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The IKB-SEISTEC™ marine sediment profiler

The IKB-SEISTEC™ marine seismic profiling system is a unique seismic tool for collecting vertical incidence shallow seismic profiles in inshore and inland water environments. Initially designed as a prototype instrument in 1987 for the shallow water areas of the Canadian Beaufort Sea, this system has developed into a well-proven profiler for use in water depths of less than 1 metre. The system can also be used in water depths of greater than 200 metres. Presently 15 systems are in use worldwide being used for cables and pipelines route surveys, foundation studies, sediment thickness estimates and many research areas including sediment transport studies and geo-archeology.

The production version of the profiler comprises of a catamaran approximately 2.5m (8 ft) long that supports an electro-mechanical sound source generically known as a **Boomer** and a directional *Line in Cone* broadband seismic receiver. This receiver has a 61 cm aperture and is totally enclosed in a flooded stainless steel fairing as shown in Figure 1. The sensitive element of the *Line in Cone* receiver is a 20 cm long line hydrophone. Underwater connectors connect the hydrophone to a gain-controllable amplifier enclosed in a watertight electronics can.

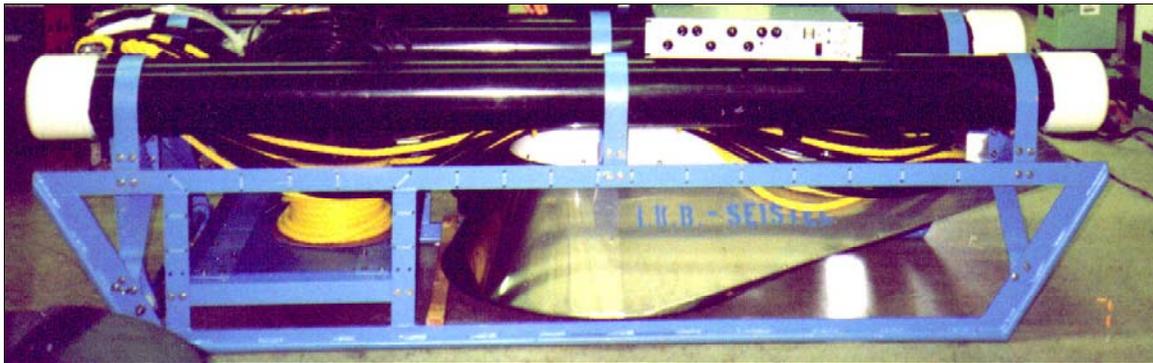


Figure 1 View of the IKB-SEISTEC™ profiler and the SPA-3 Signal Processor

The Tow cable bundle comprises a 7 kV rated dual coaxial cable used to provide power to the Boomer source (Figure 2), a multi-conductor cable for the receiver signals and a polypropylene stress member.

Even though the seismic source and the receiver are as close to each other as is physically possible, the system is designed such that seismic echoes reflected for the seafloor less than 20 cm from the bottom of the cone can be detected. These echoes can then be recorded using commercially available gray scale recorders, suitable tape recorders or

digital acquisition systems. An analog signal processing and conditioning unit, the SPA-3a (Figure 3), is used to power the **Seistec** receiver pre-amplifier, to condition the echoes and to provide trigger signals for the boomer power supply and various signal recording devices. The Boomer source is compatible to all readily available high-voltage energy units that can supply between 100 and 300 Joules at 3.7 kV.

It is customary to clamp a GPS receiver to midway between the source and receiver to ensure that positioning of the catamaran is precise (See Figure 4). This configuration ensures that no offset errors exist whether the catamaran is towed fixed to the side of a boat as shown or towed from the stern.

Development of a dynamic motion compensation scheme to minimize the effects of wave motion on the vertical position of the catamaran is presently underway is is expected to be introduced in late 2006 together with an upgraded SPA-4 processor.



Figure 2 The IKB Model B3 Boomer Source



Figure 3 The SPA-3a Signal Processor and Conditioner



Figure 4. Harbour Survey from small boat

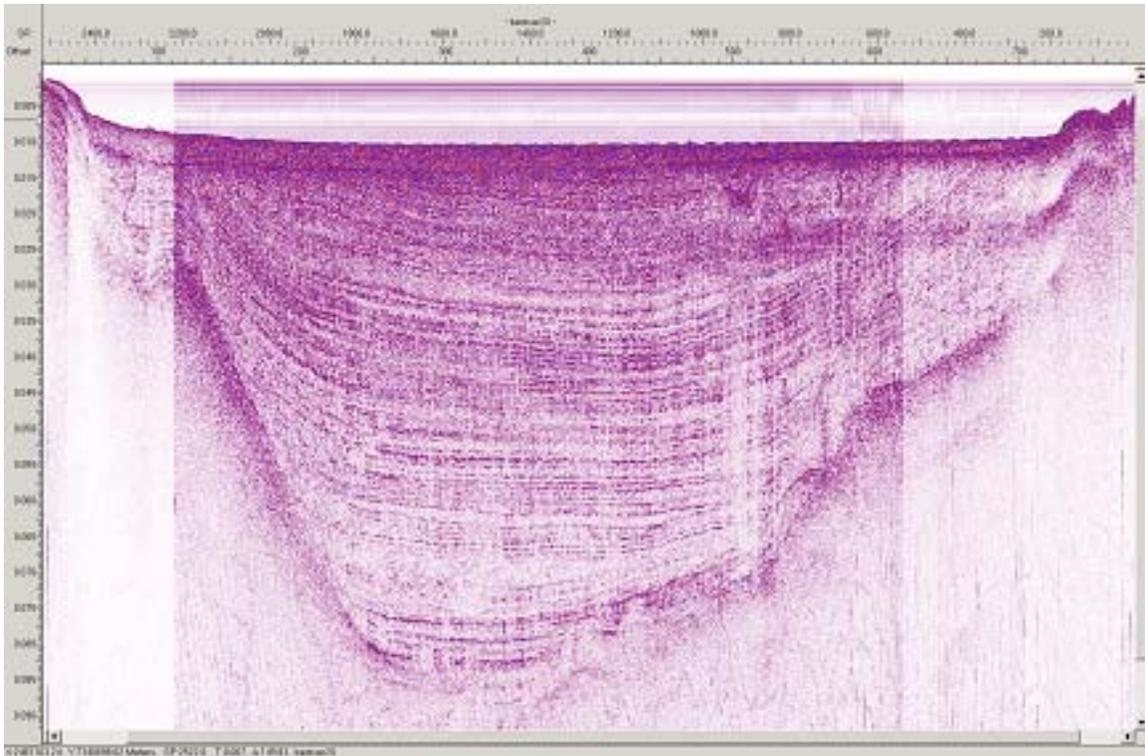


Figure 5 SEISTEC Data from Beaver Harbour, New Brunswick. Track 900m, Vertical about 70m.

The high-resolution capabilities of the Seistec profiler are shown in Figure 5. Here about 70m of soft sediments over bedrock were profiled with 20 cm vertical resolution.