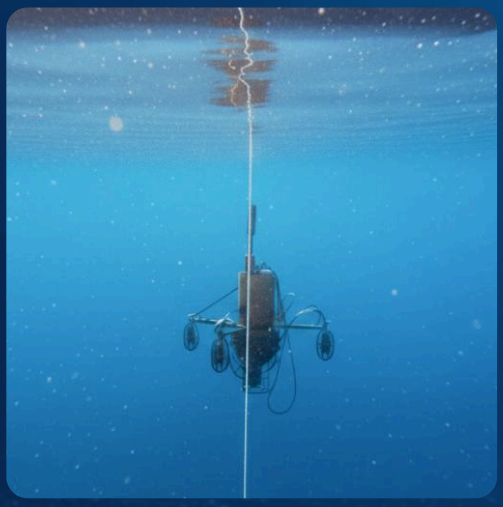
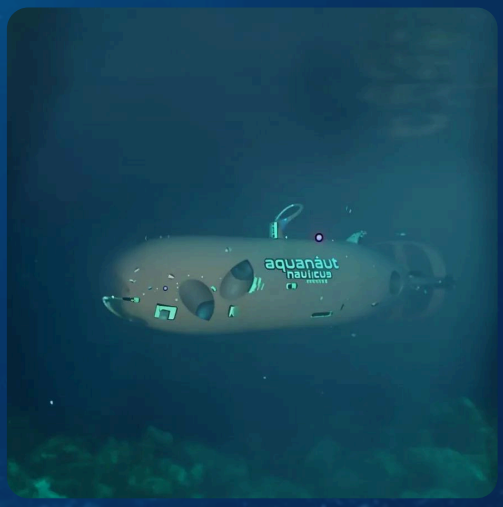
Deployment Spotlight

Deep-Water Testing of Subnero Modems in the Gulf of Mexico





SUBNERO

Overview

Subnero modems are designed to excel in the challenging conditions of tropical shallow waters, where dynamic environments and high noise levels often limit performance. However, thanks to their adaptable architecture and advanced algorithms, Subnero modems deliver equally strong results across diverse environments worldwide.

This article highlights deep-water tests in the Gulf of Mexico conducted by Nauticus Robotics, a close collaborator and customer of Subnero, to evaluate modem performance during missions at depths of more than 2000 meters in vertical channels.

About Nauticus Robotics

Nauticus Robotics, Inc. is a Houston-based developer of autonomous ocean robots powered by AI, designed to support sustainable subsea operations. Their flagship robot, the Aquanaut, is a next-generation untethered autonomous subsea vehicle built for inspection, survey, and leak detection. Nauticus combines advanced robotics with intelligent software to deliver safe, efficient, and environmentally responsible subsea services.

