



GEOSCIENCES WINNER

GLOBAL GEOPHYSICAL | AUTOSEIS HDR

The drive to reduce costs and improve operating efficiencies continues to be a dominant theme within the E&P sector in general, and the seismic industry in particular. As finding and development costs escalate, there is a growing need for improved seismic technologies that drive down data acquisition costs and increase efficiency without compromising either safety or environmental impact. This need has been the impetus behind the rapidly growing trend to switch from cabled to cableless recording systems. Autonomous recording nodes in particular have a number of significant advantages over traditional cabled and radio telemetry recording systems such as improved operating efficiency and flexibility in design and deployment.

Global Geophysical has created one such system, called the AutoSeis High-Definition Recorder (HDR). With this compact recording technology crews are able to lay out and pick up recording channels much more rapidly using fewer workers and with less vehicular support, both of which lead to reduced HSE risk exposure to the crew. In addition, downtime is reduced since there are no instances of network failures as there are with cabled or radio telemetry systems. Because the recording units are independent from one another, there are no physical or electrical limitations on total channel count nor on how near or far the units can be positioned from each other. As a result, it is much easier to customize 3-D design and deployment where topography, surface access, or landowner restrictions can limit traditional recording systems.

The AutoSeis HDR also benefits the operation by its reduced weight, which improves safety conditions for the crew and increases the number of stations that can be transported. The tool weighs 0.7 lb/single channel station, the lowest weight of any nodal recording system on the market, according to the company. Together with a 20 Amp-hr lithium-ion battery, which is independent from the recording node and can power the unit for more than three weeks, the total weight is approximately 3 lb.

AutoSeis has more than 155 dB of dynamic range and an internal noise floor of only 5 microvolts, which is the best on the market today, the company said. Recording accuracy such as this can help retrieve small signals from under high noise levels, a characteristic that is particularly important for microseismic monitoring. The seismic data on the HDR are recorded in full 32-bit digital format to ensure full resolution is preserved. Though using a global positioning system to discipline the timing on the tool's internal clock to maintain accuracy is not unique to AutoSeis, the tool is the

only node, according to the company, that uses a helical scan antenna originally designed for military use. Another advantage unique to the tool is its full encasement in resin, which prevents environmental intrusion – typically of water – that can result in loss of data or recording failure.

In the Wolfcamp formation, where operators are faced with rugged topography, obtaining seismic data that properly illuminate the target formation is difficult. Traditionally, data have failed to generate the seismic resolution needed to support detailed stratigraphic interpretation and stress field characterization. A survey was conducted to test the value of high-resolution, wide-azimuth, high-fold seismic data in such a setting while tightly controlling the cost of acquisition. The AutoSeis nodal recording system allowed for rapid deployment and retrieval of recording groups thanks to its lightweight design, the company said. More than 1,200 groups per day were laid out and picked up. The seismic crew recorded more than 2 billion traces spanning 920 sq km (355 sq miles) in difficult terrain in approximately five months. Eight times the data effort incremented costs by 58% and resulted in a substantial uplift in the quality of the imaged data, according to the company. ■



Advantages of autonomous nodes over cable and radio systems include less weight and space, less environmental impact, improved safety, fewer coverage holes, unlimited scalability, and higher production rates, according to Global Geophysical. (Image courtesy of Global Geophysical)