

Sea Water Antenna System

A device that uses a stream of seawater to transmit and receive communication signals

The U.S. Navy seeks to commercialize U.S. Patent 7,898,484 (Electrolytic fluid antenna) and U.S. Patent Application 12/539,834 (Improved electrolytic fluid antenna) through licensing agreements and collaborative partnerships.

Background

Increased use of wireless communications requires additional antennas to support data transmission. In many situations there is limited space for antenna placement. For example, Navy ships normally use metallic antenna elements. These protruding structures can number up to 80 antennas per ship, taking up valuable topside real estate and easily interfering with one another if not strategically placed. With increasing antenna demand, smaller antennas are becoming more valuable to save precious surface real estate.

The Technology

SSC Pacific has developed a technology that uses the magnetic induction properties of sodium chloride (salt) in seawater to transmit and receive communication signals. The device works by pumping a stream of seawater through a current probe. The height of the seawater stream determines the antenna's frequency. For example, UHF frequencies require a 2-foot high stream of water, while VHF and HF frequencies require 6-foot and 80-foot high streams (respectively). The width of the stream determines the antenna's bandwidth. The antenna requires a relatively small footprint and can be modified to accommodate multiple frequencies and bandwidths by stacking current probes and adding additional spray nozzles. The technology could be used on land with salt-supplemented water, replacing large unsightly antenna towers with fountains. The device could also be used on land or sea as a solar- or battery-powered emergency antenna system.

Key Benefits

- Decreases antenna footprint in situations where real estate is scarce
- Eliminates the need for unsightly metallic antenna structures
- Transmits and receives communication signals at different frequencies and bandwidths depending on the height and width of the seawater stream
- Can be modified to accommodate multiple frequencies/bandwidths at once
- Can be turned off when not in use, allowing antennas to "disappear" from the landscape
- For use as a small portable emergency antenna, powered by battery, solar panel or foot pump and consisting of a quarter-sized current probe

Development Status

- U.S. Patent issued: 7,898,484; U.S. Patent Application pending: 12/539,834
- DoD 5000 Series Technical Readiness Level 3: Analytical and experimental critical function and/or characteristic proof of concept (Prototype exists)

For more information on technology transfer, please contact us at (619) 553-5118 or email ssc_pac_t2@navy.mil

SD 859 Rev. 1, April 2011. SSC Pacific, San Diego, CA 92152-5001
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Navy vessels house up to 80 or more antenna structures to support wireless communications.



A stream of salt water can be used to transmit and receive signals over various frequencies and bandwidths.



The patented antenna has been tested at a distance of over 30 miles at frequencies ranging 2 to 400 MHz.

Space and Naval Warfare Systems Center Pacific (SSC Pacific) is one of the U.S. Navy's premier research, development, test, and evaluation (RDT&E) laboratory and fleet support centers for command, control, communication, computers, intelligence, surveillance, and reconnaissance (C4ISR).

<http://enterprise.spawar.navy.mil/techtransfer>