



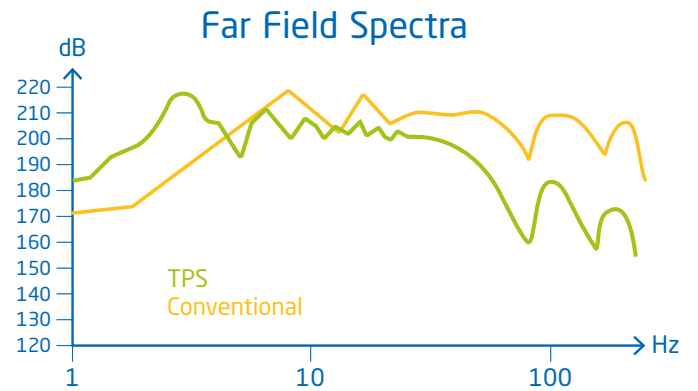
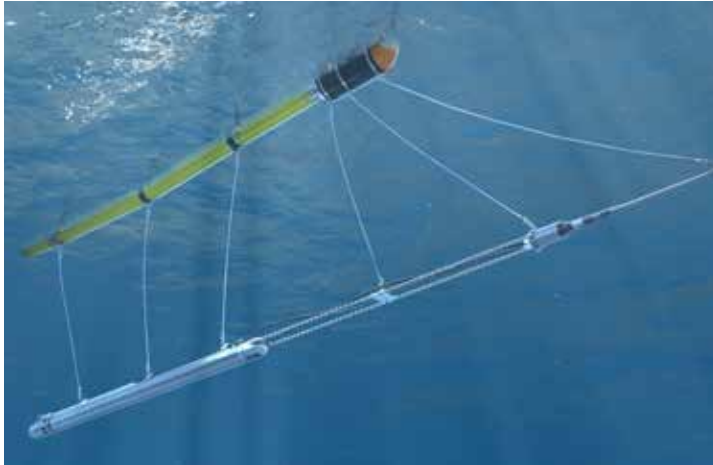
TPS™

BROADBAND MARINE SOURCE



Broadband marine source

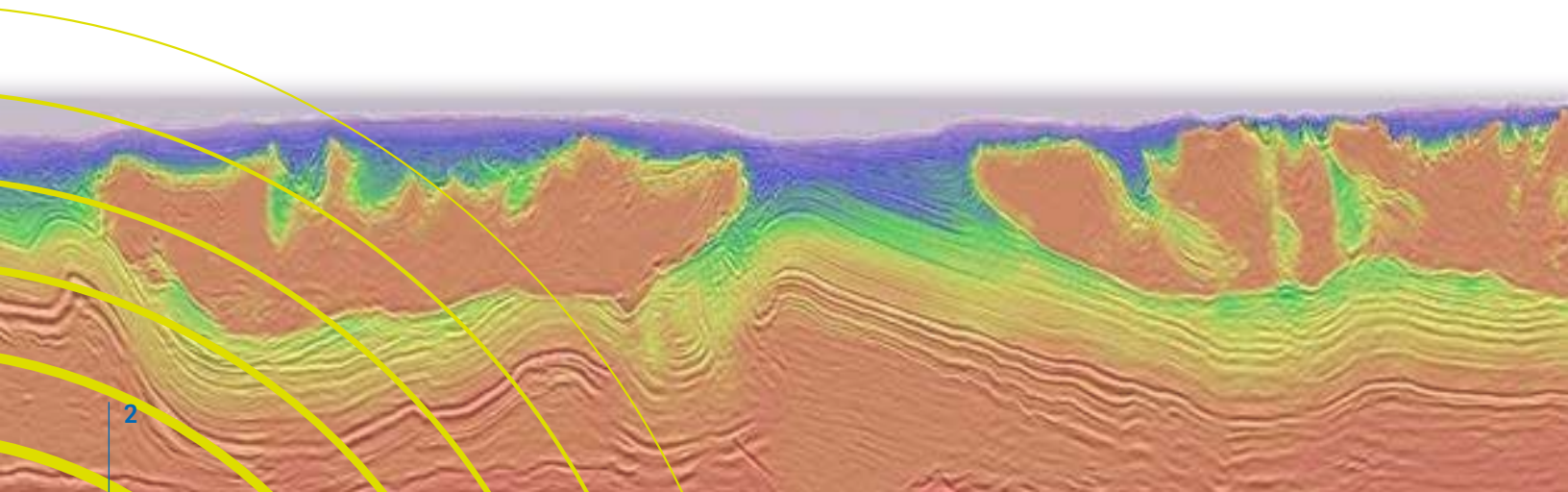
TPS™ (Tuned Pulsed Source) is a new marine seismic source that provides geophysical clarity by improving low frequency content while also supporting important environmental benefits. This innovative technology significantly reduces the output of energy in the frequency range above that of use for defining oil and gas targets.



IMAGING DEEP TARGETS & COMPLEX AREAS

Increased low-frequency content

TPS generates useful signal an additional octave and a half beyond that provided by standard sources. The low frequency content provides for deeper and more efficient penetration of the seismic waves, making the TPS significantly better for imaging targets under complex overburden such as sub-salt and sub-basalt. TPS also enables building velocity models with full waveform inversion (FWI) mitigating the problem of cycle skips, improving resolution by reducing sidelobes and enabling the construction of blocky reservoir models with less need for well log data to provide the low frequencies required.



COMPLIANT WITH SENSITIVE AREAS

Minimized high-frequency content

Acoustic noise generated by marine seismic sources overlaps in the higher frequencies with the range that marine mammals use to communicate. TPS reduces these high frequency emissions which would limit potential disturbance to wildlife.



SIMPLIFYING OPERATIONS

Easier deployment and retrieval

TPS arrays have fewer elements, all of which are located under a single float. This simplifies deployment and retrieval, improves source steering and positioning control, reduces shot-to-shot variations that are due to sub-arrays drifting cross-line, improves cross-line sampling and increases tolerance to bad weather.

TPS has been deployed and tested using both rigid and flexible floats, with quick and easy integration to existing float designs. During a recent test, the deployment of a dual TPS took one sixth of the time it took to deploy a dual conventional source from the same vessel.

Improved HSE

Auto-fire is a major risk in marine pneumatic sources while draining the air. Unlike conventional sources, the TPS has a safe method including a check valve that ensures that the pressure in the operating chamber is high enough for the TPS to never auto-fire while the air is being drained.



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