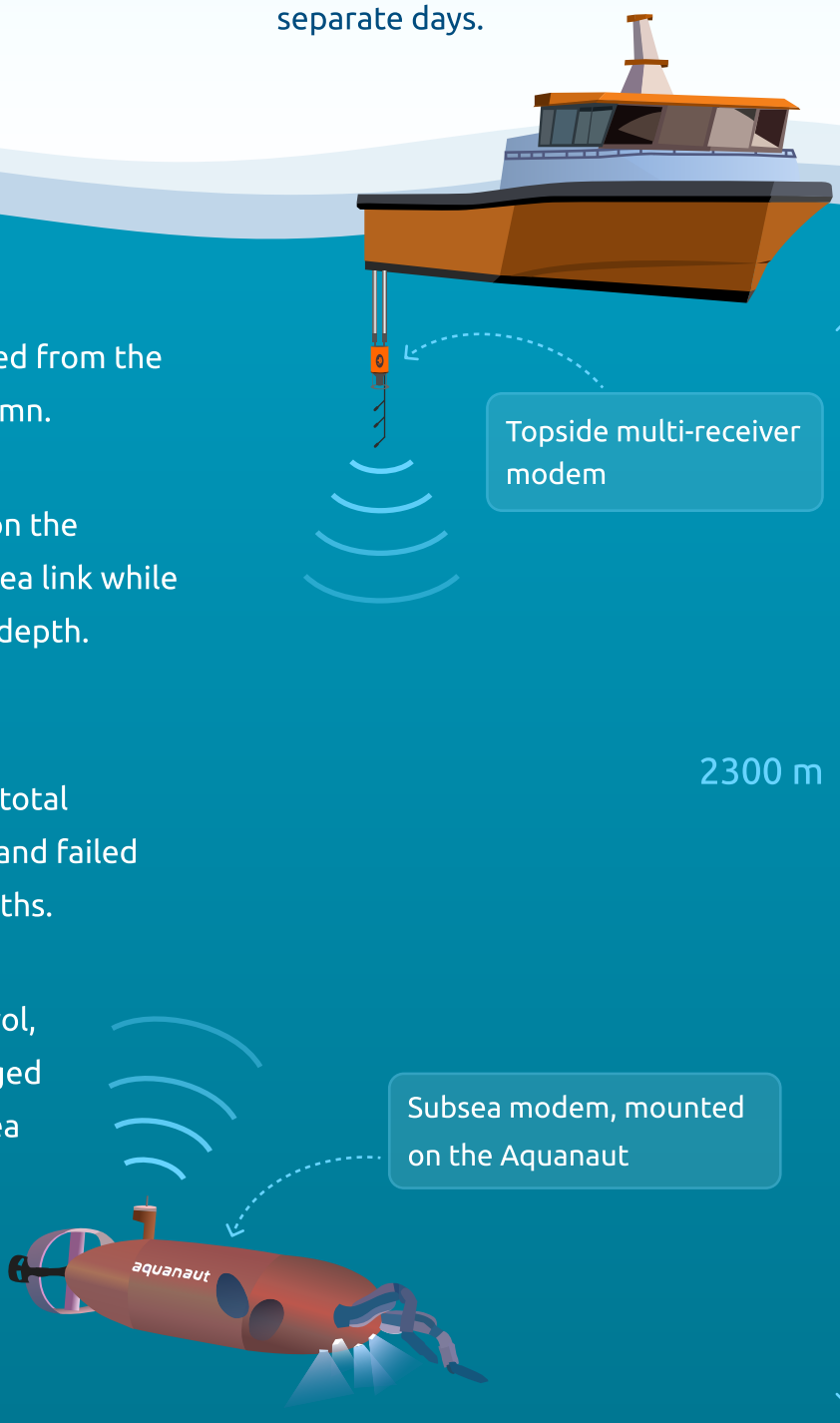
Objectives

The primary goal was to validate reliable communications between a mothership-deployed topside modem and a subsea modem mounted on the Aquanaut robot during deep-water operations.

- The test measured communication performance at ranges of more than 2000 m in a vertical channel.
- Subnero's deep-rated acoustic modems were selected for their robust design and advanced software capabilities.
- To establish consistency, tests were performed first with an ROV (where both nodes were accessible) and then replicated with the Aquanaut over two separate days.

Test Procedure

1. The topside modem was lowered from the mothership into the water column.
2. The subsea modem, mounted on the Aquanaut, maintained the subsea link while descending more than 2300 m depth.
3. Communication statistics were continuously logged, including total packets transmitted, received, and failed at each of the prespecified depths.
4. Telemetry, command and control, and payload data were exchanged between the topside and subsea modems at regular intervals.



