk (Bonn, Germany, 26-28 May 2015). Available: <https://documents-dds-ny.un.org/doc/UNDOC/GEN/V15/061/40/PDF/V1506140.pdf?OpenElement>

<sup>45</sup> UNCOPUOS, A/AC.105/1097.

contribute to implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030; (c) To promote the use of Earth observation to track and identify ways to assess extreme climatic events affecting sustainable development efforts worldwide; and (d) To identify ways in which Earth observation can be used specifically to contribute to the implementation of the new sustainable development framework and to track progress towards the various targets that that framework establishes.”

The resolution also came with various recommendations “with regard to disaster risk reduction, sustainable development, climate change and cross-cutting issues.”<sup>46</sup>

In 2019, the UNGA also adopted a resolution on the report submitted by the COPUOS STSC on the agenda and implementation of “Space2030”.<sup>47</sup> The report signifies that:

“The “Space2030” Agenda and implementation plan is submitted by the Committee to the General Assembly as a [comprehensive] / [visionary] and forward-looking strategy for reaffirming and strengthening the contribution of space activities and space tools to the achievement of global agendas, addressing long-term sustainable development concerns of humankind. It also contributes to charting the future contribution of the Committee to the global governance of outer space activities, [based on applicable international law].”<sup>48</sup>

A further revised draft was adopted by the COPUOS STSC in 2020 on the submission of working paper by the Bureau of the Working Group on the “Space2030” Agenda.<sup>49</sup>

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<sup>46</sup> UNCOPUOS, A/AC.105/1097.

<sup>47</sup> UNCOPUOS STSC, A/AC.105/C.1/L.382 of 6 November 2019, Fifty-seventh Session, Draft “Space2030” agenda and implementation plan – Working paper submitted by the Bureau of the Working Group on the “Space2030” Agenda. Available: <https://documents-dds-ny.un.org/doc/UNDOC/LTD/V19/108/08/PDF/V1910808.pdf?OpenElement>

<sup>48</sup> UNCOPUOS STSC, A/AC.105/C.1/L.382.

<sup>49</sup> UNCOPUOS STSC, A/AC.105/C.1/2020/CRP.16 of 13 February 2020, Fifty-seventh Session, Revised Draft “Space2030” agenda and implementation plan – Working paper submitted by the Bureau of the Working Group on the “Space2030” Agenda. Available:

## SDGs for Space?

It is well understood now that the achievement of SDGs targets and indicators very much depending on the usage of space science and technologies.<sup>50</sup> Yet a pertinent question arises here is since the space is playing major role in our planetary balances and helps in sustaining lives on earth, why we should not talk about sustainable space? Since the activities in outer space is increasing day by day and space is “busier like never before”, this is the right time to talk about preserving the pristine environment of space. We should deliberate on this now itself otherwise it will reach to the point of no-looking-back. In this regard, very hard hitting question on human greed (sic) were raised to a high-level panel of the World Meteorological Organisation (WMO) that “is a space-related objective missing from the 17 Sustainable Development Goals (SDGs) adopted by the United Nations in 2015?”<sup>51</sup> It is evident from the SDGs, targets, and indicators that the current global goals do not include the idea of sustainable space. The high-level panel also expressed deep concern that “[w]e want space to be accessible to human activity, but we don’t want a Wild West”.<sup>52</sup> It was affirmed that the “space forms part of our daily lives” and “countries must agree on how to protect space while encouraging technical progress.”<sup>53</sup> In this context there is deliberations ongoing to incorporate 18<sup>th</sup> Goal in SDGs to include sustainable space.<sup>54</sup> Though it is not clear about placing the space sustainability as 18<sup>th</sup> SDG, the India’s Permanent Representative

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[https://www.unoosa.org/oosa/oosadoc/data/documents/2020/aac.105c.12020crp/aac.105c.12020crp.16\\_0.html](https://www.unoosa.org/oosa/oosadoc/data/documents/2020/aac.105c.12020crp/aac.105c.12020crp.16_0.html)

<sup>50</sup> Baumgart, André, et al. "Space for the Sustainable Development Goals: mapping the contributions of space-based projects and technologies to the achievement of the 2030 Agenda for Sustainable Development." *Sustainable Earth* 4.1 (2021): 6.

