IISL COLLOQUIUM ON THE LAW OF OUTER SPACE (E7)
Interactive Presentations - IISL COLLOQUIUM ON THE LAW OF OUTER SPACE (IPB)

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IS SPACE FUEL A SPACE OBJECT: IN-SITU PROPELLANT PRODUCTION AND THE LEGAL FRAMEWORK THAT GOVERNS IT

Abstract

With humanity looking to the stars, it seems likely humankind will bring many of its problems along with it, the insatiable need for energy notwithstanding. With the commercial, economic and practical aspects of in-situ resource utilisation, namely in-situ propellant production, growing, rockets will likely be powered with fuel made entirely of or derived from compounds found on (or in) celestial bodies: From Helium-3, water, methane etc. to even liquid metal alloys. In other words, space will soon be in its own race for the cheapest, cleanest, and most efficient space fuel - and with it, likely bring the space-equivalent problems of our energy use on Earth. This begs the question: What will these problems actually look like? Who will bear the responsibility and liability if damage relating to space fuel occurs, such as with oil spills on Earth? Better yet, when does celestial material become space fuel in the eyes of the law? Finally, does it ultimately matter?

This paper aims to tackle the following: (1) Identify current and potential issues surrounding energy use in space, (2) Answer whether space fuel falls under the current legal definition of space object, and (3) How the *lex lacuna* regarding space fuel can be filled. Thus, the paper first outlines the current issues with energy use in space, taking a broad scope and summarising areas of current and future space use. The paper then looks at the way registration and liability work within space and specifically in relation to space fuel, as well as how damages relating to fuel are dealt with on Earth. Subsequently, an in-depth review of the legislative work conducted relating to celestial material is provided, with an analysis of whether space fuel falls under the current definition of 'space object' or whether the definitions of 'space product' or 'space resource' may prove more appropriate. Finally, the paper concludes that space fuel will better fit the latter definitions, but will most likely need further reclassification in the future.