

22nd IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND DEVELOPMENT (D3)

Strategies & Architectures as the Framework for Future Building Blocks in Space Exploration and Development (1)

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EXPLORING NEW DEPTHS: UNVEILING PROTEUS™, THE INTERNATIONAL SPACE STATION OF THE OCEAN, AND ITS UNIQUE ASTRONAUT TRAINING CAPABILITIES

Abstract

This presentation will introduce PROTEUS™, the International Space Station of the Ocean, and demonstrate its synergistic services and astronaut training capabilities through innovative methods like the implementation of unmanned underwater vehicles (UUVs), manipulation of buoyancy to emulate full or partial gravity and simulation of the "underview" effect, contrasting with the well-known "overview" effect experienced in space. PROTEUS™ is the world's most advanced, multi-purpose underwater architecture designed to drive innovation in the blue economy, amplify ocean storytelling and enable research to address pressing global issues. Multiple modular, state-of-the-art PROTEUS™ installations will form a worldwide network of connected habitats enabling aquanauts, astronauts, scientists, teachers, and artists to live and work underwater in a way not otherwise possible. PROTEUS™ possesses the potential to serve as a key building block in space exploration and the cultivation of future astronauts. Just as astronauts operate remote vehicles in space, those undergoing training within the PROTEUS™ habitat acquire the proficiency to remotely maneuver UUVs, thereby increasing their interactions with robots and preparing them for the challenges of space exploration. Drawing parallels to NASA's Neutral Buoyancy Laboratory, PROTEUS™ will enable smoother manipulation of masses in the aquatic environment, thereby enhancing training experiences for astronauts preparing for space missions. Furthermore, by providing a platform similar to Aquarius, PROTEUS™ has the potential to simulate NEEMO missions and offer extreme environment isolation training to agency (NASA, CSA) and commercial (Axiom, Orbital Reef) astronauts. While viewing the Earth from Space, many astronauts report a cognitive shift known as the "overview effect." Similarly, astronauts in the PROTEUS™ underwater habitat will experience an opposing, "underview effect." While observing the Earth from the depths of the ocean, astronauts in training will gain a unique perspective on the vast expanse of water that encompasses over 70% of our planet. In essence, PROTEUS™ epitomizes a convergence of cutting-edge technology, scientific innovation and human ingenuity, serving as a beacon for interdisciplinary collaboration and exploration both beneath the ocean's surface and beyond. Through its multifaceted mission to unlock the mysteries of the deep sea while fostering a deeper understanding of space exploration, PROTEUS™ heralds a new era of discovery and possibility, poised to reshape our relationship with the ocean and the cosmos alike.