<sup>51</sup> ITU, Should space become the 18<sup>th</sup> SDG?, (1 June 2021). Available: <https://www.itu.int/hub/2021/06/should-space-become-the-18th-sdg/>

<sup>52</sup> ITU.

<sup>53</sup> ITU.

<sup>54</sup> Yan, Yongliang. "Maintaining long-term sustainability of outer space activities: Creation of regulatory framework to guide the Asia-Pacific space cooperation organization and selected legal issues." *Space Policy* 47 (2019): 51-62.

to the United Nations Mani Panday stressed that “whether or not space sustainability is ever adopted as an 18<sup>th</sup> SDG, countries must collaborate” and continue with the international cooperation for effective space governance.<sup>55</sup>

## Sustainable Space

Sustainable space is beneficial for us all in many ways. As discussed above, space science and technologies help in improved human lives on earth. It also required to be maintained in the context of planetary balances. It is also significant for increased activities in outer space. Thus, it is important to give consideration to the environmental protection while indulging in any activities in outer space. This has been a point of concern since long. The Committee on Space Research (COSPAR) was created by the International Council of Scientific Union in 1958 itself to address the concern of space environment.<sup>56</sup> In various resolutions of the UNGA and the treaties on outer space have emphasised that a peaceful, conflict-free, and “space for all” depends much on international cooperation and sustainable environment of outer space for long-term exploration. However, there are number of threats that need to be addressed in order to have sustainable space, such as, mitigation of space debris, Anti-satellite tests, militarisation and weaponization of outer space, rising commercial activities including mining and tourism in space, and traffic congestion.

In this regard, the concept of long-term sustainability of outer space was perceived by Karl Doetsch during UNCOPUOS speech in 2004.<sup>57</sup> On the same issue, in 2007, Gerard Brachet produced a white paper.<sup>58</sup> In 2008, the French delegation made proposal to add

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<sup>55</sup> ITU, Should space become the 18<sup>th</sup> SDG?, (1 June 2021). Available: <https://www.itu.int/hub/2021/06/should-space-become-the-18th-sdg/>

<sup>56</sup> Yan, "Maintaining long-term sustainability of outer space activities: Creation of regulatory framework to guide the Asia-Pacific space cooperation organization and selected legal issues."

<sup>57</sup> Yan.

<sup>58</sup> Johnson, Christopher. *The UN COPUOS Guidelines on the Long-Term Sustainability of Outer Space Activities – A Secure World Foundation Fact Sheet*, (2014). Available:

‘sustainability’ in the agenda of the UNCOPUOS. In this way finally, the Scientific and Technical Subcommittee (STSC) establishes a Working Group on the Long-term Sustainability of Outer Space Activities (LTSOSA) in 2010.<sup>59</sup> The terms of reference of the LTSOSA was adopted at the fifty-fourth session of the UNCOPUOS in 2011 under the chair of Peter Martinez for the period of 2011-2014.<sup>60</sup>

The Working Group did a holistic and comprehensive work on “current practices, operating procedures, technical standards and policies associated with the long-term sustainability of outer space activities throughout all the phases of a mission life cycle.”<sup>61</sup> It also explored into the existing legal framework in the outer space treaties and governing principles. However, it is to note that the Working Group was not tasked to develop new legal instruments and binding obligations.<sup>62</sup> Yet the Working Group came up with Guidelines for the long-term sustainability of outer space which is “voluntary, non-binding” that states, and intergovernmental organisations could apply while entering into space activities.<sup>63</sup> Four expert groups were created working on specific issues and to develop guidelines: A. Sustainable space utilization supporting sustainable development on Earth; B. Space debris, space operations and tools to support space situational awareness sharing; C. Space weather; and D. Regulatory regimes and guidance for new actors in the space arena.<sup>64</sup>

