

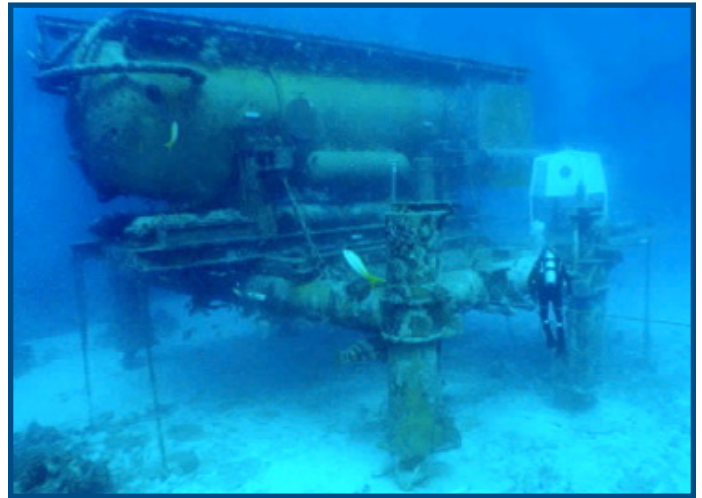
## VIMS professor leads mission to underwater research station

### Celebration of 50 years of human seafloor habitation could mark last use of “America’s Inner Space Station”

(July 11, 2012) Professor Mark Patterson of the Virginia Institute of Marine Science will next week team with National Geographic’s Explorer-in-Residence Dr. Sylvia Earle on what could be the last expedition to NOAA’s *Aquarius* Undersea Laboratory, the world’s only underwater research station.

Their weeklong mission is a celebration of 50 years of human habitation of the ocean floor. Human “aquanauts” have been living on the seafloor for purposes of science, innovation, and exploration since Jacques Cousteau launched the *Conshelf I* project in 1962.

*Aquarius*—aka America’s Inner Space Station—is located 8 miles off Key Largo, Florida, 60 feet below the surface of the Florida Keys National Marine Sanctuary. Since its deployment at the site in 1993, the school-bus-sized lab has supported more than 115 missions, which have generated upwards of 300 peer-reviewed scientific publications and provided knowledge and long-term data to help guide the management and conservation of coral reefs in the U.S. and around the world. The lab is owned by NOAA and operated by the University of North Carolina Wilmington.



*America’s Inner Space Station: The Aquarius Undersea Lab sits in 65-feet of water about 3 miles offshore from the Florida Keys. Photo courtesy of Mark Patterson.*

### Research & Outreach

During the upcoming mission, scheduled for July 15-21, Patterson and Earle will focus their research on the nearby coral reefs. To share the excitement and inspiration of living beneath the sea, the mission will be available worldwide via a Ustream video feed generated by the *Aquarius* Reef Base, the onshore command center for the undersea habitat.

Broadcasts from the mission will also be available to schools, science camps, aquariums, and other educational facilities, including the Science Museum of Virginia in Richmond and teams of “Research Experience for Undergraduate” students at VIMS, the Woods Hole Oceanographic Institution, and Mote Marine Laboratory in Sarasota, Florida.

Patterson and Earle are also scheduled for underwater interviews with reporters from ABC’s *Nightline* and NPR’s *Science Friday*. *One World One Ocean*, a project of IMAX pioneer MacGillivray Freeman Films, will host social-media outreach during the mission.

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A special feed video on Thursday, July 12th will allow previous *Aquarius* aquanauts attending the 12th International Coral Reef Symposium in Cairns, Australia, to share their *Aquarius* research highlights with the public and the current *Aquarius* team. NOAA Chief Jane Lubchenco primed the pump for Thursday's live feed during her keynote address to the ICRS attendees, calling ocean acidification the "osteoporosis of the sea" and noting that it has emerged as one of the biggest threats to coral-reef ecosystems and the people that depend on them for food and jobs.



*Drs. Sylvia Earle and Mark Patterson topside during preparation for their Aquarius mission.*

Patterson, head of the Autonomous Systems Laboratory at VIMS, has a long history of living and working underwater. He introduced the use of computer technology to NOAA's Hydrolab—the predecessor of *Aquarius*—in 1984, and has participated in 7 previous *Aquarius* missions. With support from the National Science Foundation and NOAA, he continues to develop and deploy advanced instrumentation and robotic submarines to study how corals cope with environmental stress from global warming and ocean acidification.

Earle—an internationally renowned oceanographer and Time magazine's inaugural "Hero for the Planet" in 1998—is a pioneer in the use of advanced technology for human exploration of the seas. She has led more than 60 expeditions worldwide involving more than 7,000 hours underwater in connection with her research—including the first visit by a team of women to an undersea habitat during the Tektite mission of 1970.

