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INCENTIVIZING ADOPTION OF CISLUNAR ORBITAL DEBRIS MITIGATION POLICIES VIA  
NORMS OF BEHAVIOUR**Abstract**

With a rapid increase in the population of near-Earth orbits in recent years, there has been a concerted international effort towards the mitigation of orbital debris generation. Due to the vast amounts of debris that already exist in near-Earth orbits, however, studies have shown that mitigation is no longer sufficient, and active debris removal efforts will be needed to manage the growth of orbital debris. As humanity makes a return to the lunar regime, there is an opportunity to avoid repeating mistakes made in the near-Earth regime and apply a preventative approach to preserving key cislunar orbits and fostering sustainable growth of space traffic.

While policy measures towards the same are being proposed, they are typically non-binding and cannot be unilaterally imposed. It is therefore important to encourage the adoption of these policy recommendations, and incorporate them implicitly into the spacecraft design process and operational procedures. While prior research has proposed different approaches towards fostering space sustainability, such as the framework of common-pool resources and subjective obligations of good governance, few have done so in the context of implicit encouragement of orbital debris mitigation across the lifetime of a space mission. This varies significantly from the ground reality of existing cultures within the space industry, where best practices and preventative measures for a variety of risks and hazards are adopted without being codified or signed into law. A prime example is the ISS keep-out sphere, which is strictly adhered to despite not being clearly permitted or prohibited by international jurisprudence.

Our work aims to characterize potential strategies to incentivize implicit adoption and adherence to proposed policy measures for orbital debris mitigation in the cislunar regime. We leverage the rich history of precedents for international collaboration across public and private entities for the International Space Station, and discuss relevant similarities with the proposed Lunar Gateway and other key Artemis program elements. Our approach centers on developing a preliminary ethnographic understanding of current developmental and operational cultures for cislunar missions, and analyzing the norms of behaviour pertaining to actively incorporating preventative debris mitigation measures as a design consideration. Collectively, these analyses aim to push the narrative framing around compliance to proposed policy measures away from that of a regulatory burden and towards a positive perspective of fostering access to, and growth within, cislunar space. This work has been generously funded by NASA ROSES Grant 80NSSC24K0058.