Who We Are

Ellis is an innovative geoscience company providing seismic interpretation software and services to the Oil and Gas industry. Our mission is to bring new comprehensive solutions to geoscientists: reducing the time of interpretation, improving the quality, and giving a deeper understanding of the geology behind seismic data.

What We Do

Software

PaleoScan™ is an integrated seismic interpretation software offering an innovative workflow that increases productivity and resolution. Thanks to a comprehensive approach, a geological model is generated while interpreting the seismic volume. PaleoScan™ changes our perception of the seismic data and takes interpretation a step further in the exploration and production process.

Services

Ellis provides a wide range of services, on-site or in-house, from tailor-made solutions to full case studies. Our geoscientists have an extensive experience in interpreting seismic data from all over the world. With our input, clients can better understand the geology and characterize the reservoirs.

What We Offer

Data Reconnaissance

In frontier exploration, new ventures and large scale projects, PaleoScan™ allows the geoscientist to quickly assess the hydrocarbon prospectivity of seismic datasets. It is used advantageously in data room environments for peer review and geological evaluation with partners.

Exploration

Identify prospects and delineate reservoir geometries at an early stage of the exploration cycle. Innovative tools to map seismic attributes on a multitude of horizons and determine volumes via geobody extraction are invaluable for de-risking drilling decisions.

Development

Understand reservoir properties and architecture with high resolution stratigraphic analysis and detailed fault imaging. PaleoScan includes intuitive QI tools including rock-property prediction and data classification and analysis through cross-plotting. PaleoScan™ gives powerful understanding throughout the development process.
**Full Featured Seismic Interpretation Platform**

PaleoScan™ is a new generation of seismic interpretation platform. It includes all the necessary tools to run a comprehensive workflow, from data loading to generation of interpreted objects in a user-friendly environment. Thanks to rapid data screening, interactive cross navigation and powerful editing tools, the interpretation can be refined and the geological model can be previewed in real time. A suite of applications allows the semi-automatic generation of horizons, the stratigraphic slicing of volumes, the extraction and quantification of geobodies, the automatic extraction of faults, and the cross correlation of wells and markers. PaleoScan™ runs on Windows® 64-bit and takes advantage of parallel computing with the latest multi-core technologies.

**Add-on Modules**

- **Advanced Interpretation**
  - Sequence stratigraphy
  - Color blending
  - Automatic geobody extraction
  - Unconformity management
  - Static geological model
  - Watertight model

- **Time Depth**
  - Seismic - well tie
  - Velocity modeling
  - Depth conversion

- **Properties Modeling**
  - Kriging / co-kriging
  - Rock properties modeling
  - Synthetic seismic
  - Interval velocities generation

- **Python API**
  - Execute Python code in PaleoScan™
  - Custom seismic attributes
  - Custom user interfaces and tools
  - Integration of external libraries

- **Data Connector**
  - Petrel®
  - OpenWorks®
  - GeoTertio™

---

**Core Application**

- 2D & 3D seismic interpretation
- Coordinate Reference System
- Integrated 2D and 3D viewers
- Rapid data screening
- Co-rendering
- Sessions and custom settings
- Multi survey and large dataset
- Horizon / fault interpretation
- Automatic fault extraction
- Geological time model
- Stratigraphic slicing
- Attributes and calculator
- Geobodies extraction
- Volumes calculation
- Gross rock volume
- Well correlation
- Spectral bluing
- Inversion
- Cross plot and classification

---

**Why Choose PaleoScan™?**

**Innovative Solutions**

PaleoScan™ is a new generation of seismic interpretation platform using machine learning augmented technology. In a fully integrated 2D and 3D environment, it offers a complete range of interpretation tools used from data reconnaissance to reservoir characterization.

**Increased Productivity**

Our computer-aided methodology empowers you to go further and faster with your seismic interpretation. Your results are used for stratigraphic analysis, structural modeling and quantitative interpretation.

