



FireFly® Cableless Land Acquisition System

FireFly is a cableless acquisition system that enables the recording of cost-effective, fully-sampled, full-wave seismic surveys while increasing field productivity. FireFly delivers step-change improvements to image quality. By removing the constraints of cables, geophysicists are able to custom design surveys for challenging subsurface targets and to increase receiver station density significantly to fully sample the subsurface. When connected to VectorSeis®, ION's MEMS-based 3C (multi-component) sensor, full-wave data can be recorded with the highest vector fidelity available in the marketplace. The cableless design of FireFly also greatly improves field productivity while reducing HSE exposure.

FireFly [The Right Tool] for:

Optimized Field Productivity

- Crews can reduce survey planning and acquisition cycle time by conducting integrated real-time surveys utilizing the features available on ION's Connex infield navigation, positioning and control functionality.
- FireFly accommodates high productivity vibroseis operations with the incorporation of fleet navigation and management tools.
- Seamless integration with Pelton source controllers, Vib Pro™ and Shot Pro™ II, enables high production shooting modes and delivers processing-ready data.
- FireFly greatly reduces weight, crew and infrastructure requirements compared to cable-based systems.
- ION's Connex offers detailed operational reporting, remote access to equipment and crew operations, as well as comprehensive QC capabilities.

Enhanced Imaging

- VectorSeis full-wave, multi-component 3C digital receivers enable enhanced seismic image quality and better reservoir characterization.
- FireFly captures both P-wave and S-wave seismic data utilizing VectorSeis' digital MEMS accelerometers for broadband, full-wave data acquisition with high vector fidelity offering superior image resolution.

Scalable Architecture

- FireFly enables economic scalability of surveys compared to conventional cable-based methods by utilizing smaller crews and minimizing field infrastructure for deployment.
- FireFly can accommodate a wide range of operations from small-scale 2D to mega channel, high-density 3D surveys providing a viable solution for expanding channel count demand.

Reduced HSE Exposure

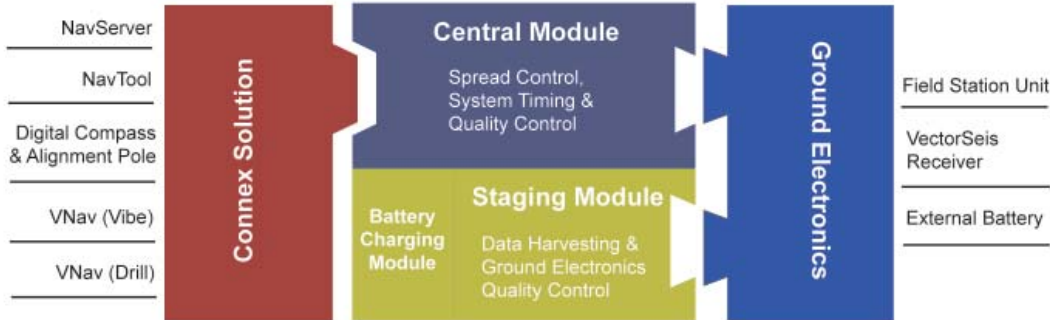
- FireFly's lightweight, cableless equipment reduces the health, safety and environmental risks associated with carrying and deploying conventional heavy cable over rough or complicated terrain.
- With minimal ground equipment and no heavy cable to deploy, FireFly is an ecologically conscious system which leaves a very small footprint on the environment.
- Crews can easily identify and avoid hazards, permit restricted areas and other unfavorable obstacles by leveraging the Connex survey planner, crew planner and NavTool functionality.

Reducing HSE risk is an industry-wide concern for geophysical contractors and E&P operators. Managing and meeting quality and HSE requirements are increasingly more difficult to accommodate in a conventional cable-based acquisition world. While decreasing reserves and complicated subsurface geology is driving image-driven surveying and faster productivity, service providers need the most cost effective, efficient solution to reduce their HSE exposure on labor and the environment. FireFly offers a system that maintains strict adherence to HSE guidelines, and provides E&P operators and contractors with detailed HSE tracking and monitoring capacity.





FireFly System Components



ION's Connex Solution

A combination of comprehensive software and rugged field tools that provides streamlined logistics management. Includes the NavServer for managing spatial data and coordinating seismic acquisition programs; the NavTool for navigation, deployment, retrieval, QC, in-field troubleshooting and dynamite operations; the Digital Compass and Alignment Pole to provide dead reckoning and measure actual receiver headings; VNav Vibe for fleet navigation, positioning and management; and VNav Drill for dynamite drilling operations management.

Central Module

The command center of crew operations. Provides the operator with a climate controlled environment to monitor and manage real-time field activity and monitor system quality and status. Houses the Central Station Computer (CSC) for real-time monitoring of field operations; the Truck Interface Module (TIM) for master and source timing and control; the Central Radio Unit (CRU) for high bandwidth wireless communication; and the Quality Control Computer (QCC).

Staging Module

The hub for data harvesting and field equipment diagnostics of cableless ground electronics which reduces the amount of time devoted to infield troubleshooting. Can accommodate up to 396 Field Station Units and VectorSeis receivers for seamless data collection and quality control utilizing the integrated Transcriber 3.



>Real-time Integrated Surveying

Conventional cable-based seismic acquisition programs are labor intense and require additional time and personnel to deploy. With real-time integrated surveying and optimized workflow tools, FireFly offers a comprehensive solution to enhance field operations visibility and increase productivity. Deployment team shown with NavTool, Digital Compass and Alignment Pole.

Cableless Ground Electronics

The cableless, scalable electronics provide operating flexibility to accommodate simple 2D or complex 3D survey designs in the most challenging environments.

- **VectorSeis Receivers**

3C digital receivers with patented MEMS accelerometers for recording full-wave seismic data utilized for high resolution imaging.

- **Field Station Unit**

Lightweight, rugged cableless ground equipment designed to collect and store data from the VectorSeis receiver, and transmit real-time status and QC information to the Central System.

- **External Battery**

External battery provides power to the Field Station Unit and VectorSeis receiver combination. The flexible design and intelligent QC allows crews to change batteries rapidly for continuous recording environments.