

United for space sustainability: the (Stick) and Carrot Approach

With more than 28,000 satellites to be launched during the next decade (Euroconsult, 2024), and even more pieces of debris currently orbiting the Earth, the risk of in-orbit collisions is about to dramatically rise, putting in danger numerous vital satellite systems for our society. While current and 'traditional' sanction-based regulations seem to have reached their limit, there is a need to adopt a new approach to unite world leaders and make them agree on a common approach to ensure a sustainable use of space.

Quick overview of today's current challenges

There is undoubtedly a growing awareness of the congestion issue in space, which has led to the adoption of major soft law instruments at the international level (UNOOSA, 2021) and some game-changing national regulatory revisions (FCC, 2022). However, adopting more sustainable behaviors in outer space has a price that all space actors are not yet in a position to afford.

Addressing space debris often entails installing new propulsion systems on spacecraft or employing third-party Active Debris Removal services, both incurring additional costs. National regulators might be hesitant to impose such obligations on their industries, particularly when it could create unfair competition with foreign counterparts.

The most viable solution seems to be the adoption of a multinational system overseen by a supranational body, which does not seem possible for the moment. As evidenced by the lack of ratifications of the Kyoto Protocol (UN, 1997), sovereign States tend to reject new regulations if they perceive negative effects on their economy (G. W. Bush, 2001). Instead, they are more inclined towards rules that offer advantages, such as gaining a competitive edge or avoiding penalties. This principle is commonly known as the 'Carrot and Stick' theory.

Introduction of the 'Carrot and Stick' theory in the space sector

Rewards and sanctions are commonly viewed as two sides of the same coin. Rewards, or "carrots," signify improvements in a target position relative to its baseline expectations, while sanctions, or "sticks," denote deprivations relative to the same baseline (van Aaken and Simsek, 2021). The removal of a sanction is often seen as a reward, and vice versa. Despite this, literature and experience (De Geest and Dari-Mattiacci, 2013) suggest that carrot approaches tend to be more effective than stick approaches for both theoretical and practical reasons.

Psychologically, sanctions are often perceived as unfair and illegitimate, particularly when targeting sovereign States (van Aaken and Simsek, 2021). Rewards, on the other hand, are generally welcomed by stakeholders, improving their perception of newly adopted standards.

Practically, sticks often require binding rules and enforcement systems (Bradford and Ben-Shahar, 2012), while carrots can be bonuses or optional incentives sought by volunteers. In the global space sector, the likelihood of implementing a legally binding agreement in the near term is slim, and

there exists no international ‘sheriff’. But, various entities within the space industry can voluntarily offer rewards without the need for such enforcement mechanisms.

The reward approach has been successful in various sectors, including the financial industry, where international rating agencies utilize diverse tools to evaluate a bank's financial strength and creditworthiness, providing guidance to future investors and regulatory bodies (Investopedia, 2024).

This reward approach is only emerging in the space sector. One of the most promising initiatives is the Space Sustainability Rating (SSR) initiative conceived by the World Economic Forum and hosted by eSpace (EPFL Space Center) in collaboration with other key partners.

The SSR (Space Sustainability Rating, 2022) is an optional assessment tool that enables space stakeholders to gauge the sustainability of their projects using established and validated metrics. Operators who participate in this process will receive a bronze, silver, gold, or platinum badge based on their performance, without revealing any sensitive mission data.

These ratings offer some benefits to operators. Firstly, they can use the obtained badge to enhance the company's image and bolster future projects. Additionally, companies will receive practical recommendations for identifying potential areas of improvement and support from various stakeholders involved in the SSR process.

Developing a reward approach for global space sustainability

In the future, the aim is to extend the SSR-like scheme to offer additional incentives to stakeholders who demonstrate sustainable practices in orbit through partnerships with various space and non-space entities.

In addition to enhancing a positive image, a high rating could streamline the licensing process for operators. Regulators might utilize this rating system to evaluate operator performance and offer financial and administrative benefits during licensing. It could also become a prerequisite for accessing R&D co-funding opportunities. Furthermore, a favorable rating could be a criterion for securing government contracts and accessing national/regional programs once the system gains wider acceptance.

As highlighted in the 2023 United Nations (UN) Policy Brief 7 (UN, 2024), collaboration with other UN bodies is crucial for ensuring the effectiveness of this process. Given that access to frequencies remains a critical asset in the industry, the International Telecommunications Union (ITU) and national regulators may incentivize good practices by granting preferred access to some disputed frequencies based on this rating system.

For non-space stakeholders, a reduced risk of in-orbit incidents may attract investors to support operator programs further, while insurers might consider lowering premiums, similar to practices in the automotive sector in many countries.

Apart from acting for the greater good, these partners must also derive some benefit. While it will likely decrease the risk of liability for Launching States, supporting sustainable practices will also reduce the number of incidents that insurers may have to cover and the financial consequences of in-orbit collisions that might concern investors.

Due to its non-mandatory nature and its encouraging aspect, this system holds significant potential for uniting decision-makers in their efforts towards achieving space sustainability.

Implementing an effective rating system and adopting a 'carrot' approach presents a promising alternative to traditional 'stick' measures for ensuring sustainable space use. Realistically, initial concrete initiatives may only be embraced by a few actors. However, with backing from global organizations such as UN bodies and demonstrating its positive impact, this solution stands a strong chance of rallying world leaders to agree on a unified approach to safeguarding space for future generations.

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