New Seismic Data?

Make it Shine!

PRE-STACKPRO
Better Prospecting with Pre-Stack
High-Definition Seismic Data Analysis

We founded Sharp Reflections to bring high definition to the seismic interpreter’s desktop. More detail and clearer images – that’s our goal. We do it by tapping the rich information in pre-stack gathers, using big-data computing technologies. Analyze the pre-stack amplitude signal for the quantitative rock and fluid information that will help you drill more successful wells. Stop compromising – go pre-stack.

Your First Stop for New Data

Our Pre-Stack Pro software combines pre-stack visualization, processing, and interpretation in one powerful platform. QC new data, improve gather quality, and generate exactly the stacks and attributes you need to target promising anomalies. Use our new fast-track interpretation tools to quickly pick reservoir events, extract amplitudes on gathers, and validate DHIs.

Build Confidence in Your Amplitudes

Today’s quantitative interpretation techniques require the best data possible, and fall short when the seismic signal is compromised by noise, velocity errors, and other processing artifacts. You need gathers to assess data quality and amplitude reliability. We’ve got the tools to do it.
The core technology in Pre-Stack Pro is built on High-Performance Computing (HPC) innovations from Fraunhofer ITWM in Germany. ITWM’s Center for HPC and Visualization is a world leader in scalable storage, 3D visualization, and development/optimization of parallel codes. Pre-commercial work was funded by Statoil in Norway.

Pre-stack information takes up space - lots of it. A single survey can fill up your hard drive. Legacy software written for single core chips just can’t keep up. Pre-Stack Pro was developed from scratch, using modern code for today’s multi-core chips. All computations take place in global memory, for unparallel performance. You can really process and analyze your data in real time.

At Sharp Reflections we think big. We’ve built a new, fully-parallel computing platform designed to make pre-stack analysis easy and effective. We’ve leveraged cluster computing technologies, and deliver them on affordable hardware. You can use our tools to extract new information from seismic data you’ve already paid for - without external reprocessing. That’s value!
Visualization for Fast, Efficient 3D QC

Good data is the basis for solid business decisions. Pre-Stack Pro helps you quickly establish the reliability of your seismic data. It’s easy to link stack, gather, and map viewers so you’re always just a single click away from pre-stack insight.

The bigger the data, the more you need fast, interactive visualization.

What’s Hiding in Your Stacks?

Seismic processing is rarely perfect. Our tools will help you identify multiples, other noise, and residual moveout that can contaminate good signal and degrade your interpretation volumes. Awareness is the first step to a solution.
Live Stacks

In Pre-Stack Pro, you can see how each offset or angle trace contributes to the stack. Decide on mutes and angle ranges for specific targets. If traces are degrading the image, just mute them away. Big improvements in data quality can sometimes be achieved without any additional gather processing.

Offsets or Angles

We work with horizons and velocity data, so that you can focus on target events in the angle domain. Pre-Stack Pro can apply angle mutes, generate angle gathers, and deliver custom angle stacks for interpretation.

AVA Attributes

AVA attributes (intercept/gradient/fluid factor) can help you identify potential reservoirs and distinguish hydrocarbons from water. In Pre-Stack Pro you can generate them directly from gathers, before and after data conditioning. Why pay a vendor for these products when you can make them yourself?
Gather Conditioning - View and Do!

Most datasets need additional processing. Decisions made on spec surveys are rarely ideal for a specific target interval, and amplitudes always need to be calibrated to new wells. For quantitative interpretation, gather conditioning is really a requirement.

Real Time Feasibility Testing

Find what’s hiding in your stacks! With Pre-Stack Pro, you can apply interactive filters to gathers in memory and instantly see the result. Our Processing Toolkit includes Radon demultiple, gather flattening, spectral balancing, and dip-steered random noise removal. Even on entry-level systems, tests that normally take weeks can be run in a few hours. It’s easy to create before-and-after views of the data, show what’s been removed, and ensure that you aren’t damaging primary reflections.

Better Data, When you Need It

Feasibility is great but you need to do the whole job. We have a batch flow system that tackles the full survey. Performance is on par with more expensive cluster platforms. You can generate improved, noise-cancelled stacks and inversion-ready angle gathers in days. That’s faster than you can solicit contractor bids for the same job.
Interactive Horizon Interpretation

When time is short, you need to maximize interpretation efficiency. We’ve built the tools to help. Track promising events on stacked volumes, snap or track the picks on gathers, and extract all amplitudes and AVA attributes in just a few mouse clicks. Pre-Stack Pro can take you from virgin data to a portfolio of promising amplitude leads in just a few short days.

Seed and Track Events on Stacks

Our parallel, in-memory architecture dramatically accelerates automated interpretation. Just drop in a few seed points, and let it fly. Change any tracking parameter, and see the result on the full survey - in seconds. QC and error correction are best-in-class. Transfer all results to your everyday interpretation system for refinement, so you won’t skip a beat.

