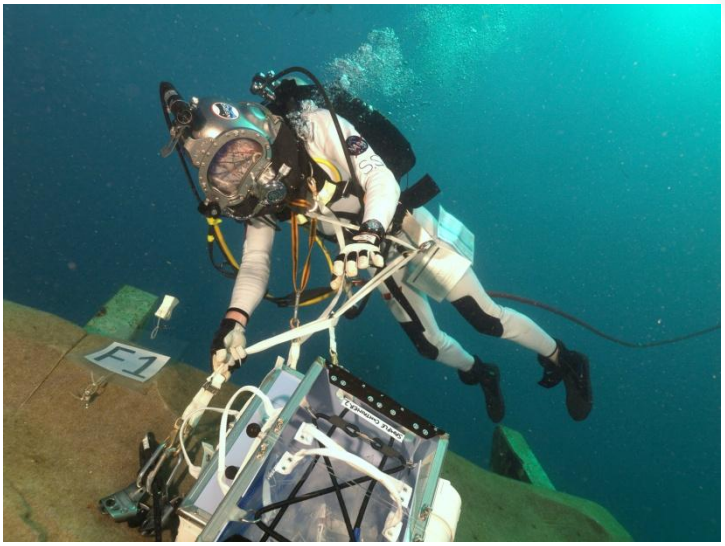
NEEMO 16

Mission Day 2 - Status Report

Aquarius Reef Base, Key Largo, FL

Tuesday, June 12, 2012



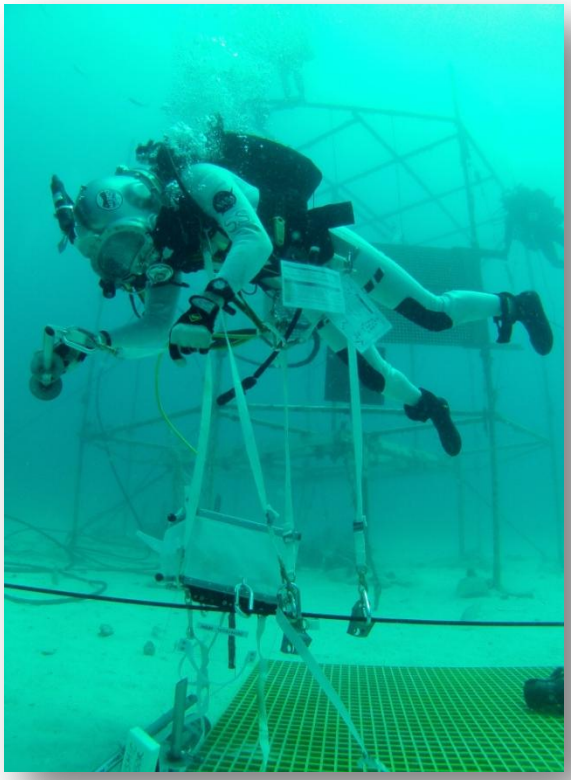
Steve Squyres evaluating sample containers during an EVA.

Becoming Aquanauts

The mission is unfolding smoothly on Mission Day 2, a testimony to the hard work and professionalism of the people involved. Today at 11:05 a.m. EST Dottie Metcalf-Lindenberger, Kimiya Yui, and Tim Peake joined an elite group of people in this world who have spent 24 hours under the sea in "saturation", making them the world's three newest aquanauts. James Talacek, Justin Brown and Steve Squyres, of course, were already veteran aquanauts. Dottie, by virtue of having flown in space and lived under the sea, becomes the newest "aquastronaut"!

Tim Peake and Steve Squyres in the habitat.

Dottie Metcalf-Lindenburger and Kimiya Yui in the habitat.



Aquanaut Steve Squires deploys the geophysical array.

Anchored EVA Techniques

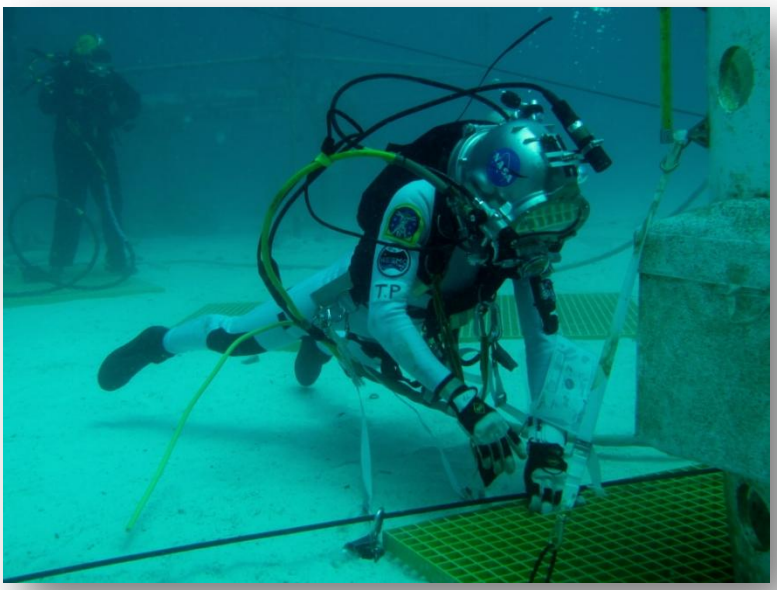
The primary EVA objective is the testing of techniques, operational methods, tools, and communications protocols that are being developed for human exploration of Near Earth Asteroids (NEAs) in a simulated microgravity environment.

