57th IAA SYMPOSIUM ON SAFETY, QUALITY AND KNOWLEDGE MANAGEMENT IN SPACE ACTIVITIES (D5)
Interactive Presentations - 57th IAA SYMPOSIUM ON SAFETY, QUALITY AND KNOWLEDGE MANAGEMENT IN SPACE ACTIVITIES (IP)

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INTERACTIVE CRATER EXPLORATION ROVER (ICER) WITH BIONIC CAMERA FOR ACUTE PERCEPTION AND VISUALIZATION WITH PREDICTIVE CONTROL

Abstract

It is a swarm of lunar rovers equipped with a bionic camera as an innovative exploration tool designed to investigate lunar craters with enhanced capabilities. The goal is the combination of advanced robotics and image capture technology using photogrammetric computer vision. Photogrammetry as the science of making measurements from photographs, allows a scene from a set of disordered images or videos with techniques that result in a detailed geospatial product with positional precision at the level of electromagnetic mapping.

The project is a spatial photogrammetric analysis for an evaluation of the roughness properties of circumpolar lunar craters. The roughness properties of impact craters are valuable indicators of crater

degradation and can provide information on crater ages. It is to assess the potential age of small craters (less than 15 km) that are believed to host surface ice by quantifying the roughness within these craters as well as on the outside.

The Interactive Crater Exploration Rover (hereinafter referred to as **ICER**) aims to unravel the mysteries hidden within the craters of the Moon. With the use of a bionic camera (with the ability to magnify to microscopic levels) it would offer unprecedented perception and visual acuity. With this remarkable imaging system, **ICER** can capture high-resolution three-dimensional images, allowing scientists and researchers to analyze the intricate details of crater formations.

By leveraging the capabilities of this mission, the lunar **ICER** paves the way for comprehensive lunar exploration, revealing new insights into the geological history of the Moon and potentially discovering valuable resources. The swarms of ICER rovers would allow measurements and prediction models to be made of the use of the resource found.

These resource detection tests are important for the development and construction of roads, farms, energy distributors, sunscreens, and that converge and connect lunar villages by means of train-capsules that allow the spacewalker to be mobilized more quickly, avoiding overexposure. to radiation.