



# Explorer<sup>TM</sup> Time-to-Depth Conversion



# Explorer

Efficient time-to-depth conversion and velocity modeling in any geological environment

Fully integrated with other Paradigm Epos®-based products, Explorer provides a comprehensive set of tools for the implementation of velocity modeling and depth conversion workflows in a variety of geological environments. It is the ultimate depth conversion toolkit for both quick look depthing and advanced analysis, with controlled uncertainty.

## The Ultimate Velocity Modeling and Conversion Tool

Paradigm® Explorer™ is the industry's leading time-to-depth conversion, velocity modeling and quality control solution, delivering fast and accurate time-to-depth conversion and precise velocity models in any geological environment.

Explorer provides a wide variety of velocity modeling and depth conversion techniques, ranging from vertical velocity scaling to geostatistical velocity mapping and map migration. By easily and efficiently rationalizing

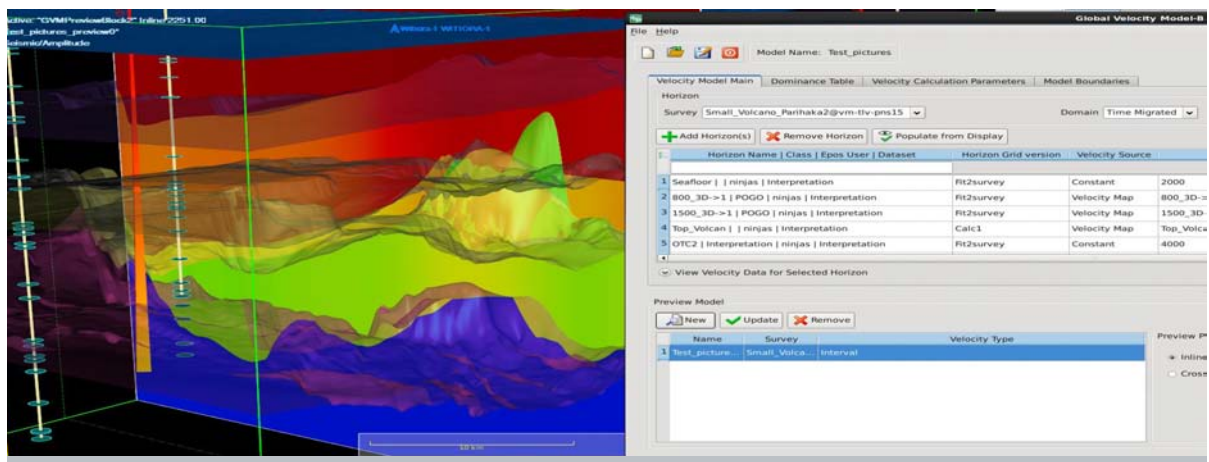
multiple sources of velocity and velocity model data, Explorer reduces depth position uncertainty for seismic data assets in any structural play.

## Efficient Velocity Model Building

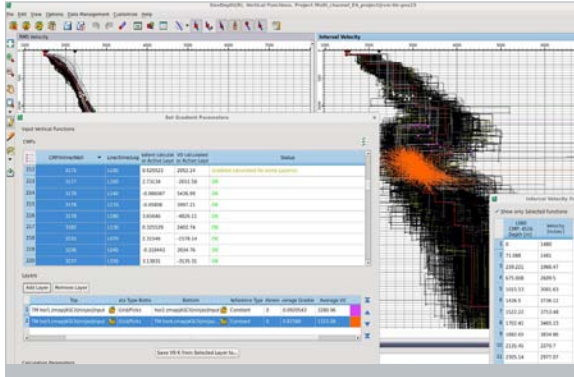
Velocity models are an essential building block of every geoscience workflow, from depth imaging to interpretation and reservoir characterization, up to well planning. Explorer offers a complete velocity model building solution that enables the creation of velocity models through an easy-to-use, one-window interface, with no loss of the technological advantages that have traditionally characterized the product.

With the ability to perform interactive, on-the-fly previews in 3D space, Explorer provides a simple, flexible, and robust way to define and QC a velocity model using various velocity sources.

Both layer-based and structure-independent approaches can be implemented when building velocity models for converting time interpretation data to depth. Explorer combines well and seismic velocities in order to create consistent velocity models.



▲ Preview horizon-based Global Velocity Model from mixed velocity sources in 3D Canvas



- ▲ Calculate vertical gradient from selected vertical functions, for user-defined gradient layer in Vertical Function windows

### Robust Depth Conversion

Depending on the complexity of the velocity model, depth conversion can be performed by vertical scaling or ray migration. Interpretation, well, seismic and attribute data can all be scaled from time to depth and from depth to time using the same active velocity model.

### Seismic-to-Well Calibration

Explorer provides advanced tools for depth calibration of interpretation to well markers:

- **Time-preserving and Well Tie Tomography**

The time-preserving and well tie tomography functionality extends to the poststack domain capabilities that were previously only available with prestack applications. Using

Explorer tomography, it is possible to consistently tie the velocity model to wells in a single run. The functionality also enables re-depthing, to systematically improve depth seismic-to-well marker misties.