The expert groups submitted the draft containing 33 guidelines out of which eight guidelines were on development of policies and practices for sustainable space and four guidelines emphasised on

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[https://swfound.org/media/189048/swf\\_un\\_copuos\\_lts\\_guidelines\\_fact\\_sheet\\_december\\_2014.pdf](https://swfound.org/media/189048/swf_un_copuos_lts_guidelines_fact_sheet_december_2014.pdf)

<sup>59</sup> Johnson.

<sup>60</sup> Martinez, Peter. "Development of an international compendium of guidelines for the long-term sustainability of outer space activities." *Space Policy* 43 (2018): 13-17.

<sup>61</sup> Martinez.

<sup>62</sup> Martinez.

<sup>63</sup> Martinez.

<sup>64</sup> Johnson, *The UN COPUOS Guidelines on the Long-Term Sustainability of Outer Space Activities – A Secure World Foundation Fact Sheet*.

international cooperation on long-term sustainability of outer space.<sup>65</sup> The Working Group chair Peter Martinez looked into 33 draft guidelines and omitted the overlap by containing only 18 guidelines.<sup>66</sup> In 2016, the COPUOS agreed on the first 12 guidelines and submitted a report to the UNGA.] Again, in 2018, the COPUOS further added 9 more guidelines. In this way, currently the LTSOSA is contained of 21 Guidelines – “collection of internationally recognized measures for ensuring the long-term sustainability of outer space activities and for enhancing the safety of space operations.”<sup>67</sup> The Guidelines have been categorised in four heads:

1. “Policy and regulatory framework for space activities: Guidelines A.1 – Adopt, revise and amend, as necessary, national regulatory frameworks for outer space activities. Guidelines A.2 – Consider a number of elements when developing, revising or amending, as necessary, national regulatory frameworks for outer space activities. Guidelines A.3 – Supervise national space activities. Guidelines A.4 – Ensure the equitable, rational and efficient use of the radio frequency spectrum and the various orbital regions used by satellites. Guidelines A.5 – Enhance the practice of registering space objects.
2. Safety of space operations: Guidelines B.1 – Provide updated contact information and share information on space objects and orbital events. Guidelines B.2 – Improve accuracy of orbital data on space objects and enhance the practice and utility of sharing orbital information on space objects. Guidelines B.3 – Promote the collection, sharing and dissemination of space debris monitoring information. Guidelines B.4 – Perform conjunction assessment during all orbital phases of controlled flight. Guidelines B.5 – Develop practical approaches for pre-launch conjunction assessment. Guidelines B.6 – Share operational space weather data and forecasts. Guidelines B.7 – Develop space

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<sup>65</sup> Johnson.

<sup>66</sup> Johnson.

<sup>67</sup> Martinez, "Development of an international compendium of guidelines for the long-term sustainability of outer space activities."

weather models and tools and collect established practices on the mitigation of space weather effects. Guidelines B.8 – Design and operation of space objects regardless of their physical and operational characteristics. Guidelines B.9 – Take measures to address risks associated with the uncontrolled re-entry of space objects. Guidelines B.10 – Observe measures of precaution when using sources of laser beams passing through outer space.

