Taking Space Sustainability to the Next Orbit: a Bold Step for Europe´s Future

A dedicated EU Legislation for space activities should foster industrial competitiveness and promote agreed upon sustainability requirements in mission design

Space Security as a full-fledged strategic domain for EU affairs

Propelled by heightening geopolitical tensions with Russia, the much-awaited EU Space Strategy for Security and Defence (SSSD) announced in a joint communication by the European Commission and EEAS High Representative Josef Borrell on March 10th laid the foundations to further integrate all aspects of Space Security at the center of EU affairs. This new set of strategic priorities builds on the 2022 Strategic Compass, recognizing the contested nature of outer space, the vulnerability of space assets, and the need for EU coordination to protect them in a rapidly evolving and contested environment.

In this regard, SSSD is a significant EU policy milestone that introduces a unique opportunity for Member States to align politically on sensitive space issues and build stronger collaboration schemes for a common understanding of space threats, ranging from man-made threats such as space debris and anti-satellite technology (ASAT) to natural hazards such as space weather. In this context, the Commission announced that SSSD encompasses four pillars:

A) Work towards considering an EU Space Law aimed for a common framework for Space Safety, Security and Sustainability;
B) The establishment of an ´Information Sharing and Analysis Centre (ISAC)´ together with EUSPA for awareness raising activities to ´facilitate the exchange of best practices among commercial and relevant public entities on resilience measure for space capabilities´;
C) Initiate preparatory work to guarantee long-term autonomous access to space for Member States;
D) Focus on ´the technological sovereignty of the EU´ together with ESA and EDA, especially with regards to strategic dependencies and the industry supply chain;

This position paper seeks to discuss the first pillar on the possibility of introducing EU space legislation for Member States aimed at improving the protection of space assets with resilience measures, information sharing and enhanced cooperation.

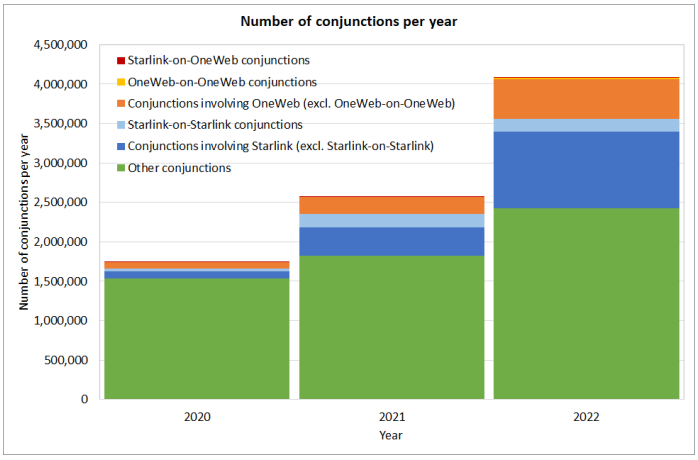
EU Legislation for Space Activities: Stakes and Challenges

European Space Policy´s legal basis provided by the Treaty of the Functioning of the European Union (TFEU) excludes the supranational harmonization of national legislations. And yet, European Space Policy has also been a long history of successful supranational cooperation, with the EU progressively taking a more proactive role in the space sector for a wide variety of reasons. While Member States ratified international space treaties, not all of them decided to implement a domestic legal framework for space activities resulting in a fragmented legal landscape with different approaches and provisions.

To tackle this problem, Niklas Nienaß, German MEP for the Greens/EFA, introduced a proposal for a coordinated EU space legislation in February 2022 that not only would incorporate the obligations of international space treaties´ guidelines but also would adopt a Directive providing guidance for domestic space law development.[i] Pursuing similar efforts in a parallel process to build consensus on Space Sustainability, EU space ministers agreed on an ´EU Approach to Space Traffic Management´ in June 2022 aimed at ´fostering legislative and standardization aspects´ in the field.[1]

Towards a common understanding of minimum sustainability requirements for institutional and commercial actors

The rapid growth of the global space industry resulted in an all-time high number of rocket launches per year and orbiting satellites (+8200 in total) with a 134% increase in the number of predicted conjunctions between 2021 and 2022, especially due to two main megaconstellation players – Starlink and OneWeb, as



[1] An U Approach for Space Traffic Management (europa.eu)

shown on Graph 1 (H. Lewis, University of Southampon). These concerning data perfectly illustrate the criticality of minimum in-orbit mobility capabilities for all spacecraft, not only throughout the duration of the mission but also when it comes to deorbiting.

Therefore, a dedicated EU Legislation for space activities should impose a set of minimum sustainability requirements to be observed in the licensing of space activities, including:

A) **Maneuverability requirements**: All operating spacecraft in orbit should be able to control their trajectories and to execute timely and effective collision avoidance maneuvers. Such requirement should be technology-neutral, permitting the reliance on active propulsion system as well as passive maneuverability, eg by differential drag.

B) **Post-mission disposal requirements**: All spacecraft in LEO, following the completion of the mission, should be disposed through atmospheric re-entry as soon as practicable, and no later than five years after the end of the mission.

C) **Quantitative risk assessments**: License applicants should be required to conduct a collision risk assessment with large objects as well as a casualty risk assessment, if planned post-mission disposal involves atmospheric re-entry of the spacecraft. A license may only be granted if the risks do not exceed certain predefined thresholds (eg the risk of collision with large objects must not exceed 1 in 1,000). The risk calculation methods should be based on generally accepted technical standards.

Simplified licensing procedures, incl. exemptions from the above minimum requirements, should be provided for small spacecraft in LEO with active propulsion capabilities, non-profit entities (such as universities), science focused payloads or one-time demonstration missions.

Considering the alarming situation in Earth's orbit and the increasing involvement of commercial actors in addressing defence and security needs of institutional actors, it is timely to assess the relevance of implementing such an important EU legislation for the long-term sustainability of space activities and Europe´s future for several reasons:

A) These efforts could bring significant benefits to the industry by establishing a level playing field and leveraging capacity building while stimulating innovation in all aspects of Space Sustainability;
B) Dedicated EU policy actions to enhance industrial competitiveness in this specific field could lead to more disruptive and innovative ideas relevant to institutional demand and the long-term strategic development and implementation of SSSD;
C) An EU Legislation for Space Activities would be an opportunity to put synergies in place addressing Climate, Defense and Cyber issues and could take inspiration from environmental impact assessment models;
D) Especially with regards to Space Traffic Management, emerging business models in On-Orbit Servicing, Assembly and Manufacturing (OSAM) and their associated standards a coordinated EU approach to Space Sustainability would improve the EU´s ability to wield influence on International Space Diplomacy in international for a and with key non-EU partners such as the United States.

Concluding remarks

The accelerating pace at which space hardwarwe is being deployed today is cause fror concern for the preservation of limited orbital ressources and should therefore go together with bolder collaborative efforts towards building consensus on space sustainability requirements, including minimum maneuverability requirements for spacecraft, for all space faring nations. In this sense, the EU has a moral responsibility to proactively support broader Space Sustainability efforts in a coordinated way to protect European space assets while making sure these efforts are appropriately backed to promote innovation and fair competition in industry.

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