

Efficient and Effective Full-Wave OBC: Tools and Techniques

James Musser*

Input/Output, Inc., Stafford, Texas, United States
jim.musser@i-o.com

and

Felix Bircher

Input/Output, Inc., Stafford, Texas, United States

Abstract

With advances in sensor, recording and processing technology, seabed seismic surveys have become economically and geophysically effective tools for seismic imaging. OBC data recorded with well-coupled, high vector fidelity digital accelerometers can provide broadband full-wave images for very deep structures while simultaneously imaging shallow data with high resolution.

Low power electronics, wireless networks and compact computing resources make it possible to produce a remote recording system capable of recording 1000 channels of seismic data with a stand-alone buoy. With such technology, a 60-80m manned recording vessel can be replaced by a few recording buoys.

By eliminating the need for a recording vessel, a potential noise source is removed from the recording spread. The risk of dragging the front ends of the cables during vessel moves is negated, reducing problems with repositioning the cables and maintaining consistency of the coupling and statics for the cables. Additionally, HSE exposure is minimized with reduced fuel and personnel requirements and emissions control.

Since they need not be connected to a central recording vessel, multiple cables can be deployed to meet any imaging requirement – long offsets and/or wide azimuths, as well as acquisition near pipelines and other obstructions. The number of cables and receiver stations deployed is not limited by the capacity of a central recording system, allowing survey designers to create highly efficient large recording patches, further improving the quality of images. Very efficient wide-azimuth survey designs can be easily acquired using source lines oriented perpendicular to the cables.