



Aquarius Reef Base

Fact Sheet: 2015

Deployment on Conch Reef, Florida Keys: 1993 (baseplate deployed 1992)

Distance From Islamorada shore base: 15.4 km (8.5 nm)

Distance offshore: 9 km (5.4 nm)

Hatch depth/ storage depth: 14 m (46 fsw) 35 psi

Depth of bottom directly below Aquarius: 18 m (60 fsw)

Habitat Specs:

Aquarius weight: 82-ton double-lock pressure vessel

Baseplate weight: 120 tons

Dimensions: 14-meters long by 3-meters in diameter (46 ft x 10 ft)

Crew: 4 scientists and 2 technicians

Amenities: kitchen facilities that include a microwave, instant hot water dispenser, refrigerator, sink, dining and work areas; computer work stations and Internet access.

Telecommunications:

- 1 GB Ethernet from Aquarius to the LSB via umbilical.
- From LSB to Shore - Motorola PTP 600 series wireless bridge (maximum: 180 Mbps; minimum 75 Mbps).
- A DS3 (50Mbps) connection to the world from base
- Multiple video feeds via web cams in and outside Aquarius
 - Internal video feeds (3): Wet porch, entry lock and main lock
 - External video feeds (4): Gazebo, starboard aft, (2) repositionable
- Polycom and Vbrick video conferencing capabilities
- Diver underwater communications
 - Diver-to-diver
 - Diver-to-Aquarius
 - Diver-to-Shore

Independent life support: 72-hours minimum power, high-pressure air, oxygen, and carbon dioxide removal.

Productivity:

Total number of Aquarius projects conducted in Key Largo (1993-2014): 124

Project by mission category:

- Peer reviewed marine ecosystem science and long-term monitoring: 63
- Education and outreach: 7
- Undersea equipment testing and technology development: 25
- Training and advancement of operational capabilities: 29

Note: Most projects include components of all four project categories listed above.

Peer reviewed publications resulting from Aquarius Reef Base support: 600+

Aquanaut Statistics:

Total number of people that have saturated in Aquarius since deployment in the Florida Keys:
374

- Staff: 40
- Scientists: 334
- Male: 277 (77%)
- Female: 82 (23%) – including an all-female science crew in 1994.

Programmatic:

Mission manning levels: Average 10 staff members (permanent, temporary and volunteer)

Annual operating costs: ~\$1.1M (does not include mission support costs)

Optimal operations year: 80 days while in saturation

Average mission length: 7-10 days

Longest mission conducted onboard Aquarius: 31 days (2014: Mission 31)

Longest continuous saturation mission conducted onboard Aquarius: 18 days (2006: NEEMO-9)

Life expectancy for Aquarius: System is certified annually by ABS and is structurally sound to remain on the bottom for the foreseeable future.

Value of Aquarius

- Sited in the Florida Keys Marine Sanctuary off Key Largo for 21 years, Aquarius has proven to be instrumental in the advancement of oceanic research - especially in assessing long-term ecological changes, engaging America's future leaders through ocean-inspired learning, and serving as a catalyst for development of the next generation of marine and extraplanetary explorers and exploration technologies.
- Research at Aquarius has helped guide the stewardship of not just the Florida Keys National Marine Sanctuary, but also other coral reef ecosystems both in the US and worldwide.
- Aquarius provides an ideal platform for long-term monitoring of coastal oceans and coral reefs. The laboratory provides stable power, has a scalable IT infrastructure that facilitates innovative sensor deployment, utilizes the latest industry communication technology that offers a reliable means to transmit data and video, and is the only manned ocean observing platform that allows for data groundtruthing and sensor design and testing.
- As a saturation diving laboratory, scientists working from Aquarius can dive for up to nine hours a day at depths down to 95 feet. This represents a nine-fold productivity increase in the amount of bottom time as compared to divers working from the surface. This facilitates intensive, manipulative studies that require extensive time underwater. Scientists conduct as much research in one, 10-day saturation mission as they could in 3-6 months diving from the surface.
- Because of its ability to capture the imagination of an entire country and world through the eyes of people living under the sea, Aquarius can play an important role in ensuring American competitiveness for generations to come.

- The Aquarius Reef Base staff has extensive experience working with marine scientists engaged in scientific diving operations - including project management, logistical and technological expertise, dedicated safety oversight and training and an intimate knowledge of the local environment.

Media

- Catlin Seaview Survey Google Street View of Aquarius and the immediate Conch Reef area: <https://www.google.com/maps/views/u/0/view/streetview/oceans/aquarius-reef-base-florida-keys-united-states-of-america/MsYwoi2mM9QAAQYn9GI5w?gl=us&heading=114&pitch=100&fovy=90>.
- 360 Aquarius: <https://eyes.kolor.com/video/2c0b82e95143f5e2a4c14e8d1bfefec5>.
- Jonathan Bird fulldome documentary 'Space School': <http://www.fddb.org/fulldome-shows/space-school/>
- IMAX film, 'Journey to Space': <http://www.space.com/28003-journey-to-space-documentary-to-hit-imax-screens-trailer.html#oid=80dDg5cjp600915WDTAp1rzYFWGL2I3>