



Breakthrough Technology For

UUV Imaging and Communications



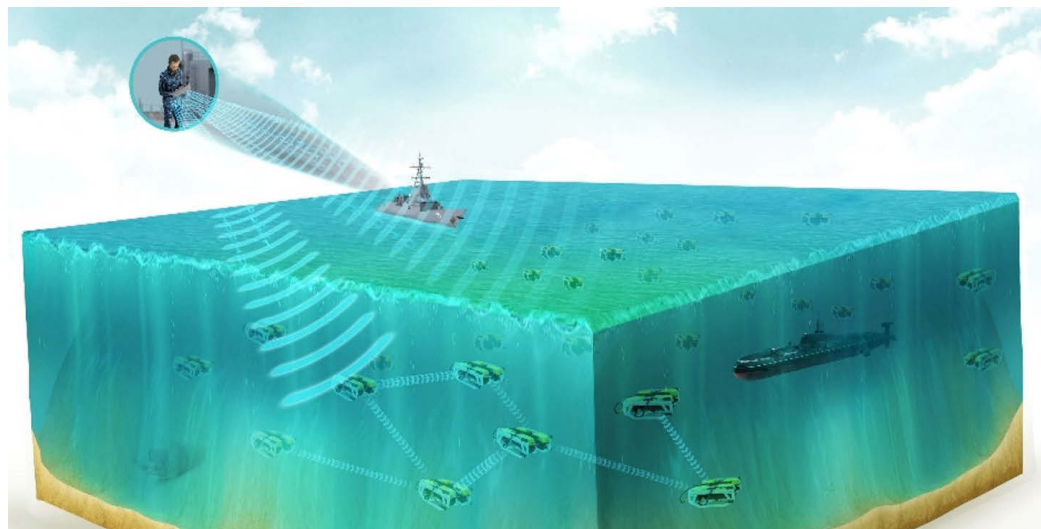
High bandwidth communication remains the limiting bottleneck for command and control of undersea Naval assets, for example, UUVs, surface assets such as USVs, and airborne vehicles such as drones. The future lies in mesh-networked, AI-controlled devices swarming above and below the surface. Saltenna LLC has developed several innovative, patented antenna systems which significantly increase capacity for high-frequency RF signal transmissions in undersea and through-the-surface environments, while providing a considerable performance advantage over other currently used undersea communication techniques.

