



GeoTomo

Earth Modeling and Imaging Solutions

GeoThrust™

TomoPlus™

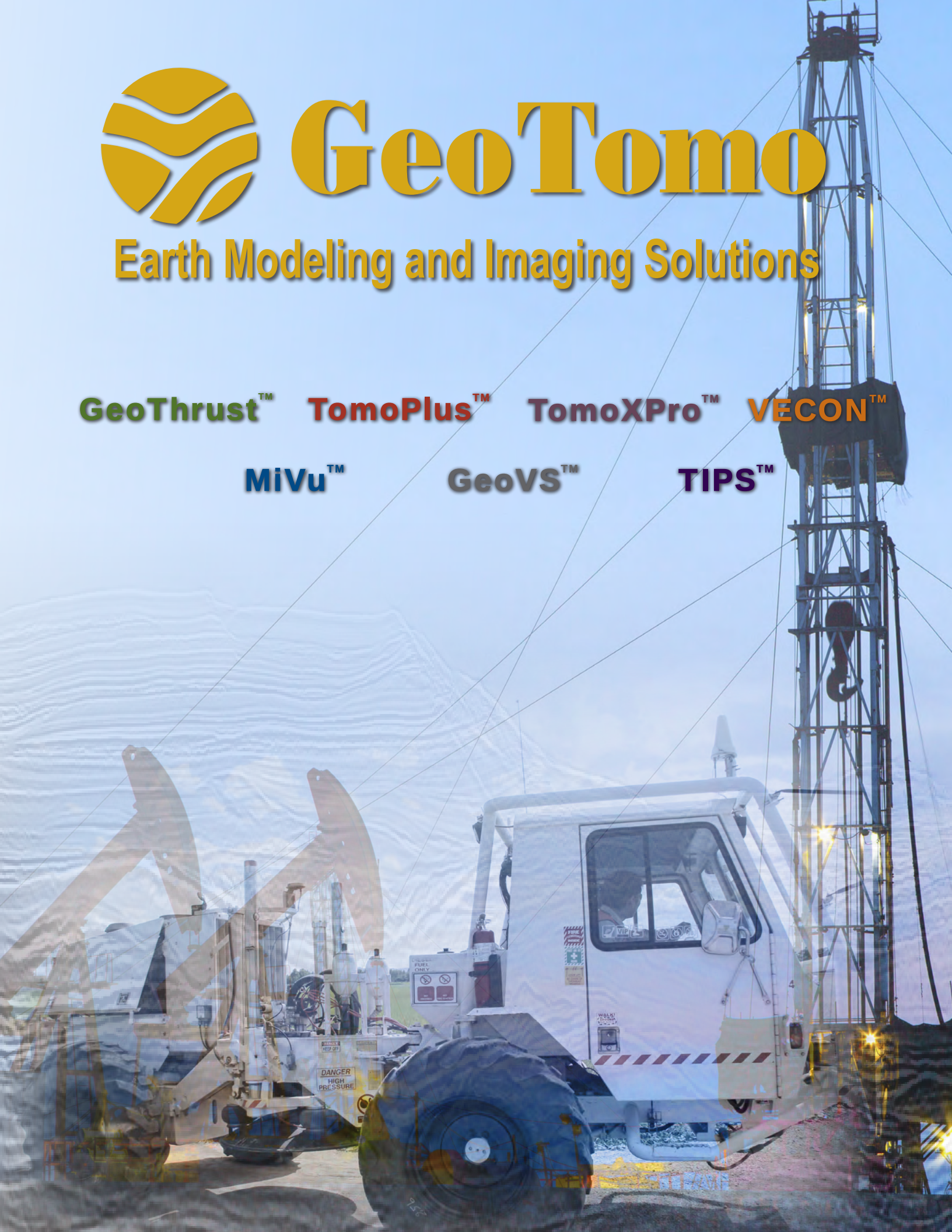
TomoXPro™

VECON™

MiVu™

GeoVS™

TIPS™



TomoPlus™

Near-Surface Imaging & Statics Solutions

TomoPlus™ is a comprehensive near-surface solutions package. It is designed to obtain an accurate near-surface velocity model and derive accurate long and short wavelength statics solution to help seismic data processing.