3. International cooperation, capacity-building and awareness: Guidelines C.1 – Promote and facilitate international cooperation. Guidelines C.2 – Share experience related to the long-term sustainability of outer space activities and develop new procedures, as appropriate, for information exchange. Guidelines C.3 – Promote and support capacity-building. Guidelines C.4 – Raise awareness of space activities.
4. Scientific and technical research and development: Guidelines D.1 – Promote and support research into and the development of ways to support sustainable exploration and use of outer space. Guidelines D.2 – Investigate and consider new measures to manage the space debris population in the long term.”<sup>68</sup>

The Guidelines create non-binding obligations on states and intergovernmental organisation to follow. However, the Guidelines of the COPUOS is a significant step in achieving the long-term sustainability of outer space. Considering such contribution, the COPUOS has initiated the next phase of LTSOSA discussions in COPUOS – LTS 2.0.<sup>69</sup> The Committee in 2019 session decided to continue with the LTSOSA dialogue and review the implementation of it.<sup>70</sup> It also decided to establish a Working Group with five-year workplan under the STSC to deliberate on the LTSOSA.

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<sup>68</sup> UNSOOSA, ST/SPACE/79 of 7 June 2021, Guidelines for the Long-Term Sustainability of Outer Space Activities of the Committee on the Peaceful Uses of Outer Space. Available: [https://www.unoosa.org/res/oosadoc/data/documents/2021/stspace/stspace79\\_0\\_html/st\\_space79E.pdf](https://www.unoosa.org/res/oosadoc/data/documents/2021/stspace/stspace79_0_html/st_space79E.pdf)

<sup>69</sup> UNSOOSA, ST/SPACE/79

<sup>70</sup> UNGA Official Records Seventy-fourth Session Supplement No. 20, Report of the Committee on the Peaceful Uses of Outer Space, Sixty-second session (12-

Additionally, to achieve LTS, “norms of behaviour” or the “code of conduct” for states could also prove significant. In developing that standards of behaviour, the COPUOS in 2019 emphasised on developing the protocols of “norms of behaviour.”<sup>71</sup> The paper framed significant issues such as long-term sustainability, security, debris, space situational awareness, importance of cross-cultural communication, and risks and attribution as an area of concern. Thus, the elements of “norms of behaviour” were considered into four focus areas by the conference. These are: 1. Launch, 2. Debris mitigation and management, 3. Space situational awareness, and 4. In-orbit operations. Based on various considerations and questions, the conference agreed for verity of recommendations.<sup>72</sup>

Simultaneously, the Committee also came up with “Space2030” idea similar to SDGs and submitted a report to the UNGA.<sup>73</sup> The resolution was titled “The “Space2030” agenda and the global governance of outer space activities” which explained in detail about the “Space2030” and also disclosed about the first UN space summit of the twenty-first century UNISPACE+50 to celebrate the 50 years of the UNISPACE to be held on 20-21 June 2018.<sup>74</sup> The “Space2030”

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21 June 2019). Available:  
[https://www.unoosa.org/res/oosadoc/data/documents/2019/a/a7420\\_0\\_html/V1906077.pdf](https://www.unoosa.org/res/oosadoc/data/documents/2019/a/a7420_0_html/V1906077.pdf)

<sup>71</sup> UNCOPUOS, A/AC.105/2019/CRP.12 of 13 June 2019, Sixty-second Session (Vienna, 12-21 June 2019), Operating in space: towards developing protocols on the norms of behaviour. Available:  
[https://www.unoosa.org/res/oosadoc/data/documents/2019/aac\\_1052019crp/aac\\_1052019crp\\_12\\_0\\_html/AC105\\_2019\\_CRP12E.pdf](https://www.unoosa.org/res/oosadoc/data/documents/2019/aac_1052019crp/aac_1052019crp_12_0_html/AC105_2019_CRP12E.pdf)

<sup>72</sup> UNGA Official Records Seventy-fourth Session Supplement No. 20, Report of the Committee on the Peaceful Uses of Outer Space, Sixty-second session (12-21 June 2019). Available:  
[https://www.unoosa.org/res/oosadoc/data/documents/2019/a/a7420\\_0\\_html/V1906077.pdf](https://www.unoosa.org/res/oosadoc/data/documents/2019/a/a7420_0_html/V1906077.pdf)

