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A CHILEAN ROBOTIC SOLUTION FOR SPACE MINING IN MARS

Abstract

Mars is the next frontier of human positioning in space. Therefore, it is essential to understand its environment and develop technologies that allow us to grow a sustainable way of life in it. For this, space mining stands as one of the disciplines with the greatest impact on obtaining resources and has the existing exploration tools in order to analyse and repurpose the materials found on the martian soil. This would reduce the costs and size of the missions, contribute to a greater understanding of the space environment and help us to provide solutions to terrestrial problems from minerals obtained abroad. For Chile, these space challenges are unbeatable due to our mining experience.

Today, mining works based on different phases of exploration, which require different technologies and resources to be carried out. In particular, after the geophysical and geochemical analysis of a particular area. For this, an in-situ exploration phase is necessary. Currently, for global mining, this phase is one of its major problems, since the resources involved are mainly human, most of the time they work in highly hostile environments which puts human lives at risk. The work conditions during operating mining seasons entails great peril, requiring a vast investment for these companies to put human safety as a first priority.

Space Robotics is a Chilean interdisciplinary project, which seeks to establish initiatives that promote the space development of Chile through the use of cutting edge robotic technologies. We create technological solutions for terrestrial problems in hostile environments, making our planet a proof of concept, and then scaling and transforming it into space technology. Thus, we present a Chilean robotic solution for space mining which incorporates technologies focused on the analysis, recognition and selection of minerals in-situ, high mobility, stability and endurance of space, innovating in energy resources, and state of the art in communication technologies.