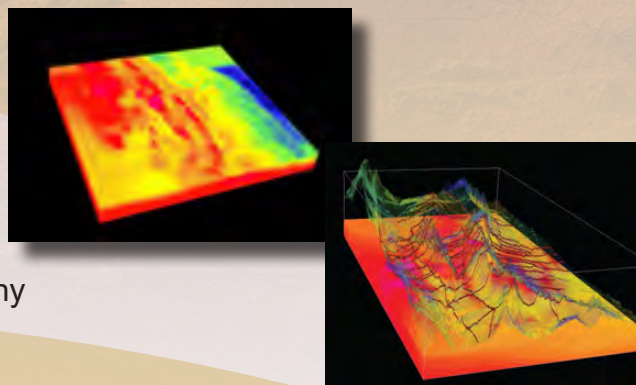
TomoPlus™ offers both conventional and high-end near-surface refraction solutions to handle a variety of near-surface problems. In simple situations, conventional approaches are applied to resolve high velocity contrasts and offer high resolution solutions. In complex areas, conventional methods may be applied to derive a good initial velocity model, and then high-end imaging technologies, such as nonlinear traveltime tomography, full waveform tomography, or joint traveltime waveform tomography may be applied to resolve more details. Besides several robust automatic first-break pickers, **TomoPlus™** offers basic and advanced 2D & 3D near-surface imaging and statics approaches;

Basic

- Refraction Delay-Time
- GLI3D Refraction Traveltime Inversion

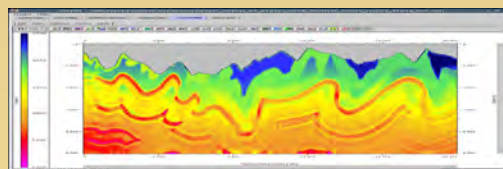
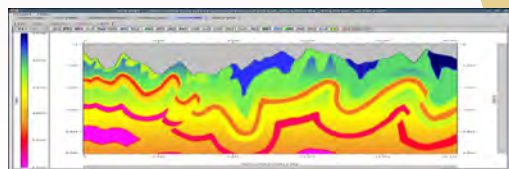
Advanced

- First-Arrival Nonlinear Traveltime Tomography
- Full Waveform Tomography
- Waveform Envelope Inversion
- Joint Traveltime – Waveform Tomography
- Joint Traveltime – Early Arrival Waveform & Waveform Envelope Inversion
- Joint Traveltime – Gravity Tomography
- Joint Traveltime – Electromagnetic (EM) Inversion



TomoPlus™ SEISSPACE® Plug-in

Now available as a SEISSPACE® plug-in for improved workflow efficiency between the two applications! The nature of the system allows for interactive QC and utility functions to facilitate the processing and use of these imaging and statics technologies.



2D & 3D Seismic Data Processing System

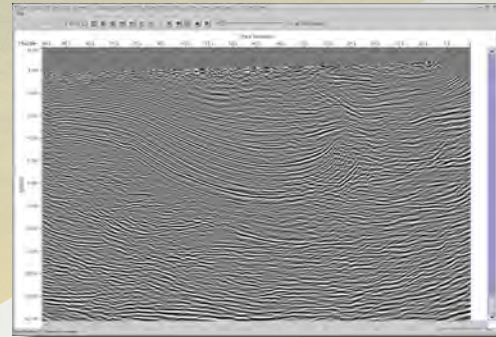
GeoThrust™ has been designed with a workflow architecture to obtain an accurate earth model and earth image in time and in depth from data recorded with irregular geometry in areas with rough topography, complex near-surface, and complex subsurface, with uncompromisingly high technical specifications for data analysis and quality control, but easy to learn and easy to use.

Distinctively Unique Features

- Nonlinear Traveltime Tomography statics and velocity models
- Subsurface velocity estimation, modeling and imaging from topography
- Interactive QC of geometry and parameters
- Image-based picking rms and interval velocities
- Workflow architecture allows focus on the geological and geophysical aspects

Anisotropic Time Imaging (PSTM)

- First Arrival Traveltime Tomography based near-surface statics
- Migration velocity, gradient, and anisotropic parameters scan along horizons
- Target-oriented multiple attenuation
- High-amplitude, random, coherent noise attenuation
- Kirchhoff / Wave Equation Migration from topography
- Crooked-line imaging

