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21st IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND DEVELOPMENT (D3)
Strategies & Architectures as the Framework for Future Building Blocks in Space Exploration and Development (1)

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HOLISTIC RESEARCH FOR CIRCULAR LUNAR DEVELOPMENT: UPDATES FROM SGAC'S TECHNICAL UNIT RESEARCH FOR A THRIVING LUNAR ECOSYSTEM (TURTLE)

Abstract

Few contest that the Moon is set to play a key role as enabler of a new era of sustained and sustainable space exploration. However, for this to occur we need to ensure the safe and sustainable development of the Moon itself first. As lunar plans turn to action, it is becoming more and more apparent that operators are not really factoring the activities conducted by others into their own plans. This lack of holistic thinking inevitably increases the risk of interference among lunar activities and represents a critical threat to the safe and sustainable development of the Moon. Conversely, on a small body such as the Moon, the adoption of a systemic approach to technology and infrastructure development would reduce costs, prevent harmful interference and minimize the impact on the environment.

To shed light on these topics, in September 2020 a group of 10 young researchers from the Space Generation Advisory Council (SGAC) came together to form the Technical Unit Research for a Thriving Lunar Ecosystem (TURTLE). The proposed paper will summarize the research conducted within the TURTLE Group after two years of foundational research on key areas for lunar development - landing sites, power systems, logistics, biospheres and dust mitigation - as well as on additional areas to be explored in 2023. Further, the paper will also update on the status of TURTLE's foundational work for the global development of a Lunar Exploration Technology Adaptive Roadmap (LETAR) that could act a shared reference framework across all lunar actors driving and supporting lunar sustainable development through technological inclusiveness, interoperability and adaptability.

Please note that this abstract is submitted under the auspices of the Space Generation Advocacy Policy Platform (SGAPP), with the support of SGAC.