

Exploration of Other Destinations (5)
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INNOVATIONS FOR ENHANCING HUMAN SYSTEMS INTEGRATION WHILE EXPLORING...
UNDERWATER. IN A CAVE. 90 METER BELOW SURFACE.

Abstract

Aquanauta is a series of manned mission simulations that is to study the adverse effects of isolation, confinement, darkness on cave divers in thermal caves. Our rationale to organise such high fidelity mission simulations is that astronauts regularly train as divers in large artificial pools, where they can explore the effects of microgravity and practice specific protocols and skills later carried out or used on the International Space Station. Further, astronauts often train together in caves in order to get used to confined and isolated contexts and preparing for missions in the Moon's lava tubes. Despite significant efforts to understand, human factors in extreme contexts remain understudied and are usually mitigated with meticulous sampling and training processes. In the not too far future, human space exploration will impose new needs were the human factors may not be "factored out" so easily. Crews of six cave divers, or 'aquanautas' will live in a habitat underground that is connected to a natural thermal cave with a diverse tunnel system completely under water, reaching out nearly 10kilometers in length to 90 meters deep. Our current dive equipment is capable of carrying out approximately seven-hour long dive hikes, similar in length to actual space walks performed by astronauts. Our purpose is to research the effects isolation, confinement, darkness and microgravity on humans, and to understand how human factors and the systems we can design can benefit teams in conducting work and/or living in these extreme environments.