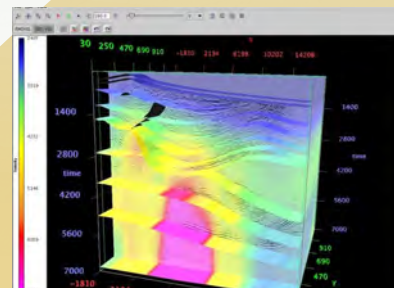
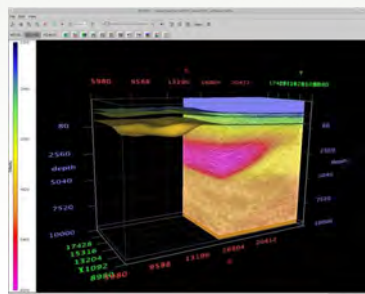
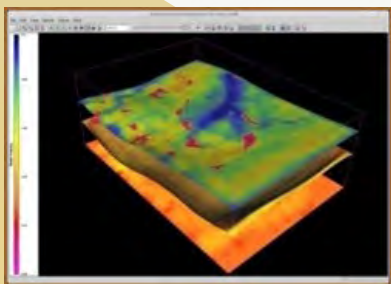


Anisotropic Depth Imaging (PSDM)

- First Arrival Tomography / FWI near-surface model
- Reflection* / Fast Beam Tomography* subsurface model
- Tomo-Holistic depth image model
- Kirchhoff / Wave Equation / RTM* / Gaussian Beam Migration*

Advanced Depth Imaging Technology Partner Z-Terra

**Technology licensed separately by Z-Terra*



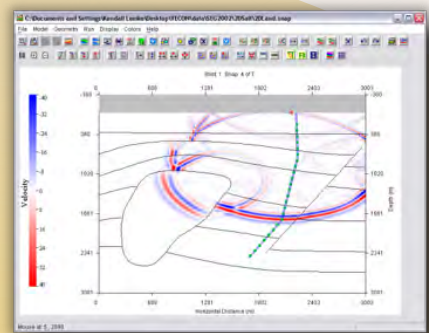
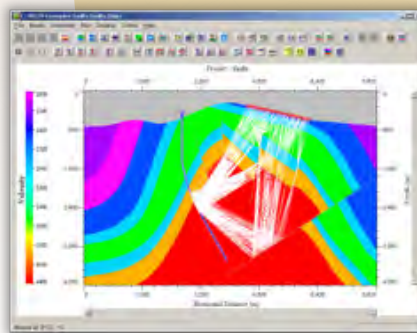
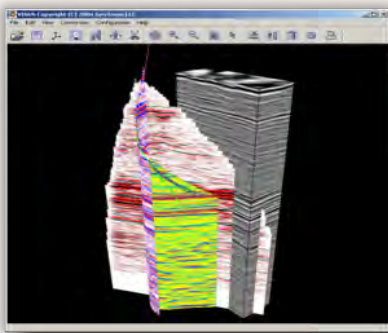
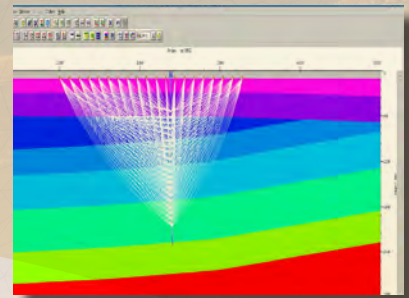
VSP and Surface Seismic Modeling and Survey Design

VECON™ is an interactive 2D & 3D vertical seismic profiling (VSP) and surface seismic survey design and modeling software package. Designed for all levels of geoscientist.

VECON™ features a fast, accurate, intuitive and easy-to-use toolkit for working on site, remotely through Internet, or in a workstation environment. Its overall ease of use, simple and robust model building concepts, and integration with the most advanced wavefront raytracing and forward modeling finite difference technologies distinguish it from other seismic survey design and modeling products.

Distinguishing Features

- Handles VSP and surface seismic geometries for both geophone and DAS arrays
- Fast, accurate, intuitive, and easy-to-use
- Builds layer and grid models with interfaces, objects, and faults
- Imports a variety of model and data formats
- 2D/3D wavefront raytracers for direct waves, reflections, and conversions
- Outputs include traveltimes, raypaths, and SEGY files
- 2D acoustic, elastic, and anisotropic finite difference modeling
- 3D isotropic and anisotropic raytracer (TTI, VTI, HTI)
- 3D acoustic finite difference modeling
- Interpolates across irregular / incomplete / non-uniform / empty cells in SEGY input model
- Parallel computation for workstations and clusters
- Designed for Windows and Linux systems



Microseismic Processing System

MiVu™ is a microseismic processing package that includes pre-survey design and modeling, preprocessing, event location and source mechanism estimation for data that was recorded during hydraulic fracturing. The software will handle downhole geophone, DAS and surface geophone array data.

