

23rd IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND
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EXPLORATION AND DEVELOPMENT (IP)

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LUNAR CLOUD SERVICES

Abstract

In the coming decades, lunar exploration will experience significant growth with the increase in satellite, lander and rover missions. This development will generate a massive volume of data that poses a critical challenge: the efficient transfer and processing of information between the Moon and Earth. Current limitations make this process slow, expensive and an obstacle to the continuity of missions.

To address this problem, the creation of Lunar Cloud Services is proposed, lunar data centers designed to process information directly on or beneath the lunar surface, for greater protection. These centers would employ advanced computing technologies and artificial intelligence to analyze large volumes of data locally. Only the processed results and the most relevant information would be sent back to Earth, optimizing bandwidth use and significantly reducing latency.

At an initial stage, it is suggested to modify a lander to function as an autonomous data center, equipped with storage and processing capabilities, hardware for artificial intelligence. Subsequently, a cluster of interconnected landers would be established, allowing for distributed and redundant processing

This architecture offers a scalable and efficient solution when handling complex data and missions, while minimizing resource consumption in transmissions. In the future, the infrastructure could evolve to support the processing of advanced artificial intelligence models, including the possible implementation of Artificial General Intelligence (AGI).

The Lunar Cloud Services approach represents a crucial step towards an autonomous space infrastructure, capable of handling the increasing complexity and demands of exploration on the Moon and near space.