IAF SPACE EXPLORATION SYMPOSIUM (A3)
Moon Exploration – Part 2 (2B)

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CHALLENGE DRIVEN INNOVATION AT ESA: PROSPECTING TECHNOLOGIES.

Abstract

The European Space Agency (ESA), in partnership with the Luxembourg European Space Resources Innovation Centre (ESRIC) has been conducting the first Space Resources Challenge in the period April 2021 - September 2022. In this paper the merits of Challenge Driven Innovation shall be presented and the winner of the competition shall be announced.

The main goals of the Challenge were to identify technologies needed for the prospecting of large areas of the Moon for future ESA missions and to engage the space resources communities. A discussion on both shall follow.

The Challenge was run with a series of two field tests in which an analogue Moon terrain was produced in two venues in the The Netherlands and in Luxembourg. Out of the 12 participants of the first field test, 5 teams were selected on the basis of their performance in the robotics challenge and on the quality of their industrial/scientific peroposal, according to consolidated ESA procedures. The second field test was used to select the final winner of the overall Challenge and the prize shall consist of a development contract for the selected technology from both ESA and ESRIC.

The criteria used in selecting the winner of the two field tests covered some of the technological, operational and scientific aspects of prospecting missions: navigation, ground-truth analysis and measurements, robotics and autonomy. The objectives were to provide answers to the issues of long-range terrain mapping, short-range object recognition and operations autonomy.

The various goals were addressed by industrial and academic teams form all member stated participating to the E3P ESA programme: this paper shall not cover in detail the various technologies and approaches presented but rather shall provide a survey of the approaches that were demonstrated: single vs multiple robotics assets, sensors, operators interfaces, autonomy during loss-of-signal and locomotion solutions.