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SPACE SUSTAINABILITY RATING: TOWARDS AN ASSESSMENT TOOL TO ASSURE THE
LONG-TERM SUSTAINABILITY OF THE SPACE ENVIRONMENT

Abstract

The ever-increasing amount of space debris continues to pose a threat to valuable space assets. The reliance on space assets coupled with an expected growth of large constellations of micro-satellites and nano-satellites emphasize the critical need to foster responsible behavior by all actors to ensure long-term sustainability of the space environment. The Space Sustainability Rating (SSR) was first conceptualized within the World Economic Forum Global Future Council on Space Technologies. The SSR aims to provide a new, innovative way of addressing the orbital challenge by encouraging responsible behavior in space through increasing transparency of actors' debris mitigation efforts designed to support long-term sustainability of the space environment. This paper presents the work of an international and transdisciplinary team to contribute to the early definition of the technical element and operations of the SSR. The paper presents the SSR design methodology to provide a comprehensive rating for sustainability of space missions in the context of the general status of the environment and global level of adherence to

space debris mitigation practices. The SSR would act as a voluntary mechanism, whereby actors undergo an evaluation of their mission through a questionnaire; existing indices and other information should be used in addition to a specific questionnaire in establishing a rating. By sharing its rating, the actor would provide a single point of reference externally for their mission, thereby increasing transparency and placing emphasis on its debris mitigation approach, without disclosing any mission-sensitive or proprietary information. The rating will act as a differentiator and trigger positive outcomes (e.g., impact insurance cost or funding conditions), incentivizing other actors to improve their behavior. The design, development and implementation of the SSR requires a number of steps including the creation of a technological platform among the space actors to ensure awareness, promote positive concepts and guarantee transparency of the approach. Based on input from different stakeholders (eg. governments, regulators, space agencies, industry trade associations etc.), the paper proposes potential steps to design the technical metrics and parameters of the SSR. The paper further explores the feasibility of the SSR to positively impact elements of the Space value chain – from manufacturers and insurers to launch providers and operators, as well as end customers.