### **The Last Mission?**

The continued operation of *Aquarius* is under serious question due to an Obama Administration plan to eliminate the \$4 million National Undersea Research Program (NURP) under which the lab and several other undersea research programs operate. In April, a U.S. Senate spending panel threw further doubt on the future of *Aquarius* when it proposed to fold NURP into NOAA's Office of Ocean Exploration and Research. The fate of *Aquarius* within these budget-cutting and reorganization proposals remains unclear.

Saul Rosser, Operations Director of the *Aquarius* Reef Base, says "There's been some budgetary questions within Congress related to *Aquarius*, which definitely has us concerned. This mission is an opportunity to engage people with the habitat and understand the benefits it brings."

Otto Rutten, Associate Director of the *Aquarius* Reef Base, says "If the *Aquarius* program is ever shut down, what's going to be lost is a national asset, losing the world's only underwater laboratory. Fifty plus years of a legacy, and it's not easy to restart that if it were ever lost."

Patterson says the habitat's value lies in its facilitation of underwater research. "*Aquarius* has allowed me to do experiments that can't be done in the lab," he says, "and makes underwater research much easier than when diving from the surface." By living in *Aquarius*, the scientists' body tissues "saturate" with nitrogen gas, allowing them to spend much longer on each SCUBA dive than a surface-based diver.

Thomas Potts, *Aquarius* Reef Base director, says "The real benefit of *Aquarius*—science wise—is that you get about a 9-fold increase in productivity. You can spend 9 hours per day diving, at about 65 feet, where you'd be lucky to spend an hour a day diving from the surface. It gives you the opportunity to live on the bottom and actually concentrate on your research."

“Being able to study the animals and plants in their home using an underwater habitat gives me the gift of time,” adds Earle. “Time to see what these magnificent life forms are actually doing on the reef, time to notice the small and seemingly insignificant that later turn out to be a sea secret. Every time I live underwater I come back with new insights and a hundred new questions.”

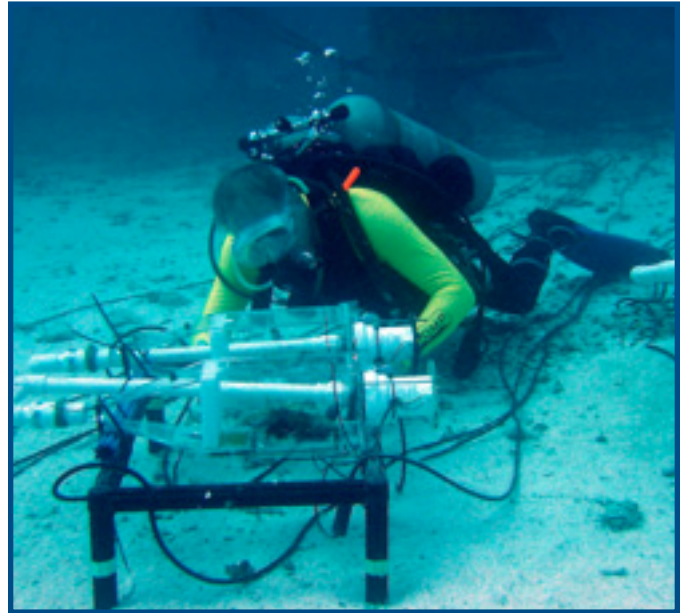
Joining Patterson and Earle on the expedition is DJ Roller, a fellow aquanaut, underwater explorer, and award-winning filmmaker who uses his custom-designed 3-D underwater digital camera system to capture images in resolutions high enough for 5-story-tall IMAX screens. Roller and his production team will capture an entirely new view of science and living underwater.

Roller says, “Living underwater and exploring the ocean as an aquanaut is a life-changing experience that has given me a whole new perspective. The 3-D camera system creates a window into another world and has scientific merit as the determination of scale and distance isn’t possible from 2D cameras.”

During the upcoming mission, the aquanauts will illustrate the advantages of living and working on the seafloor by experiments on different corals and algae that cannot be conducted diving from a boat, or from a shore-based lab.

“We’ll use sophisticated instruments to measure the health of coral colonies on the nearby reef,” says Patterson. “I’ll be conducting measurements on coral and sponge respiration and photosynthesis using a PAM fluorometer and a micro-electrode system. Our results will help predict how corals will cope, or not, as the oceans change.”

Rounding out the *Aquarius* dive team is M. Dale Stokes—an internationally known marine scientist from Scripps Institution of Oceanography and a veteran of 4 previous saturation science missions at *Aquarius*. Stokes is an expert in underwater instrumentation, coral reef biology, and the physical and chemical oceanography of reefs. He will be collaborating with Patterson on planned experiments on corals and sponges.



*VIMS professor Mark Patterson monitors oxygen probes during a previous Aquarius mission.*