Results

Reliable performance across all depths

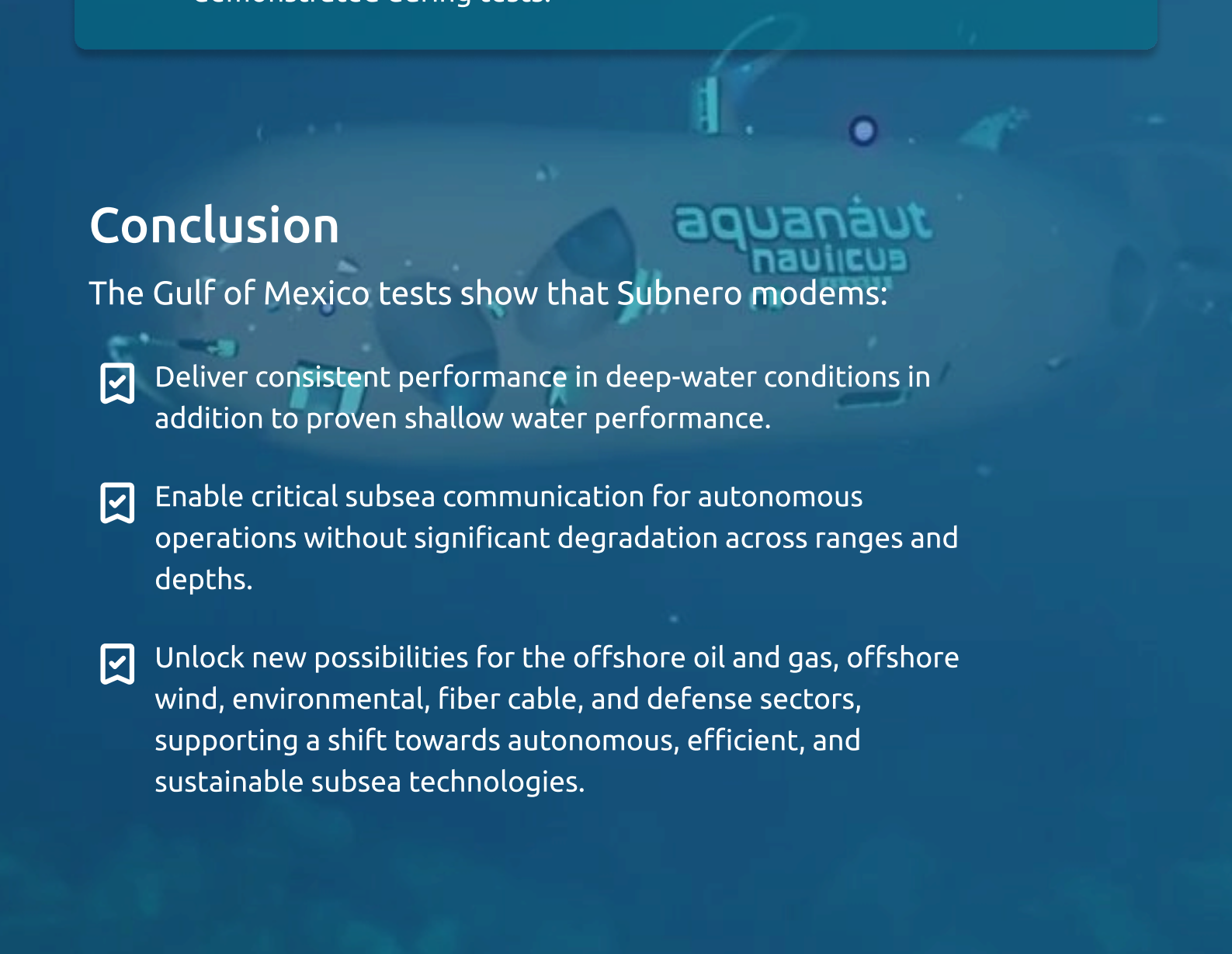
Subnero modems maintained communication links from the surface down to 2,300 m.

>70% packet success rates

Achieved consistently, with no major performance drop-off at depth or distance.

Enhanced throughput with software features

Smart file transfer, priority handling, mailbox, etc. were tested and demonstrated during tests.



Conclusion

The Gulf of Mexico tests show that Subnero modems:

- Deliver consistent performance in deep-water conditions in addition to proven shallow water performance.
- Enable critical subsea communication for autonomous operations without significant degradation across ranges and depths.
- Unlock new possibilities for the offshore oil and gas, offshore wind, environmental, fiber cable, and defense sectors, supporting a shift towards autonomous, efficient, and sustainable subsea technologies.

Perspectives

> The Aquanaut represents the future of subsea robotics, and Subnero's modems are a critical enabler of our vision. These tests proved that reliable underwater communication can be achieved at ultra deep-water operational depths, giving us the confidence to expand autonomous operations globally.

John Gibson

Nauticus Robotics President and CEO

> We are proud to see Subnero modems perform beyond expectations in deep-water Gulf of Mexico tests. This demonstrates our mission to provide underwater communication solutions that work everywhere — from shallow tropical waters to deep offshore fields.

Manu Ignatius

Subnero CEO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