Millennium®

A Refraction Statics Solution

KEEP PRODUCTIVITY FLOWING

Setting the standard for 2D/3D geometry QC, first break picking, and refraction statics, the Millennium Series includes two methods for solving near-surface statics problems. A full 3D turning-ray tomography technique, FathTomo®, uses an inversion approach for creating a near-surface velocity model. It augments our world-class delay time refraction solution, Fathom. The recent release of XSaber™, a revolutionary approach to first break batch-picking, completes the toolbox of solutions that companies around the globe use to keep productivity flowing.

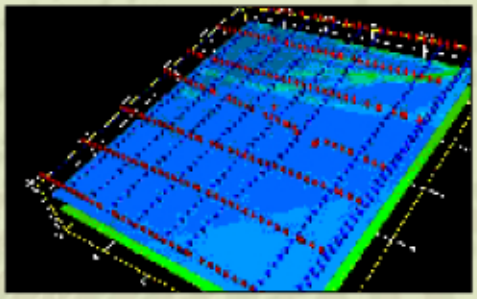
GEOMETRY IMPORT AND QC

Importing geometry from industry standard formats is simple using the pre-defined configuration files or ASCII import feature in GeoScribe II. Map views, cross sections, binning displays, and statistical analysis tools make it easy to evaluate accuracy and coverage issues that can affect important processing decisions.

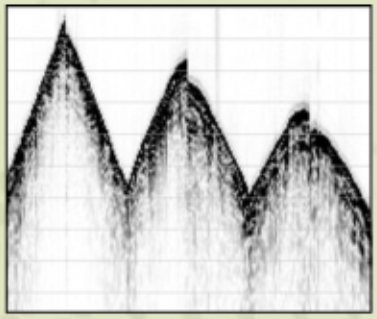
FIRST BREAK PICKING AND ANALYSIS

As an industry pioneer in first break picking programs, ION's GX Technology (GXT) group's latest development, XSaber, is a revolutionary new approach to a very traditional problem. This methodology for batch-picking first breaks uses a variety of image processing methods to enhance and isolate first arrivals on a seismic record. Large volumes of trace data are picked in a matter of minutes. XSaber's quick setup and unique approach build on the value of existing Millennium first break analysis and interactive tools. The XSaber method reduces time-consuming user interaction without sacrificing the reliability and accuracy of the picks. As a valuable add-on to Millennium, an XSaber purchase will pay for itself with the increase in productivity.

Of course, Millennium also includes a robust toolbox of traditional interactive and batch algorithms in several sort domains to suit any data type. You can count on reliable picking using model-based interactive or attribute-based batch picking. We have simplified the analysis step with tools that are designed to look at the dataset picks in an efficient manner. The branch point analysis application lets you select refractors, and the complementary fold and QC displays allow skillful and efficient identification of appropriate refractors for Fathom.



Quickly review model attributes



Reduce time picking first breaks

REFRACTION METHODS

Two very different methods are available for solving near-surface problems. Both approaches are proven performers in creating a good statics solution, and each method has a unique set of strengths. Fathom uses a Gauss-Seidel approach, utilizing delay times to calculate a layer-based model. FathTomo uses tomography to build a near-surface velocity model and calculate statics. The differences in the methods are focused primarily on the fundamental assumptions of the earth model. The tomography approach sees the earth as a much more complex model. This new approach will yield better models in areas where the delay-time method is difficult to use because refractors are hard to define, or large velocity variations or inversions exist. Fathom is a robust method where unorganized mis-picks exist or when the interpretation must be constrained to ensure input data reliability and quality.

FATHOM ANALYSIS AND MODEL BUILDING

The Fathom refraction method includes an analysis software tool to create refractor offset selections and determine velocity and delay times. An extremely accurate geometry QC algorithm aids in detecting even the smallest errors in your source and receiver XY coordinates, to give you absolute confidence in the accuracy of your data positioning. Model building is the final interpretive step in the Fathom refraction process. You can build a direct refraction-based model using the refractor information from Fathom Analysis or integrate independent model information to calibrate or define layers for the near surface model.

TOMOGRAPHY

The FathTomo technique is a velocity inversion procedure that uses turning rays to iteratively solve for velocity in the near surface. You can use prior geological information or a delay-time based model from Fathom as the initial model input. Parameterization and interpretive steps are minimal, but flexibility is built in if you want more control over iteration or convergence parameters. The technique is optimal for solving vertical velocity variations and inversions. Because it is not dependent on your ability to identify refractors in the dataset, FathTomo is adaptable to almost any environment and produces excellent statics results.

3D VISUALIZATION TOOL

To help you quickly understand and interpret results, we've added a powerful software tool for displaying and rotating 3D attribute space. It is very useful in creating perspective views to display multiple attributes, see volumetric changes, view velocity horizons, or design customized views. The sense of spatial continuity enhances your ability to review the components of the statics solution quickly and confidently.

EXPORT

Export of statics and model information for further processing is possible using our predefined interfaces. Some systems, such as ProMAX and Focus, have direct links. A variety of ASCII-based files make it easy to import results into almost any processing system.