

SOLUTION BRIEF

Magnetic Communications Overview

Traditional wireless communications—such as radio frequency (RF), optical, and acoustic—provide significant benefits. However, they have limitations in environments where signals cannot penetrate materials like water, soil, concrete, and metal or where detection can jeopardize the mission.

EWA-GSI's Very Low Frequency (VLF) magnetic communications solution provides a short-range, low-probability of detection (LPD) signal that penetrates materials where traditional signals are not viable. Additionally, these signals can be detected by vector receivers to provide direction of arrival to support navigation and tracking.

Potential applications include:



Maritime Operations — Enables submarines or divers to exchange information and location without surfacing or using RF and acoustic signals that are easily detected. Allows Uncrewed Underwater Vehicles (UUVs) and Uncrewed Surface Vehicles/Vessels (USVs) to communicate and navigate among sea-bed sensors or other systems.



Covert Ground Operations — Allows operations inside buildings, underground bunkers, and cave/tunnel warfare to communicate with teams outside with short-range data links between units while tracking location.



Secure Comms — Enables secure local communications between devices, sensors, weapons systems, or drones without broadcasting signals, creating a Low Probability of Intercept (LPI).

Solution

EWA-GSI, a division of Sigma Defense, has developed a VLF Magnetic Communication link that uses a magnetic field to communicate data signal direction through complex media and the boundaries between air, water, earth and shielding, operating in the 3 KHz to 300 KHz spectrum. Magnetic field sensors require volume sensing as opposed to area sensing required for electrical fields. The solution is limited to short range, low-data-rate communications, but is ideally suited for applications in missions demanding LPI/LPD communications.