**A Comprehensive Approach**

PaleoScan™ enables you to comprehensively interpret seismic volumes and simultaneously build geological models. Thanks to real-time modeling and control tools, PaleoScan™ takes your seismic interpretation further along the E&P workflow.

**Integrated Solution**

PaleoScan™ is an integrated solution which manages all the standard formats of the oil and gas industry including seismic, well, horizon and fault data. It also proposes direct connections to other platforms for a seamless data exchange.

**High Resolution**

PaleoScan™ allows sub-seismic resolution interpretation. An unlimited number of horizons can be generated from the model at very fine scale to identify prospects, correlate wells and markers, and better characterize reservoirs.

**Excellent Support**

Our geoscience and IT teams based in France (Montpellier), the United States (Houston), Australia (Perth), Kuala Lumpur (Malaysia) and Brazil (Rio de Janeiro) provide first-rate support to PaleoScan™ users either online or onsite.
Core Application

A Comprehensive Method for Seismic Interpretation

PaleoScan™’s global method is a semi-automatic workflow, where a geological time model is computed while the seismic data is being interpreted. Horizons are auto-tracked across the full seismic volume, chrono-stratigraphically sorted in real time and used to generate a geological model. PaleoScan™ makes this process fully interactive for the geoscientist, who can refine the interpretation of every horizon and increase iteratively the level of accuracy of the geological time model. The interpretation is therefore faster and of better quality. The method can be applied to both 2D and 3D datasets.

Relative Geological Time Model

Global interpretation in PaleoScan™ consists of a three-step computer aided workflow. During the first step, a grid of horizon patches (the Model Grid) is generated across the entire seismic volume on each polarity (peak, trough, zero crossing, and inflection point).

The size of the patches is defined by the interpreter according to the scale of the prospective area and the complexity of the geological settings. In the second step, those patches are linked automatically thanks to a global cost function minimization process based on the distance and the correlation of neighboring patches.

A chronostratigraphic sorting is automatically performed to assign relative geological ages to all the horizon patches. During this second phase, the interpreter edits interactively the connections between auto-tracked horizons and updates the model in real time to obtain an optimum solution. In the third and last step, the auto-tracked and refined Model Grid is used to compute the final Relative Geological Time Model (the Geo-Model), from which a whole suite of interpretative applications is derived.

One of the main applications is the capability to extract an infinite number of iso-age surfaces from the Geo-Model through the Horizon Stack, which allows an ultra-fine stratal-slicing of the seismic volume for the detection and characterization of very fine geologic features.

The workflow is also applicable to 2D datasets, where within an innovative 2D line interface and a pseudo-3D environment single and multi 2D lines can be interpreted rapidly; mis-ties can be corrected with a variant shift and a pseudo-3D Geo-Model can be generated.

Automatic Fault Extraction

Faults are automatically extracted from a seismic volume through an optimized computation, where the user keeps control of the volume inputs during every step of the workflow. This innovative method is based on the variance values in elongated windows at numerous dips and azimuths. The Fault Plane corresponds to the maximum variance average for a certain direction (dip & azimuth) and yields coherent structures of natural faults.
**Interpretation**

- Horizon stack generation from the model
- Seismic horizons honoring polarities
- Sub-seismic resolution
- Dynamic flattening from stratal-slices

**Fault Interpretation**

- Fault plane attribute
- Automatic fault patch extraction
- Interactive editing
- Fault patch merge and split
- Stereonet filtering

**Geobody Modeling**

- Extract geobodies based on amplitude contrasts on horizon stack
- Automatic or manual contouring
- Volumetric computation

**Attributes**

**Surfaces Attributes**

**Geological Attributes**

**Volume Attributes**

A broad range of attributes can be computed on seismic data, geological models, or surfaces to reveal stratigraphic and structural events. A cross comparison can be performed by using interactive co-rendering data and synchronized views. A calculator with real-time preview enables the generation of custom attributes.