MiVu™ offers capabilities for;

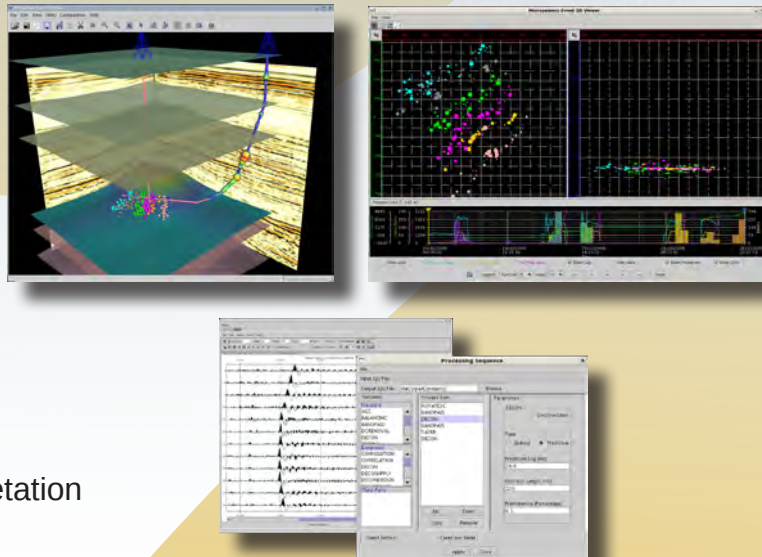
- Building simple and complex geologic models
- Interactively designing optimal microseismic monitoring geometry
- Processing data with user-defined workflows
- Event location and source mechanism estimation with multiple techniques
- Visualizing and interpreting microseismic events in 2D & 3D

Multiple event location techniques are offered such as 3D grid search, 3D migration, and cross double difference to provide insight on how different geophysical methodologies effect the location of the microseismic event. Understanding the strength and weakness of each methodology will provide a better understanding of the accuracy of the event.

MiVu™ is designed for both field engineers and processing geophysicists with automated workflows and imaging methods, and many options for advanced processing, imaging, and QC analysis.

Key Features

- Downhole and surface arrays
- Pre-survey modeling & design
- Data processing & enhancement
- Event imaging and location
- 3D Migration
- 3D Traveltime grid search
- Cross double difference
- Stacking scan
- Interactive quality control
- Focal mechanism estimation
- 2D & 3D Visualization and interpretation



2D / 3D VSP Data Processing and Imaging Solution

GeoVS™ is a VSP data processing and imaging system. It is designed to handle all types of VSP geometries such as zero offset, far offset, walkaway, vertical incident, and all 3D geometries for land and marine utilizing both downhole geophone and DAS arrays.

GeoVS™ was developed with size in mind. Performance is not an issue for large walkway or 3D VSP surveys regardless of the number of shots or number of geophone or DAS levels. The interactive workflows are designed to run on Linux workstations or cluster systems and take advantage of parallel computing.

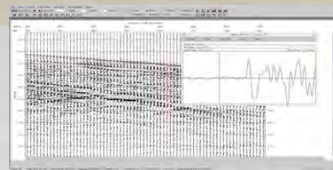
First Break Pickers

- Automatic pickers
- Semi-automatic pickers
- Manual pickers



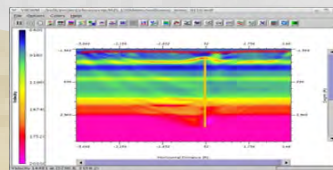
Velocity Building & Updating

- Well log initial model
- Tomography update
- VDCube (velocity layer scan)



Interactive Signal Processing

- Parallel data processing of CSG and CRG
- Interactive input parameter QC
- Interactive attribute displays



Prestack Depth Migration Techniques

- 2D Kirchhoff
- 2D / 3D Wave equation



Interferometry Imaging

- Convert down-going multiples to surface seismic
- Output stacked surface seismic gathers

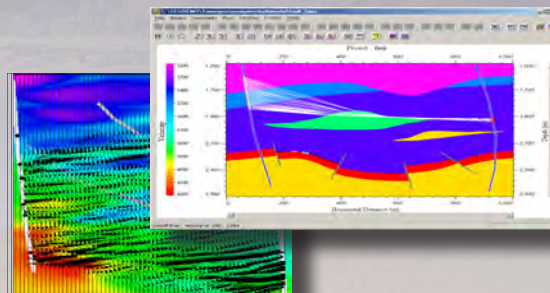


Crosshole Seismic Processing Solutions

TomoXPro™ is a crosshole seismic processing system developed for survey design and modeling, signal processing, traveltimes tomography, reflection wavefield migration, and post-processing of seismic gathers and images. It offers the entire range of capabilities that you will need for performing a crosshole seismic project.

