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TOOL FOR REAL-TIME MONITORING AND ANALYSIS OF THE EXERCISE IN THE ICE  
ENVIRONMENT

**Abstract**

Crew members need to exercise regularly to maintain their physical fitness while working in isolated, confined, and extreme environments (ICE). However, when exercising remotely, there are usually no fitness coaches available on-site to monitor and optimize their training, which can lead to injuries and suboptimal training. To address this issue, a tool based on various biosensors that uses AI/ML and augmented reality has been developed in the Hydronaut DeepLab H03 habitat, the mobile habitat used for analog missions both on the surface and underwater. The tool is modular, portable, and can be used in various environmental conditions. It consists of hardware, software, and exercise batteries that are specially designed for the ICE environment. The tool is expected to provide real-time feedback to the user and visualize correct exercise execution. Several analog space missions have been carried out to test the functionality of the tool during multi-day stays in the ICE environment in the DeepLab H03 habitat. The initial experiments with the tool demonstrated its ability to monitor various physiological and kinematic parameters of crew members in real time during exercise. Acknowledgment: The project is supported by the Czech Technological Agency under the Delta program, Project number TM04000062.