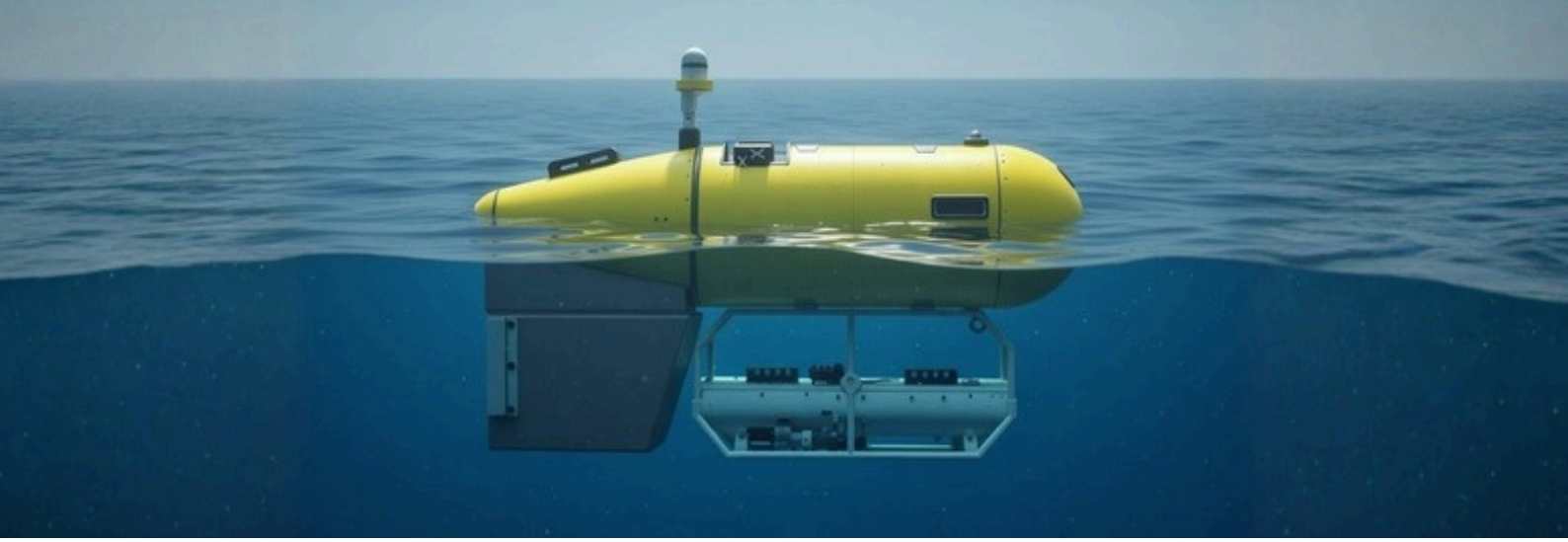


KappaSpark

The Ghost-Free Sparker Sytem.

KappaSpark is an innovative platform developed by Kappa Offshore Solutions, specifically engineered for seismic sparker sources operating in demanding marine environments. By integrating robust hydrodynamic stability with advanced equipment design and precise offshore engineering, KappaSpark delivers significantly **cleaner broadband seismic data and exceptional georeferencing** capabilities, making it an ideal solution for both UHR2D and UHR3D acquisition programs

The platform features a stable, torpedo-like **navigation float** paired with a rugged, adjustable electrode frame capable of supporting multi-tip sparker configurations. The float ensures **consistent performance in varying sea states** and incorporates a mast for any high-precision GNSS antenna, powered by a built-in underwater generator and waterproof 12V battery controller. This enables fully integrated **centimetric positioning for accurate UHR2D and UHR3D data acquisition.**

The system's key strength is its **zero-ghost source signature**. With adjustable electrode depth, it produces an **ultra-short acoustic pulse** (~2–3 ms) and greatly reduced bubble oscillation lag, shifting the first bubble-related spectral notch well above the usable frequency band. In source-over-streamer configurations — where the sparker is towed directly above a deeper streamer — the scattering effect from the navigation float further attenuates residual ghost contributions. This results in a **near-omnidirectional, short-duration Ricker-like wavelet** with minimal directional variation, even at angles up to ~25° from vertical.

This clean signature simplifies processing significantly. A **single deconvolutional filter** achieves source de-signature, residual de-ghosting, and shaping to a desired spiky, zero-phase wavelet while preserving **excellent signal-to-noise ratio.** The outcome is superior broadband imaging with fewer artifacts and **better interpretability**, even in moderate to challenging sea conditions, thanks to the platform's exceptional stability and depth control.