NEEMO 16 is a simulation of a human exploration mission to a NEA. The mission began with a robotic precursor mapping expedition of the coral reefs surround the Aquarius underwater habitat. It is being followed by humans piloting Deepworker submersibles while performing detailed observations and sample site selection.

Habitability Study

During NEEMO 16, a Space Human Factors and Habitability (SHFH) team from Johnson Space Center (JSC) funded by the Human Research Program (HRP) is testing out tools and methods they have developed for crewmembers to report near real-time observations about their environment.

NEEMO 16 crewmembers will use iSHORT (Space Habitability Observation Reporting Tool), an iPad application developed by NASA that provides crewmembers the capability to submit media-enhanced reports about factors that affect their performance and comfort during a mission. In addition, the crewmembers will use small head-worn video cameras to give walk-through tours of the habitat and to capture commentary while performing certain scheduled tasks. Researchers will evaluate the reports and videos they receive from crewmembers to determine whether these tools and methods show potential as a means to capture valuable information about habitability and spacecraft utilization during future in-flight operations.



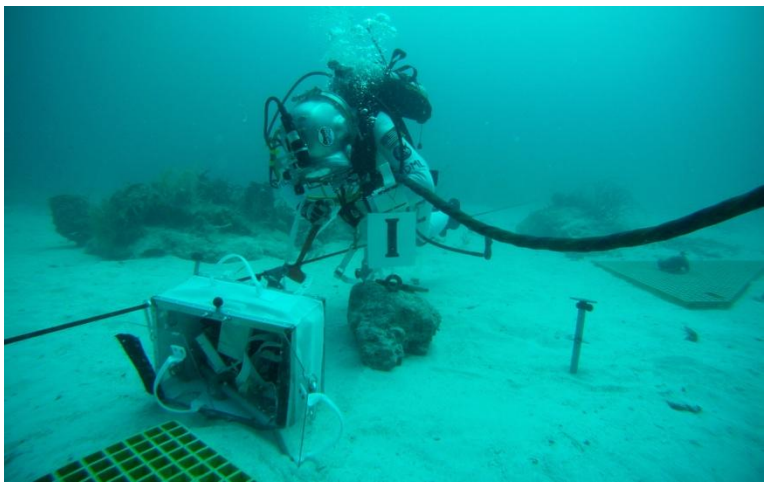
Aquanaut Timothy Peake completes deployment of the orbital replacement unit (ORU).

This is analogous to the “near-field survey” that would be performed at a NEA by astronauts using a space exploration vehicle such as the Multi-Mission Space Exploration Vehicle (MMSEV).

The final phase involves the crew performing exploration tasks on the NEA either by anchoring the MMSEV to the NEA and going out on EVA (i.e. anchored EVA techniques) or by staying attached to the MMSEV via an astronaut positioning system arm that would provide a stable work platform for them (i.e. free-flying techniques). Later in the mission, Deepworker submersibles will interact with the aquanaut crewmembers test the MMSEV free-flying modes. During the first part of the mission, starting today, the crew was evaluating the anchored modes, testing operational methods, tools and protocols for sample collection and instrument deployment tasks. Anchored modes include the use of translation lines, EVA booms, and jet packs for translating and stabilizing to perform those tasks.

A sample of the tools used during the mission.

During today’s EVA, the EVA crew members successfully deployed a geophysical array, a large orbital replacement unit (ORU) instrument, and translation lines; they also tested techniques for collecting loose rock samples, used a hammer to collect a rock chip sample, took a soil sample, and took a core tube sample. These tasks were done with the crew using translations lines on the sea floor to move around and anchor themselves. Such activities simulate deploying and using translation lines on a NEA as a candidate method to assist in exploration. Many of these seemingly simple tasks become rather complex and difficult in zero-gravity and through the mission activities, the team is discovering ways to improve procedures and tools that will make the crew more effective and efficient. For example, during today’s EVAs we learned more about the challenges associated with managing sample bags and the requirements associated with the design of translation lines based on suit maneuverability.



Dottie Metcalf-Lindenburger collects samples while on a translation line.

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