Key Features

- Pre-survey design and modeling
- Data preprocessing and conditioning
- Traveltime Tomography Imaging
- Kirchhoff and Wave Equation Reflection Imaging
- Time-Lapse Imaging
- Post-processing and enhancement

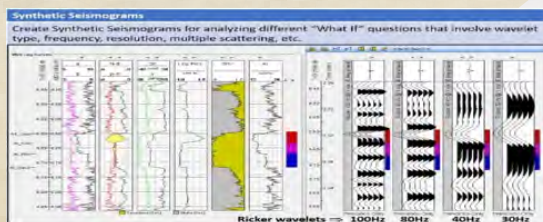


TIPS™

Toolkit for integration of Petrophysics and Seismic

TIPS™ Well Log Modeler can produce high quality AVO synthetics with a few simple data prep steps. TIPS will read your LAS file and lead you through the process to;

- Edit logs
- Generate missing curves
- Perform fluid substitution
- X-plot attributes

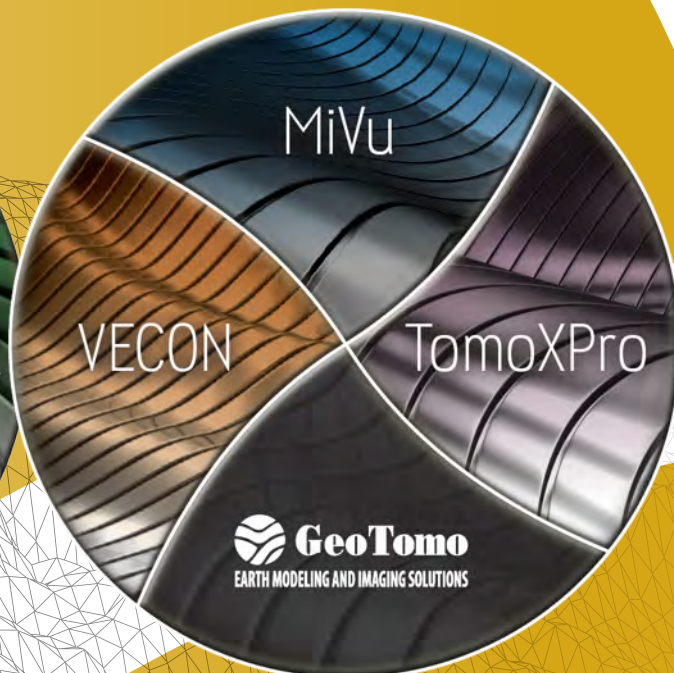
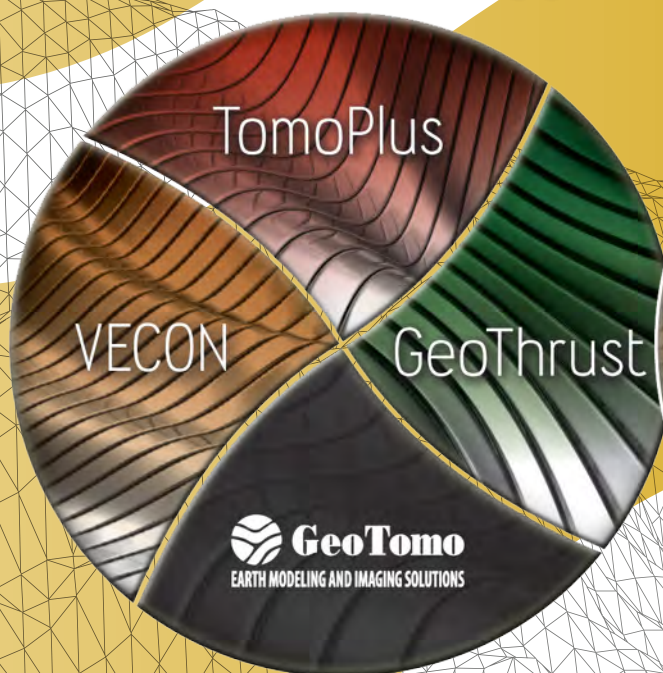


Within minutes of installing the software, you will be ready to produce models and iterate on numerous parameters to better understand your prospect.

TIPS™ Multiple Modeler

Designed as part of the **TIPS™** software suite that allows you to quantitatively evaluate the multiple-suppression success. Starting with LAS files at well locations, the **TIPS™** Multiple Modeler decomposes generalized primaries into primary-and multiple only synthetics with time-varying stratigraphic wavelets that match the seismic data where conventional synthetics fail.

Surface Seismic Applications



Borehole Seismic Applications



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