Extend to Pre-Stack Gathers

Extend any stacked horizon to pre-stack gathers for high-definition amplitude work. Our AVO-friendly algorithms can fit horizons to specific pre-stack events, or extract within windows to deal with high noise levels or preserve phase changes. Results can be displayed as pre-stack amplitude maps, or as a stack of amplitude maps computed at every incidence angle.
QI – Interpretation by the Numbers

Pre-Stack Pro’s Amplitude Analysis Toolkit will help you transform your big seismic data into insight. Use our tools to establish a consistent work process to interpret and risk seismic amplitude anomalies. Map anomalies in 3D, create surgical AVO cross-plots to assess spatial variations in amplitude response, and create custom fluid and lithology attributes to validate DHIs. Use our Wavelet Tool to shape seismic spectra and carry out quick, robust relative impedance inversions. Statoil’s probabilistic P-Cube inversion engine is available for more detailed rock property inversions calibrated to wells.

Linked Maps and Crossplots

Cross-plots can be generated quickly from any partial stack or pre-stack attribute, and refined by limiting plotted points to specific polygons. Polygons can also define specific cross-plot sub-regions, and be used to generate overlay masks showing point locations in map view. Add cross-plot overlays to generate custom attributes and delineate fluid changes and reservoir quality variations.

Pre-Stack Inversion

Pre-Stack Pro includes tools for generating a range of inversion products, from relative impedance “quick looks” to complete pre-stack AVO inversion. P-Cube, an inversion code that Statoil provided through Sharp Reflections’ Foundation Project consortium, predicts probabilities for lithology and fluid classes (LFCs) using a Bayesian inversion methodology.
Architecture

- All-parallel, in-memory application
- Purpose-built to handle full-survey pre-stack data
- Algorithms optimized for the latest multi-core CPUs
- “Cloud Ready” client/server technology, with fast image streaming from server to any OS client machine
- Scales from high-end workstation to multiple servers*
  * Multi-node systems require parallel storage

Visualization and Interpretation

- Synchronized 2D and 3D viewers for gathers, stacks and maps, with point-and-click access to any gather
- Unlimited multi-volume viewing in any window, for easy QC of entire process flow
- Blazingly fast stack and pre-stack horizon tracker
- Fast extraction of horizon amplitudes and QI attributes from any pre or post-stack data volume
- Bayesian seismic simultaneous inversion from multiple angle stacks to litho-fluid class probabilities

Processing

- Interactive stacking with spatial interpolation of mutes
- Gain, frequency, Q-compensation, and median filters
- Hi-resolution Radon (parabolic/linear) with tau-P mute
- 3D dip-steered noise cancellation filter (pre and post-stack)
- Robust gather flattening by 4th-order RMO or cross-correlation, with built-in spatial smoothing
- Spectral balance, phase rotation, NMO
- Wavelet tool for spectral shaping and match filtering
- Volume Calculator for difference/multi-cube calculations
- Batch recording and playback of multi-step workflows

Technical Requirements

Hardware requirement:

- Linux workstation or multi-node cluster with IB interconnects
- Red Hat, Centos, Scientific Linux or SUSE OS for backend
- Windows-compatible front end using remote graphics
The Pre-Stack Pro Desktop

**Volume Pool in Shared Memory**
Global shared memory space (across multiple servers), for holding all seismic datasets.

**Multiple Seismic Data Viewers**
Choose your view: pre-stack, stack, difference volumes. Line location, zoom levels, histograms and cursors can be synchronized with any other viewer and shown on maps. Each viewer can display an unlimited number of volumes.

**Smart Workflows**
One-click generation of complex processing and analysis workflows, to simplify batch calculations. Test flows are executed in memory - large flows go straight to disk.

**Interactive Processing Filters**
Powerful denoise and residual moveout algorithms, with previews that update immediately when parameters are adjusted. Design and test customized flows to improve data on specific reservoir targets.
Rich Map Canvas

Full-featured map viewer showing seismic location, arbitrary lines, wellpaths and tops, and polygons. Multiple maps may be synchronized for easy data comparisons.

Amplitude Maps and Crossplots

Extract amplitudes or attributes from specific horizons or zones, using any pre-stack or stacked volume. Cross-plot attribute pairs from multiple polygons, and post location of cross-plot subregions on any map.
Let’s Get Started

Pre-Stack Pro is surprisingly easy to use. Most customers are up and running in just a few days. How would you like to get started?

Data Analysis Workshops – You bring data, we provide everything else. Seeing is believing.

Amplitude Interpretation Studies Don’t have the time or staff to do it all yourself? We can help. We’ll dig deep into your seismic data to help you understand what’s imaged – and what’s not.

Try Before You Buy In major markets, we lease fully-configured evaluation systems with no up-front risk. Use it until you’ve made up your mind – what do you have to lose?

Contact Sharp Reflections today to arrange a workshop, study or trial
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