<sup>73</sup> UNGA, A/AC.105/1166 of 13 December 2017, (Advanced Edited Version), Committee on the Peaceful Uses of Outer Space, The “Space2030” agenda and the global governance of outer space activities, Note by the Secretariat. Available:  
[https://www.unoosa.org/res/oosadoc/data/documents/2018/aac\\_105/aac\\_1051166\\_0\\_html/AC105\\_1166AEVE.pdf](https://www.unoosa.org/res/oosadoc/data/documents/2018/aac_105/aac_1051166_0_html/AC105_1166AEVE.pdf)

<sup>74</sup> UNGA, A/AC.105/1166.

contains various action items that need to be taken. Such as increasing member states of the COPUOS to 120 by 2030, to strengthen the space activities and evolving on tools to achieve the goals. The resolution also mandated the COPUOS to review the implementation of the “Space2030” in 2025 and submit the report to the UNGA. The UNGA also undertook the idea to declare 2025 as the “International Year of Space” to “ensure that the broad societal benefits of space as an area of innovation, inspiration, interconnectedness, integration and investment continue to be experienced beyond the landmark year 2030.”<sup>75</sup> The Committee also took a progress report from the Working Group on “Space2030”. A working paper was submitted by the Bureau of the Working Group on agenda and implementation plan on 13 February 2020.<sup>76</sup>

The UNISPACE+50 Symposium was held on 18-21 June 2018 in Vienna Austria. The symposium discussed on the future of international cooperation in peaceful uses of outer space.<sup>77</sup> A special High-Level Segment of the 61<sup>st</sup> Session of the COPUOS was also conducted on 20-21 June. The High-Level Panel recognised the four pillars of “space economy, space society, space accessibility and space diplomacy.”<sup>78</sup>

## Conclusion

It is well understood that survival of human lives on earth cannot sustain any longer with sheer ignorance of environmental issues and climate changes. At the same time it is also undisputable fact that standard of living can be raised only with the due concerns posed to the

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<sup>75</sup> UNGA, A/AC.105/1166.

<sup>76</sup> UNCOPUOS STSC, A/AC.105/C.1/2020/CRP16 of 13 February 2020, Fifty-seventh Session, Revised Draft “Space2030” agenda and implementation plan, Working paper submitted by the Bureau of the Working Group on the “Space2030” Agenda. Available: [https://www.unoosa.org/res/oosadoc/data/documents/2020/aac\\_105c\\_12020crp/aac\\_105c\\_12020crp\\_16\\_0\\_html/AC105\\_2020\\_CRP16E.pdf](https://www.unoosa.org/res/oosadoc/data/documents/2020/aac_105c_12020crp/aac_105c_12020crp_16_0_html/AC105_2020_CRP16E.pdf)

<sup>77</sup> UNISPACE+50, (18-21 June 2018). Available: <https://www.unoosa.org/oosa/en/ourwork/unispaceplus50/index.html>

<sup>78</sup> UNISPACE+50.

sustainable aspects of development rather than exploiting the nature without thinking about future generations. It has been accepted and realised by the world community that in order to protect the environment and achieve the SDGs, role of space technologies is inevitable.

Since there is increased number of outer space activities which has made space environment vulnerable and susceptible to harm the pristine weather of the outer space. It is right time to talk about the protection of space environment. There are various efforts being taken by the Committee such as Space2030, Debris Mitigation policies, LTSOSA Guidelines. Much more in the form of binding regime is required to be done. A long-term sustainable space means more sustainable lives on earth.

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### DECLARATION OF CONFLICTING INTERESTS

The authors state that there is no conflict of interest in the publication of this article.

### FUNDING INFORMATION

None

### ACKNOWLEDGMENT

This article is a revised version of the paper presented in 19th ASLI Conference, 28 and 29 May, 2022.

### HISTORY OF ARTICLE

Submitted : June, 20, 2022

Revised : August, 16, 2022; December 13, 2022

Accepted : January 15, 2023

Published : January 31, 2023