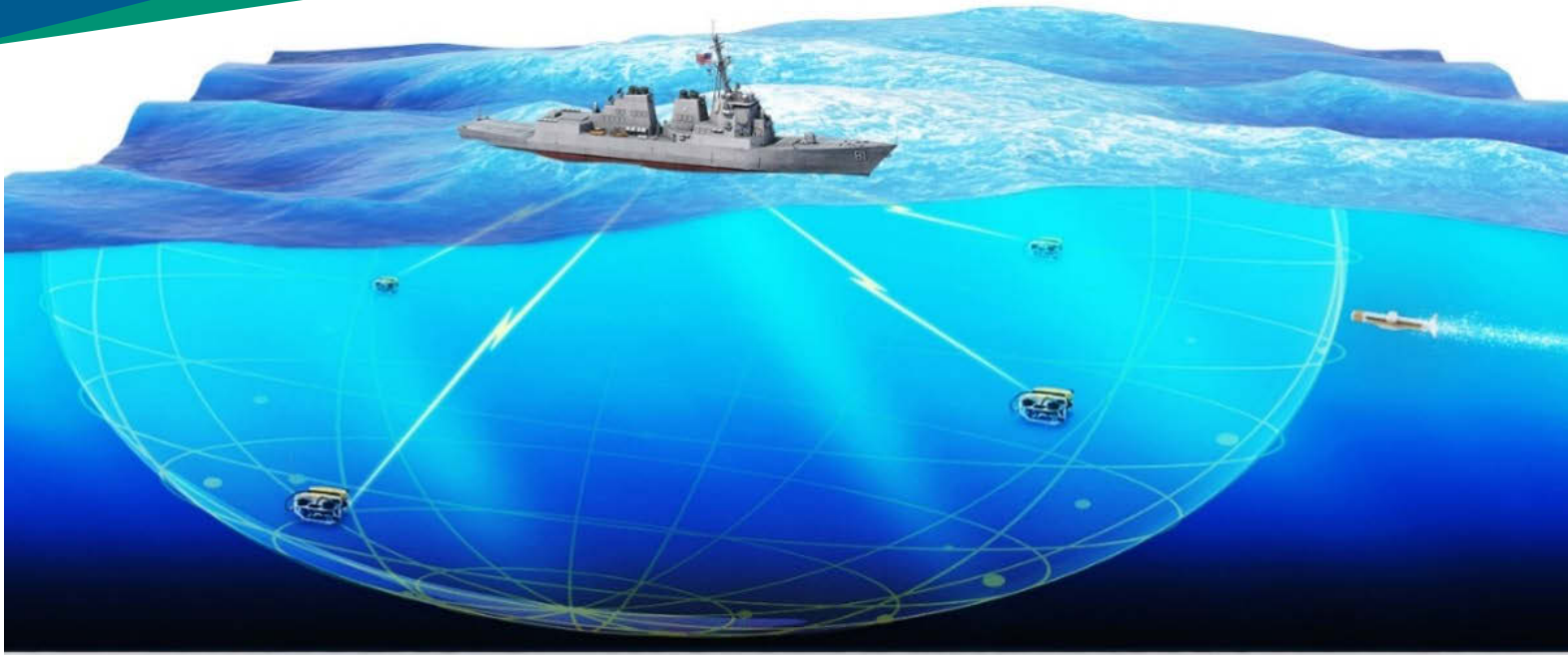
The Saltenna advantage increases with water salinity, enabling significant improvement in underwater communication distance and received power. Significant gains in underwater signal transmission results from improved coupling to surface waves, impedance matching via novel antenna enclosures, and two-dimensional beam forming.

Extended underwater signal propagation will support practical, new capacities of our innovative software defined radio (SDR)-controlled wireless communication scheme and lead to numerous applications for UUVs, UUV to UUV, and UUV to UAV communications, frogman conversations, submerged marine buoy communications, imaging, and force protection.

Saltenna LLC technology is based on surface electromagnetic waves which propagate along surfaces. Since the RF field of the surface electromagnetic waves is present both above and below the seawater surface, Saltenna technology permits RF communications through the seawater barrier, thus enabling, for example, UAV-to-UUV communication. Additionally, these waves are marine-life safe, unlike traditional acoustics.

These systems, which are ready for operational demonstrations, permit communications and imaging through conductive media, including metal and seawater for a broad range of signal types. Based on initial testing, Saltenna technologies, for underwater communications, provide at least a **10- 100 times power improvement** compared to conventional antenna configurations.





The Saltenna antenna designs all reflect a breakthrough in power consumption and size. There are many variables associated with undersea communications including distance, depth, salinity, portability, and available power. The signal is secure with a range of 10 km, a depth of 120 m, 10 kW power, and 100kHz bandwidth.

Saltenna LLC was formed in 2017 to develop novel applications of plasmonics and metamaterials. Saltenna has been engaged in several DARPA-sponsored advanced research and development projects to advance novel techniques for underwater radio. Saltenna has 12 peer-reviewed publications and multiple patents.

These all need to be optimized for a particular mission and need to be able to adapt to changing conditions. Some examples:

- A man-portable antenna for use by frogmen might use only 5W of power and facilitate high-quality voice communications over 100m at three-meter depth without any acoustic signature or interference.
- An antenna that fits inside a torpedo-shaped device, UUV to UUV communications at 10W power consumption might successfully enable useful data streams over many kilometers or further.

The digital basis for our communications enables the use of state-of-the-art PKI-encryption and compression techniques for data transmission.

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