



Viewpoint

Space sustainability approaches of emerging space nations: Brazil, Colombia, and Mexico



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ABSTRACT

A key component of efforts to address complex threats to space sustainability – such as congestion of key orbits, space debris, radio frequency interference, and potential for conflict in space – is to engage new space actors in the process. This paper will gauge the degree of awareness, interest, and involvement in space sustainability advancement of three emerging space nations in Latin America. Building on prior research that examined the development paths of space actors in three emerging space regions of the world and their impact on space sustainability, this paper will offer insights on the current space sustainability concerns and priorities of Brazil, Colombia, and Mexico. Through literature review, personal communication with experts, and by examining the involvement of these actors in international space forums, this paper identifies common themes about how these actors approach the concept of sustainability, their primary concerns, and involvement in and perspectives on mechanisms to promote it. The findings and conclusions derived from this analysis will help inform ongoing efforts to engage other emerging space actors in the region in the advancement of space sustainability.

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1. Introduction

Efforts to advance space sustainability have evolved from a growing understanding that the actions of any one space actor can have a long-term impact in the ability of all to use this shared resource. With the advent of emerging space actors – nations, intergovernmental organizations, industry, universities and even individuals – the need for shared understanding of what constitutes responsible behavior in space becomes even more pressing. Consequently, a key component of efforts to address complex threats to space sustainability – such as congestion of key orbits, space debris, radio frequency interference (RFI), and potential for conflict in space – is to engage new space actors in the process. Their involvement and support of these measures will increase the legitimacy of sustainability initiatives. Moreover, given that emerging space actors are not necessarily aware of these issues or of how their own actions can help minimize or augment our continued ability to use space in the long term, it is important that more established stakeholders engage emerging space actors on space sustainability efforts and facilitate multi-stakeholder

collaboration in promoting responsible behavior in space.

Recent research has examined the development paths of space actors in three emerging space regions and their impact on space sustainability. In “Analyzing the Development Paths of Emerging Spacefaring Nations: Opportunities or Challenges for Space Sustainability?,” Ansdell, Hendrickson, and Delgado, examined the rationales, shared challenges, and major space activities of Venezuela and Brazil in South America, identifying shared goals, differences in scope, and approaches towards international space cooperation [1]. In a case study focused on the EU-proposed draft International Code of Conduct for Outer Space Activities (ICoC), the authors concluded that both Venezuela and Brazil have demonstrated a “keen understanding of space sustainability,” but noted that similar attitudes toward mechanisms such as the ICoC “appear to conflict with those of established space actors and could thus create lasting challenges.” The authors emphasized that the examined countries’ recognition of the importance of space to national development “helps to promote space sustainability” and emphasized the key role of regional dynamics in shaping support for space sustainability mechanisms.

This paper builds on the findings of the previous analysis to examine space sustainability approaches within an emerging space region more closely, in order to gauge the degree of awareness, interest, and involvement in advancing space sustainability. It

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focuses on three emerging space nations in Latin America: Brazil, Colombia, and Mexico. At different stages of development when it comes to the expansion of their space activities, these countries have all made space activities a priority in their national development.

Brazil is the recognized leader of space activities in Latin America and has been pursuing an ambitious and diverse space program since the 1960s. Its civil space agency – Agência Espacial Brasileira (AEB) – was established in 1994. Brazil's most recent National Plan for Space Activities (PNAE), which guides its space activities in 10-year increments, aims to focus investments in the development of a globally competitive aerospace industry, while continuing to meet national needs – such as managing its vast natural resources [2].

Mexico has also had decades-long activity in space, particularly in telecommunications, and has recently taken steps to institutionalize and better coordinate these efforts. The Mexican national space agency – Agencia Espacial Mexicana (AEM) – was established in 2010. In 2012 AEM issued a plan for its space activities for 2011–2015 [3]. The following year, it released an “Orbit Plan,” a roadmap to grow the Mexican aerospace industry [4]. Mexico will also be hosting the 2016 International Astronautical Congress in Guadalajara.

Colombia is among the most recent to undertake space activities in the region. In part driven by the momentum afforded by hosting one of the Space Conferences of the Americas in 2002, Colombia has established two institutions under the Vice Presidency to expand its presence in space, with the main coordinative functions assigned to the Comisión Colombiana del Espacio (CCE).¹ Among the initial projects is the continuation of university cubesat programs, which led to the launch of the first indigenous satellite “Libertad 1” in 2007 [5].

