

IISL COLLOQUIUM ON THE LAW OF OUTER SPACE (E7)  
Legal Issues Relating to Emerging Space Activities on Celestial Bodies (3)

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SPACE SETTLEMENTS, AI, AND “FAULT” IN THE LIABILITY FRAMEWORK FOR DEEP SPACE  
EXPLORATION.

**Abstract**

The planning of human settlements in outer space, be they on permanent locations on celestial bodies or on infrastructures such as space stations, is linked to the use of advanced technologies, operated using Artificial Intelligence (AI). So far, the success of space missions has been linked to the detailed planning prior to the mission, which involves human intelligence, decision-making and coordination, contingency plans and, most importantly, human cooperation. Extraterrestrial human settlement, however, will require cooperation between human and artificial intelligence, in environments still under exploration and detached from human expertise on Earth.

Within this context, this paper seeks to explore the liability mechanism for space activities relating to the establishment and function of human settlements in outer space and identify the relevant needs and subsequent gaps in the legal framework. Specifically, the Liability Convention introduces a fault-based liability regime for damage caused in outer space, thus lowering the “negligence” threshold, as compared to the absolute liability that is applicable to damage caused on the surface of the Earth (Art. II). This paper questions whether this type of liability will suffice in addressing damage as a result of a decision-making process that originates from a joint human and artificial intelligence taking place in outer space. Considering the extra hazardous nature of outer space and the dependence of space human settlements on good decision-making practices, this paper suggests that different forms of liability could – perhaps – better address the peculiar environment of extraterrestrial settlements and the cooperation between artificial and human intelligence in it.

Machine learning, for example, i.e. “the capability of a machine to imitate intelligent human behavior” (source: MIT), will play a central role in such decision-making processes, leading to questions such as whether and to what extent the intervention of human intelligence would be expected to supervise and direct artificial intelligence. Accordingly, this paper asks whether the fault-based threshold of liability for damage caused in outer space should be rethought within this environment and its application to such situations clearly defined.

From the same starting point, this paper also asks if the existing space law framework could be amended to address such challenges, or whether a new instrument is needed to address the specificities that might arise from the future permanent (or long-term) co-existence of humans and machines in deep space.