**Conditioning:**
- Frequency filtering, Smoothing, etc.

**Stratigraphic:**
- Envelope, Sweetness, etc.

**Structural:**
- Dip, Azimuth, Curvature

**Geological:**
- Variance, Chaos, Fault Probability
- Thinning, Fault Throw

**Spectral Decomposition**

- Instantaneous time-frequency transformation
- Short Time Fourier Transform
- Continuous Wavelet Transform
- Real-time RGB blending

**Denoising**

- Structure-oriented smoothing
- Based on the vector field direction
- Real-time smoothing

**Spectral Bluing**

- Vertical resolution enhancement
- Interactive process
- Real-time preview

**Characterization**

**Well Correlation**

- Interactive display of logs and markers
- Compare seismic interpretation and well markers
- Highlight well-seismic mis-fits
- Flatten logs on horizons or markers

**Cross Plot & Classification**

- Cross plotting of volumes, horizon stacks, or well logs
- Interactive manual and automatic classification
- Regression curves generation
- Geobodies extraction and facies volumes creation

**Inversion**

- Deterministic inversion
- Interactive colored inversion
- Real-time preview
- Relative and absolute AI
Add-on Module - Advanced Interpretation

Sequence Stratigraphy
Build a lithostratigraphic framework to understand the relationship between rocks and stratigraphic evolution at the early stage of interpretation.
- Generate an interactive Wheeler diagram
- Interpret depositional sequences
- Create geological cross sections with lithology
- Build sequences in 3D
- Create horizon stacks by layers

Color Blending
Improve the visualization of your prospects with an interactive color blender of volume and surface attributes. Various blending methods are proposed: RGB (Red, Green, Blue), CMY (Cyan, Magenta, Yellow), HSV (Hue, Saturation, Value), HSL (Hue, Saturation, Lightness).
- Real time frequency filtering
- Color blending on volumes, arbitrary lines and horizons
- Creation of a 256 color blended volume

Static Geological Model
Building a geological model is a key step to understand reservoir properties and dynamic behaviour of fluids. PaleoScan™ enables to carry out all the different stages of the geomodeling workflow to create a static model such as building stratigraphic units from the RGT model, gridding the model with various patterns, populating cells with seismic facies or petrophysical properties.
- Use RGT model to drive the geometries
- Corner point grid generation with stairstep faults
- Seismic facies modeling
- Upscaling of welllog properties

Water tight Model
After defining layers in the geomodel, a watertight model is created in 3D in a defined zone of interest. Horizons and faults are remodeled and can be exported for geo-modeling applications.
- Interactive layering
- Watertight horizons and faults
- Creation of fault polygons
- Allan diagram for analysis of sealing properties
Seismic - Well Tie

The interactive seismic-well tie tool includes checkshot and sonic calibration, wavelet extraction and synthetic seismogram generation.

- Checkshot and sonic calibration
- Wavelet extractions (analytic, statistical, deterministic)
- Synthetic seismogram generation
- Interactive stretch and squeeze with undo/redo
- Interval velocity, drift velocity and correlation logs

Velocity Modeling

From the stratigraphic viewer, it is possible to create interactively a velocity model and use it to switch in real time between time and depth domains.

- Define a velocity model interactively
- Convert to depth in real time
- Use well velocity data if needed
- Compute Average, RMS and Dix velocities

Depth Conversion

Seismic volumes can be converted in real time from time to depth domain by assigning velocity models. Interpretation can be done in both domains interactively since the display of all objects is transformed within the viewer.

- Real time depth conversion of volumes and objects
- Well calibration QC
- Update velocity model in real time
- Save horizons and volumes in depth domain

Log Depth Adjustment

This tool provides an intuitive and quick way to adjust log data with seismic data in the depth domain. A simple shift or a stretch and squeeze can be applied to well logs in order to honor well markers and horizons from seismic interpretation depths.

- Log stretch and squeeze in depth
- Adjust depth values with undo/redo
- Honor well markers and seismic interpretation
- Check velocity models
Well log information can be populated in the seismic volume using the geological time model as a guideline. Various methods of propagation including inverse distance, kriging and co-kriging are proposed in an intuitive interface offering real time preview on surface or cross section along wells.

