

IAF SYMPOSIUM ON SECURITY, STABILITY AND SUSTAINABILITY OF SPACE ACTIVITIES  
(E9)Interactive Presentations - IAF SYMPOSIUM ON SECURITY, STABILITY AND SUSTAINABILITY  
OF SPACE ACTIVITIES (IP)

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SPACE MINING - AN ECONOMIC BOON, BUT A POTENTIAL RISK TO SPACE SUSTAINABILITY:  
SETTING OUT LEGAL CONSIDERATIONS OF DEBRIS GENERATED BY SPACE MINING**Abstract**

Space mining - a novel practice which promises to deliver wealth beyond what has been seen on Earth. With projects set to launch in mid-2024 from private companies, and a dedicated session on this emerging practice at the International Astronautical Congress, it is clear that space mining is a more feasible prospect than ever before. However, despite its imminent prospect, there has been limited discourse on the potential risks space mining poses to outer space through space debris generation. Researchers at the University of British Columbia have found that mining an asteroid using currently planned techniques is likely to generate a stream of debris, of which at least a portion would enter Earth's orbit, thus contributing to the growing problem of space debris (Fladeland et al.). More disconcerting is the prospect that, unlike large defunct satellites, this debris is projected to consist of very fine particles which, despite their size, can inflict damage upon satellites and other critical space infrastructure.

In anticipation of future space mining practices, this paper will explore the position contained in non-binding agreements, like the Artemis Accords and Building Blocks, i.e. that materials can be exploited without appropriating celestial bodies. It will then consider how the idea of exploitation without appropriation can exist alongside anticipated, though unintentional, debris generation through the lens of liability assignment. Technical problems, like tracking of liability-incurring debris in the event of collisions or damage, will also be considered. Finally, the question of whether current guidelines suffice to tackle debris from space mining, or whether a new regime is needed, will be considered.

Ultimately, this paper will argue that there are solutions to these problems and liability concerns should not dissuade investment in the field. Rather, liability concerns should be borne in mind when planning missions to ensure space mining is a safe and sustainable practice from its outset - not an afterthought after it tangibly contributes to space debris.

Fladeland et al. <https://arxiv.org/ftp/arxiv/papers/1911/1911.12840.pdf>