- **Seismic-to-well Calibration**

The seismic-to-well calibration application can calculate and grid seismic-to-well misties at the well marker location. The adjusted seismic maps can be previewed and saved, if desired.

### Uncertainty Analysis

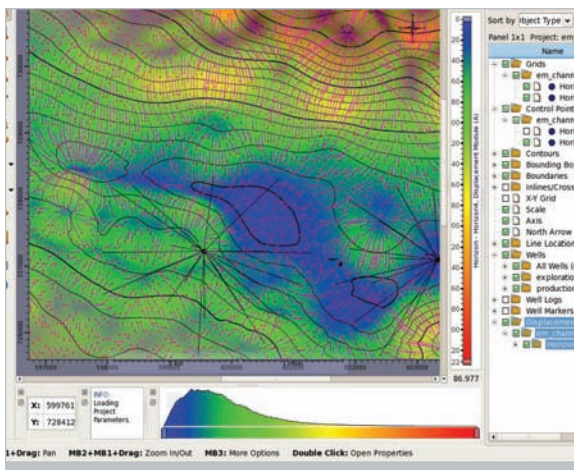
Geostatistical kriging of error maps or sequential Gaussian simulations enables the assessment of depth conversion uncertainties. Error maps and simulation results are used in Confidence Interval and Threshold Analysis applications to produce upper and lower velocity with associated depth map estimates, along with iso-probability maps.

### Mapping

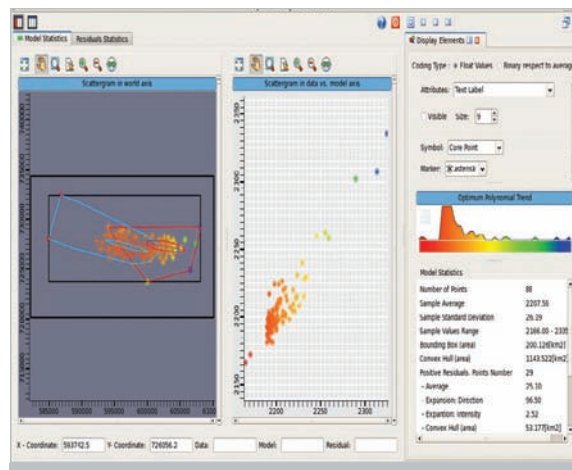
Explorer offers comprehensive mapping functionalities, including numerous mapping algorithms, interactive grid editing and grid operation tools, and an advanced user interface that allows flexible map display with overlays such as contours, wells, culture data, faults, etc.

### Geostatistical Modeling

The geostatistical toolkit is an add-on module to Explorer which offers alternative methods to deterministic approaches for velocity modeling and mis-tie analysis. A variogram modeling window enables the user to define nested variograms and provides support for geometrical anisotropy.



- ▲ Map migration techniques facilitate quantitative assessment of structural position uncertainty in time migrated interpretations



- ▲ Comprehensive geostatistical tools allow users to fully analyze the spatial distribution of data and preserve geological trends in velocity models

## Features

- Standardized ergonomic user interface
- Time-preserving and well tie tomography
- Interval/average velocity mapping and slicing using well and/or seismic velocities
- 2D/3D multi-survey depth scaling of interpretation, seismic and attribute data
- Vertical function utility:
  - Display and edit velocity & non-velocity functions
  - Transform well and seismic velocities and calculate vertical velocity gradients
- Map migration through image ray or normal incidence ray tracing
- Well mis-tie analysis and adjustment for time, velocity and final depth maps
- Volumetric analysis
- Crossplot for regression analysis of any data type
- User-defined analytical mathematical operations applied to interpretation data.
- Support for 3D and multi-line 2D surveys in the same project
- 3D solid modeling for depth conversion in complex structures
- Extraction of seismic markers from interpretations along well bore paths

## Interoperability

All Epos<sup>®</sup>-based applications enable interoperability with third-party data stores, including:

- OpenWorks<sup>®</sup> R5000
- GeoFrame<sup>®</sup> 2012
- JavaSeis

## System specifications

- 64-bit, for x64 architecture processors
- Microsoft<sup>®</sup> Windows<sup>®</sup> 7, 8.1, Vista (64-bit)
- Red Hat<sup>®</sup> Enterprise Linux<sup>®</sup> 5.3 and above, 6.0 and above

## The Paradigm Advantage

- The Explorer Global Velocity Modeling application efficiently delivers consistent velocity models throughout the system.
- Extensive workflows combining wells and seismic data assure accurate depth conversion in any structural play.
- Quick delivery of final depth maps that tie wells, honor geologic trends, and are consistent with seismic velocities.
- Quantitative uncertainty estimation and stochastic simulation help assess the risks associated with depth conversion.

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