This paper explores the following questions:

- How do these actors define space sustainability and what are their primary concerns?
- What actions are they taking to address space sustainability?
- What are their views on international sustainability mechanisms under development?

The answers to these questions were drawn from a literature review of articles, official documents, presentations, and available transcripts of events relevant to the subject. Responses to the questions above from experts of the countries examined here were also incorporated into the analysis. These interviews were conducted in an informal basis, and responses were received from three of the six individuals contacted. Excerpts from these interviews are included and credited with permission. Not intended to represent the official position of the countries in question, these help provide context to the internal discussions about the themes examined here.

This paper begins with an overview of space sustainability and ongoing multilateral efforts to promote it. The following section discusses common themes identified through this research. The last section focuses on conclusions and a discussion of how these common themes suggest a way forward for space sustainability engagement at the regional level. The findings and conclusions derived from this analysis will help inform ongoing efforts for regional engagement to advance space sustainability, and suggest areas for further research.

2. Space sustainability: An overview

Growing awareness of the risk of long-lived space debris in the 1990s was one of the main drivers of interest in the long-term sustainability of space activities. Resulting from the expansion of space activities, human-generated debris represents one of the most pressing threats to the continued ability to use and derive benefits from space. A series of initiatives began to take shape to develop multilateral measures to address this and other threats to space sustainability. One of the milestones in this effort has been the development of technical standards for debris mitigation by the Inter-Agency Space Debris Coordination Committee (IADC). A version of the space debris mitigation guidelines was developed by the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) and later endorsed by the U.N. General Assembly (UNGA) in 2007. UNCOUOS has since then continued examining related issues and has become a principal forum for space sustainability discussions.

Within the context of space activities, no official definition of the concept of sustainability has been adopted. In 2010, informal consultations among members of the UNCOUOS Scientific and Technical Subcommittee (STSC) resulted in a set of preliminary reflections on the topic and referred to a list of challenges that question the “ability to continue operating in a safe environment” and later referred to the “sustainable use of space activities.” [6] A draft report of the UNCOUOS Working Group on the Long-term Sustainability of Outer Space Activities issued in 2013, states that all space actors “should take steps to ensure that their activities do not diminish the ability of others to carry out their own space activities, either now or in the future.” [7] The Secure World Foundation, a private operating foundation that focuses on space sustainability, has defined sustainability as “ensuring that all humanity can continue to use outer space for peaceful purposes and socioeconomic benefit now and in the long term.” [8] Common in all of these is a theme of protecting the ability of current and future space and non-space actors to use space for their benefit, in accordance with international law.

In addition to space debris, the challenges to space sustainability include space weather impacts on space assets, RFI and other issues related to management of the electromagnetic spectrum, and limited awareness of the space environment and the objects operating therein. A key characteristic of all of these is that while they can occur with ill intent, they can also result from oversight and lack of awareness, particularly as more actors gain access to space technology. This has led to efforts to increase awareness of shared risks, particularly among emerging space actors, and to reduce the risk of misinterpretation or mistrust in space through the development of transparency and confidence-building measures (TCBMs).

Efforts to address space sustainability are necessarily collective, and while bilateral or unilateral efforts are welcomed, their success depends on the broadest adoption possible. Given this need for broad support and limited progress in the development of binding treaties, recent efforts have sought to develop voluntary norms of responsible behavior in space, including²:

- UNCOUOS Working Group on the Long-Term Sustainability of Outer Space Activities – Established in 2010 within UNCOUOS STSC, this working group was tasked with producing a series of best practices for space sustainability. A draft set of 33 LTS guidelines have been developed in five categories: policy,

¹ See (In Spanish), Programa Presidencial para el Desarrollo Espacial Colombiano (PPDEC) <http://www.desarrolloespacial.gov.co/Paginas/default.aspx>; and the Comisión Colombiana del Espacio (CCE) <https://www.cce.gov.co>.

² Visit the Secure World Foundation website for fact sheets on the status of each of these activities: <http://swfound.org/resource-library/swf-publications/>.

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