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ON-SITE DNA SEQUENCING FOR ASTROBIOLOGY ANALOGUE RESEARCH

Abstract

IGLUNA is a pilot project aimed at supporting and accelerating the ESA_Lab initiative. Coordinated by the Swiss Space Center, the goal of this mission is to simulate a habitat on the moon, built in the ice craters near the poles, and will be tested in a similar environment inside a glacier in Zermatt, Switzerland [1]. One of the teams participating in IGLUNA is the VUSE (VU Science Experiments) team from VU University Amsterdam [1]. The mission of the VUSE team is to design geology and astrobiology experiments that can be performed during the IGLUNA Field Campaign in June 2019.

Astrobiology experiments in this project will focus on the characterization of microbial life in the sampled environment. This is important because it could give clues on what types of organisms might be present in similar environments outside of Earth, such as on the Moon and Mars. For this reason, the main goal of the VUSE astrobiology experiments is to characterize the microbes in obtained soil and ice samples. All equipment is chosen to create a compact, portable and easy-to-use laboratory set-up. Therefore, the experiments can be performed by analogue astronauts on-site.

One of the techniques that will be used is DNA sequencing using an Oxford Nanopore minION portable sequencing device. This device is about the size of a USB stick and does not does not need an external power supply to operate. Even with additional equipment required to prepare the samples for sequencing, all equipment fits into a standard sized backpack. This will allow analogue astronauts to determine the species of present microorganisms on-site in the glacier and within hours.

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References: [1]https://www.spacecenter.ch/igluna/