This unique workflow constrained by the geology has numerous domains of application such as seismic inversion, reservoir characterization, geological correlation, velocity model building and synthetic seismic generation.

- Propagate well log properties guided by geological model
- Inverse distance, kriging and co-kriging methods
- Propagation parameters by stratigraphic sequences
- Predict rock physics distribution
- Variograms and anisotropy according to reservoir architecture
- Real time preview on horizons and lines along wells
- Intuitive and useful for qualitative interpretation applications

Forward Modeling
Generate synthetic seismic volumes
Compare real and synthetic seismic

Rock Type Prediction
“A priori” AI model for inversion
Generate porosity and sand volumes

Velocity Modeling
Create interval velocity model
Upgrade the velocity model with well data
Add-on Modules - Extra

Python API

The Python API enables you and your team to extend PaleoScan™ functionality and bring your own custom workflows to life inside the PaleoScan™ platform. Built with experienced software developers, researchers and exploratory users in mind, the API will enable you to write and execute Python code directly inside the application, with no need for external compilation. The Python API will come with documentation and examples and will provide you with the means to:

- Add your own custom Seismic Attributes to PaleoScan™ attribute library
- Design rich and interactive custom user interfaces and tools
- Integrate external libraries and call external code
- Take advantage of existing Python libraries such as SciPy and numpy and apply them to PaleoScan™ data.

The API’s functionality will grow and expand with PaleoScan™.

Data Connectors

The PaleoScan™ data connectors are essential modules for users who wish to maximize the benefits from their PaleoScan™ interpretation. Thanks to a plug-in extension, users can take advantage of PaleoScan™ functionalities by exchanging interpretation results directly between various platforms such as Petrel®, OpenWorks® and GeoTeric®. In just a few clicks data are fetched from one application and sent to the other on-demand, enabling a seamless data exchange with PaleoScan™.

Petrel® – OpenWorks® – GeoTeric®

Data I/O API

To build your own workflows in a separate environment with various objects and/or functions coming from the PaleoScan™ Core application, you can use our Data I/O API and its Software Development Kit (SDK). It is a fully object-oriented class library designed for software developers to embed our technology into any external application and/or software in a Windows/Microsoft Visual Studio C++ environment.

Management of:
- Volumes
- Horizons
- Faults
- Well / log data
- Geobodies
- Culture data

To communicate directly with the objects from PaleoScan™ projects, you can build your own link with other platforms or programs thanks to the Data I/O API. This API allows you to read and write every object such as volume, horizon, fault, well and log. You can directly point at PaleoScan™ projects and avoid data duplication for a seamless data exchange.

Viewer

To share PaleoScan™ projects with colleagues, clients or partners, the PaleoScan Viewer is a light version of PaleoScan Core application. It gives access to most of the functions of the platform such as visualization in 2D and 3D, image blending, synchronization, rapid data screening, cross navigation and real time attributes. Export options in various formats are also available for every object (volume, horizon, fault, well, geobody, layer, multi-Z).
Core Application - Main Features

3D Platform
- Multi 2D and 3D SEGY import
- Faults, horizons, wells and culture data I/O
- Data exchange between PaleoScan™ projects
- Data manager
- Sessions management
- 2D viewer and 3D viewer
- Volumes blending viewer
- Seismic 3D cube visualization
- Volume sculpting
- Volume stretch, squeeze and rotation
- Cross navigation between viewers
- Point location saving/editing
- Volumes orientation
- Volumes extraction
- Volumes merging
- Coordinate reference system management
- Unit conversion (feet, meter…)
- Theme selection: dark, light and vista styles
- Licensing tool

3D Interpretation
- 3D model grid creation
- Model grid between horizons
- Exclusion zone
- Semi-automatic horizon interpretation
- Interactive model-grid refinement with attribute mapping
- Interpretation along arbitrary lines
- Real time preview of geomodel
- 3D geo-model computation
- Smart auto-trackers for manual horizons picking
- Horizons propagation and interpolation

