



Aquarius 2001: Exploring Inner Space

Steven L. Miller, PhD. Director of National Undersea Research Center

It isn't often that you can say you were the first at something, or that you are unique. However, the Aquarius program carries both these banners. Aquarius is an underwater laboratory funded by NOAA's National Undersea Research Program (NURC) and operated by the University of North Carolina at Wilmington. The underwater lab is located at Conch Reef in the Florida Keys National Marine Sanctuary.

What is an underwater laboratory? First, it's important to emphasize that Aquarius represents the only program of its kind on our planet – that's the unique part. Aquarius represents the culmination of over 35 years of experiments and developments in the field of underwater laboratories, including major projects conducted by the U.S. Navy, and several efforts in foreign countries. Aquarius is much like any university laboratory, except that it happens to be located at a depth of over 60 feet, 4 miles offshore, and 9 miles away from its mission control facility in Key Largo.

Aquarius gives scientists nearly unlimited time to work underwater to conduct their studies, along with sophisticated computer and electronic capabilities. You've probably heard of "the bends," a sickness that scuba divers get if they go too deep or stay underwater too long. There's a joke among divers that if you want to avoid getting the bends you either don't go down, or don't come up. The *don't come up* part is where Aquarius comes in. Aquanauts live and work from Aquarius for missions that last 10 days. At the end of the mission they undergo "decompression" inside Aquarius, where the scientists are slowly brought back up to surface pressure. Thus, avoiding the bends.

The value of the program is partly measured by the results of what scientists do with their time in Aquarius, and we have a world class science program.



The Aquarius on shore before being placed in the "Conch Reef Research-only Area" off Key Largo.

But Aquarius is much more than a science program. We have linked to classrooms, aquariums, and museums across the country – reaching hundreds of thousands of students using newly installed video conferencing equipment. You might be thinking, "How do you get connected to the Internet when you're out on a reef, underwater, inside a laboratory?" Good question! We have a wireless network between Aquarius computers and our shore-based mission control computers. The bandwidth is impressive, nearly 5 Mbs in each direction, which allows decent video, voice, and nearly unlimited data transmission.

On shore, our computers are linked to the internet using a local internet service provider or ISDN lines for video conferencing. This gives students from anywhere in the world unique access to our oceans. In fact, in 1996 we hosted the world's first underwater web site as part of a Jason Foundation Expedition, with the web server deployed inside Aquarius.

Finally, we are not satisfied with being the first underwater web site, or the only underwater laboratory. Our vision is to build a program that uses our capabilities and technology to build student and educator skills and knowledge in multiple areas, and to make learning a truly exciting activity. We have the technology to share our discoveries with students from anywhere in the world – to show them the wonder of the oceans and the value of science (visit our website at: www.uncwil.edu/nurc/aquarius). The next generation of researchers and explorers, in space and in our oceans, will point, we hope, to programs like ours when they talk about what first got them interested in science. And today's teachers, we hope, will capture the excitement of exploration and discovery using materials provided by our program. We are excited about the future, our plans are ambitious - see you underwater!

Dr. Steven Miller--Biography

Dr. Steven Miller is Director of NOAA's National Undersea Research Center at University of North Carolina at Wilmington. He is currently involved in coral reef monitoring and assessment in the FKNMS to understand how coral reef communities are structured across multiple spatial scales, over time, and within marine protected areas.

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