KappaSpark's compact design and modest power needs make it **easy to mobilize and deploy.** The system is compatible with most commercial sparker sources, supports straightforward rigging, and enables **rapid integration** on vessels of opportunity — minimizing downtime, mobilization costs, and operational risks while maximizing survey productivity and data quality.

The field test results presented were achieved with a SIG PULSE sparker source installed on the KappaSpark platform. Detailed technical specifications are provided on the following page.

ENGINEERED BY KAPPA OFFSHORE SOLUTIONS

HIGH-PRECISION POSITIONING

ZERO-GHOST SOURCE SIGNATURE

SIMPLIFIED PROCESSING WORKFLOW

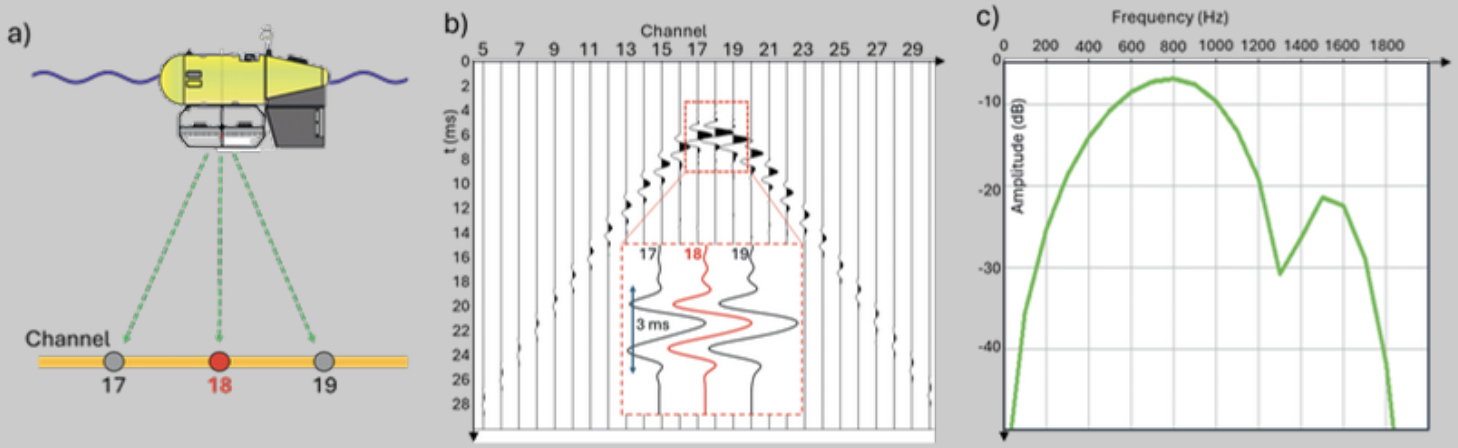
STREAMLINED OPERATIONS

KEY FEATURES

- **Zero-ghost source signature.**
- **Consistent stability at sea.**
- **Centimetric accuracy.**
- Adjustable electrode depth.
- Antenna mast for high precision GNSS positioning.

TARGET APPLICATIONS

- 2DUHR & 3DUHR.
- Oceanographic research.
- Marine construction projects.
- Carbon & capture storage site characterization.
- High-precision offshore engineering studies.



The direct seismic pulse from the sparker source (a) is recorded in the deep UHR streamer. The split-spread direct-wave recording is presented in (b) with a zoom of the central three pulses. In (c) the spectrum of the central pulse is displayed.

For more detailed results, check First Break | Volume 43 | August 2025: Ultra high-resolution shallow marine imaging with a sparker over a deep streamer https://www.viridiengroup.com/sites/default/files/2025-08/fb25-ultra-high-resolution-shallow-marine-imaging-august-2025.pdf

PLATFORM SPECIFICATIONS

(KAPPASpark only)

- Dimensions: 2 m x 0.6m x 2 m approx. (L x l x H).
- Float Volume: 260 liters.
- Total weight: 130 kg approx.
- Electrode depth: 0.6 to 5 meters (adjustable).
- Power source: underwater generator and 12-volt battery.
- Power output: 12 volts with AGM 1104 connector.

SIG PULSE SPARKER SPECIFICATIONS

(used for all field tests)

- Operating energy level: 700-2000 joules.
- Frequency spectrum: 600-1000 Hz.
- Acoustic power level: 218 dB re 1µPa @1 m at 1800 J.
- Total pulse duration: 2 ms @1400 J (immersion 60 cm).
- Dimensions : 1 m x 0.50 m x 0.50 m.

Kappa Offshore Solutions is a marine engineering company, specialized in offshore seismic data acquisition. Since its inception in 2012, Kappa Offshore Solutions delivered more than 200 projects in more than 30 countries, providing technical assistance services and seismic equipment for major clients in the Oil & Gas, Defense, Maritime and Oceanographic Research industries.

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