

NEEMO missions on board *Aquarius*

Through NEEMO, NURP has enabled NASA to further develop space flight training procedures; expand crew and mission control communication techniques; and evaluate methods that address the physiological issues and potential medical problems associated with lengthy space missions.

Living in *Aquarius* for up to two weeks, astronauts work alongside experts from NURP's National Undersea Research Center at UNC Wilmington to conduct a variety of training and evaluation missions.

To train for medical emergencies in space, astronauts have practiced telementoring, a method where physicians on Earth guide non-physicians in space to perform the necessary medical procedures. In the training exercise, a surgeon in Canada guided *Aquarius* aquanauts to perform the emergency removal of a gallbladder. All diagnostic and surgical tasks were performed on a pair of highly complex surgical dummies.

Astronauts are able to practice for space walks with US Navy EX-14 hard-hat dive suits, which offer limited mobility and a slightly negative buoyancy. Water drag notwithstanding, walking underwater in these suits provides an experience very similar to walking on the moon. Wearing the suits while constructing structures underwater can serve as an analog for extra-vehicular assembly in space.

Remotely operated vehicles (ROVs) equipped with video cameras and manipulator arms may one day be employed to find locations suitable for human habitation on other planets. During NEEMO missions, astronauts have practiced operating ROVs underwater, which simulates manipulating the flight of ROVs in space.

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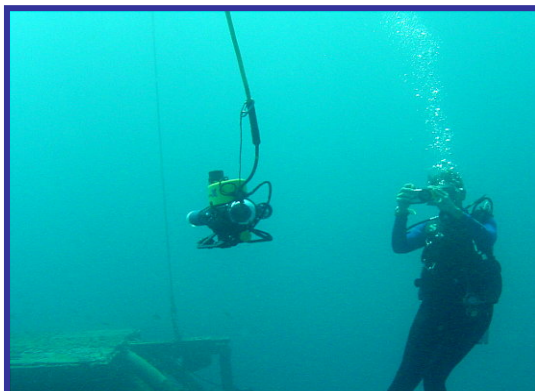
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Astronauts simulating gall bladder removal onboard *Aquarius*.



Testing the ability to manipulate equipment while wearing EX-14 system diving suits.



Maneuvering an ROV tethered from a boat serves as an analog for ROV manipulation in space.



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