IAF SPACE EXPLORATION SYMPOSIUM (A3)
Interactive Presentations - IAF SPACE EXPLORATION SYMPOSIUM (IP)

Author: Mr. Alan Hernández Martínez
Universidad La Salle, Mexico

Mrs. Anna Sofia Espino Anaya
Universidad La Salle, Mexico
Mr. López Hurtado
Universidad La Salle, Mexico
Mr. Axel Núñez Arzola
Facultad de Ingeniería-UNAM, Mexico
Mr. Itzcoatl Nunez San Miguel
Facultad de Ingeniería-UNAM, Mexico
Mrs. Varisha González Zepeda
Universidad La Salle, Mexico
Mrs. Zoe Suarez Fernández
Universidad La Salle, Mexico

HEXAPOD ROVER FOR SPACE EXPLORATION AND SPACE INFRASTRUCTURE

Abstract

In this project, we developed a self-healing system in a hexapod rover for space exploration, accompanied by other groundbreaking proposals. We all know that the landing stage could be such a challenge. Therefore, we will utilize a self-healing mechanism that allows our rover and lander to repair themselves in case of a disastrous deployment. Additionally, we aim to extract water ice via electrolysis and microwave heating, with an experiment that our Rover carries with it. Another interesting proposal arises as the Rover heads to the Moon. During the separation stages, a cable with a weight, known as the skyhook, will be deployed once in orbit. The cable, made of Zylon due to extreme conditions, aims to establish infrastructure for reaching the moon and other celestial bodies more easily.

Returning to the self-healing system, we present the rover threat detection systems. These mechanisms in space missions are crucial for the economic viability of a mission, influencing the total budget and critical for protecting the Rover from hazards such as micrometeorites and extreme environmental conditions, ensuring its safety and the mission's success. The combination of competitive prices and effective detection systems is essential for maximizing the collected data of space missions. On the other hand, the landing site for this mission we selected is the Marius crater, primarily due to its flat terrain, facilitating rover efficiency.

To be more specific, we have targeted crater A (12θ, 36N 46θ00 O), owing to its proximity to Marius Hills, the location of our lunar cave. Once on the moon's surface, some devices are gonna start operating, and one of these devices is a hybrid approach utilizing both the APXS and XRF techniques to identify water and mineral deposits, making it easier for sample extraction. The rover software is going to be powered by artificial intelligence, enhancing the system itself. The mechanisms used in the rover would provide us great versatility and smooth movement.

Furthermore, we acknowledge the potential environmental ramifications of our endeavors, on both Earth and the Moon. As we progress through subsequent phases of our project, we are committed to integrating eco-friendly practices. With these groundbreaking proposals and many others, we aim

to achieve a clearer scientific understanding leading to other planets and possible breakthroughs with financial incomes for future generations.