2D Interpretation
- 2D model grid creation
- 2D geomodel computation
- Multi 2D lines interpretation
- 2.5D environment
- Mis-lies correction with dynamic shift
- Horizons creation from multi 2D lines
- Pseudo-3D geo-model computation

3D Geo-model
- Geo-model from model grid
- Geo-model from marked horizons
- Geo-model from horizon stack
- Geo-model from external horizons

Cross Plot & Classification
- Cross plots from volumes, horizons and well logs
- Manual and automatic classification (SOM, K-Means)
- Regression curves
- Retro-mapping and geobodies extraction
- Facies volume creation

Geobody & Layer
- Geobody modeling
- Geobody isochore
- Geobody volumetrics
- Geobody classification

Faults
- Fault plane attribute
- Fault viewer
- Automatic fault extraction
- Fault dip and azimuth filtering
- Fault size filtering
- Fault splitting and merging
- Fault merging assistant
- Fault plane extrapolation
- Fault cutting

Horizons
- Horizon stack creation
- Horizon shifting
- Horizon smoothing
- Horizon merging
- Horizon picking along arbitrary lines
- Horizon and horizon stack extraction
- Horizon lighting
- Isochore computation
- Horizon stack blending viewer
- Attribute mapping

Flattening
- Horizon flattening
- Dynamic flattening from horizon stack
- Log viewer flattening
- Interpretation flattening

Multi-Z
- Multi-Z object picking for 2D and 3D
- Multi-Z object editing
- Multi-Z smoothing

Attributes
- Seismic attributes
- Frequency decomposition
- Structure oriented smoothing
- 3D model attributes computation
- Real time attributes
- Surface real time attributes
- Spectral bluing
- Colored inversion
- Calculator
- Fault Plane

Well correlation
- Log viewer
- Wells markers management and display
- Flattening from well markers
- Well marker QC table
- Well trajectory picking
- Arbitrary line picking
- Arbitrary line creation along wells
Add-on Module - Features

Advanced Interpretation

Sequence Stratigraphy

- Sequence creation
- Real time wheeler diagram
- Sequence along arbitrary lines
- Sequence extraction:
  - Layers
  - Horizons
  - Horizons stack
  - Isochore

Color Blending

- Volume
- Arbitrary line
- Horizon stack
- Horizon
- Color blended volumes export

Automatic Geobody Extraction

- Geobody extraction from attributes
- Split / merge
- Geobody volume computation
- Geobody isochore computation

Unconformities Management

- Horizons truncations
- Terminations selection
- Stratigraphic closures

Watertight Model

- Horizons / faults
- Fault polygons
- Allan diagram

Static Geological Model

- Corner point grid generation
- Stair stepped faults
- Seismic facies modelling
- Export in Eclipse format

Time-Depth

Seismic-Well Tie

- Sonic calibration
- Well tie processing
- Log depth adjustment
- Wavelet creation:
  - Analytic
  - Statistical
  - Deterministic

Velocity Modeling

- Layers definition from the model
- Interval, average, RMS and Dix velocities
- Use interval velocities from the wells

Depth Conversion

- Real time conversion
- Depth display:
  - Real time cross navigation
  - Volumes
  - Horizons

Properties Modeling

- Well rock property propagation:
  - Inverse distance
  - Kriging
  - Co-kriging

Data Connector

- Petrel®
- OpenWorks®
- GeoTeric®

- Faults
- Horizons
- Volumes
- Wells
- Culture Data
- Geobodies - Layers - Multi Z
- 2D Lines

Python API

- Write and execute Python code in PaleoScan™:
  - Custom seismic attributes
  - Custom user interfaces and tools
  - Call external code and libraries
  - Integration of existing Python libraries (SciPy, NumPy)

*Petrel® is a trademark of Schlumberger*  
**OpenWorks®** is a trademark of Halliburton  
***GeoTeric® is a trademark of FPA**