Reducing the Environmental Impact of Marine Seismic Surveys – Alternative Source Technologies and Concepts

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### Footprint is drastically reduced with increased efficiency





## Alternative marine vibrator concepts at PGS – seeking funding



#### Flex Tensional Shell

Large displacement, large surface area



#### Modular Projector System (MPS)

Small surface area, small displacement





### eSeismic

eSeismic is a novel acquisition and processing method under development. The method utilizes continuous source and receiver wavefields to produce broadband subsurface images.

### **Geophysical and Operational Benefits**

### Efficiency

> No record length or shooting interval limitations

### Quality

Improved signal-to-noise ratio; broader bandwidth

#### Environment

 Reduced Sound Exposure Level (SEL) and Sound Pressure Level (SPL)





# eSeismic – A New Approach to Marine Seismic

- Seismic is an acquisition and processing method that utilizes continuous source and receiver wavefields.
- The continuous sources wavefields can be generated with both future marine vibrator technology as well as with existing air gun hardware.
- When using air gun sources to generate continuously signals individual air guns are triggered with very small randomized intervals instead of triggering an entire source array (see resulting receiver trace on the right).





Synthetic continuous receiver trace in a stationary receiver position

eSeismic field trial example (courtesy of PGS): The dataset was acquired by firing single air guns generating a near continuous wavefield.

## **Shallow Image Resolution**





## **Shallow Image Resolution**









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