

IAF SPACE EXPLORATION SYMPOSIUM (A3)
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THE GLACIER PROJECT IN THE IGLUNA ESA LAB DEMONSTRATOR PROJECT

Abstract

The Moon has been recently an object of interest for many space institutions, both governmental and private. The plans to settle a permanent lunar base for humans come with many jeopardies. One of them is a question of safety of astronauts performing an EVA – an extravehicular activity. Both habitat and astronaut need to maintain steady communication and telemetry exchange in order to maximise the safety factor of an astronaut and the mission itself.

The GLACiER project is highly focused on this manner. During a simulated lunar mission in extreme environment in Swiss Alps, the astronaut is being localised outside the habitat by a wireless radio system in real time.

The localisation system consists of three stationary beacons and one receiver mounted on the astronaut. Using signals received from the beacons and a trilateration algorithm, astronauts' on-board computer calculates their position with regard to the beacons. Moreover, a real time text communication system between the astronaut and the habitat is provided to allow sending emergency messages. Environmental information such as speed of wind or temperature is sensed during the operation to help the team decide if it is safe for the astronaut to perform an EVA or if the astronaut located outside the habitat should head back.

The oral presentation at the IAC will cover philosophy and technical design of the GLACiER project followed by a discussion of experimental results from the Field Campaign (held in Zermatt, Switzerland in June 2019) and overall conclusions and lessons learned.

The GLACiER project discussed in this paper is conducted in the frame of the IGLUNA project. Led by the Swiss Space Center, IGLUNA is a demonstrator pilot project aimed at supporting and accelerating the ESA.Lab initiative.