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Remote research in lunar and martian analog international missions to rise knowledge about life in isolation

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Analog simulations of space missions transform from educational activities to advanced interdisciplinary research related with future Moon and Mars exploration. Here we present results from Analog Simulations Campaign 2020 at Analog Astronaut Training Center in Poland. We organised 10 analog missions starting with six missions BRIGHT engaging 9 students, mission ETERNITY, DESTINY, and two EMMPOL missions engaging 18 people, what gives 27 analog astronauts in total for the whole campaign. Analog astronauts were supported by the Mission Control Center. Several experts from various disciplines - professional researchers, participated remotely in this project. Analog astronaut samples of serum, urine, stool and saliva were transported and analysed in professional laboratories of Collegium Medicum at Jagiellonian University in Kraków, Poland.

Organised analog simulations had a common scientific and operational objectives. The main aim was to study life in isolation to support the general public in pandemic times. Missions were organised in specially equipped with environmental sensors isolated AATC habitat in the South of Poland. We collected multiple physiological and psychological data related with stress, motivation and efficiency of analog astronauts during their missions. We observed changes in physical activity, appetite, circadian rhythms, mood, and motivation, as well as interesting results from physiological samples. We defined the most critical aspects of life in isolation and tested putative solutions for improvement of the comfort of such type of existence. Based on our 4 month studies, we characterised a list of common problems strictly related with life in isolation, which were observed in tested groups. At the end, we propose solutions to improve life and well-being in restricted spaces.