

High-Performance Geoscience Interpretation Workflow

Applications Needed

- GeoProbe
- PowerView with PowerCalculator
- Well Seismic Fusion
- OpenWorks

Overview

The goal of the High-Performance Geoscience Interpretation Workflow is to provide a next-generation interpretation system that combines volume, seismic, and geological processes into a single seamless environment where quality prospects can be defined and rapidly explored.

The workflow consists of these three elements:

- An easy-to-use 1D/2D/3D interpretation environment in which a small number of powerful applications performs the majority of interpretation workflows. These applications have a common user interface that provides access to data, application, and process integration.
- Automated basic processes that let interpreters spend most of their time working on high-level tasks.
- Data management that includes all interpretation elements. With all seismic, well, and interpretation data stored or referenced by the project datamodel, applications can read the data directly from the database.

This example of the High-Performance GeoScience Interpretation Workflow uses GeoProbe, PowerView, PowerCalculator, and Well Seismic Fusion in the following manner:

1. **GeoProbe, PowerView, PowerCalculator and Well Seismic Fusion:** These applications are used in the first part of the workflow, Dynamic Integration, which focuses on interactive communication and updating of results among the applications.
2. **GeoProbe:** The second part of the workflow, Multi-Volume Interpretation and Frameworking, uses GeoProbe and modules within it to build a sealed structural model.
3. **PowerView, GeoProbe, and Well Seismic Fusion:** Basin Scale Interpretation, the third part of the workflow, combines the functionality of these three applications to build a simulation of basin evolution over time. The ultimate goal is to produce qualified play fairway maps.
4. **Well Seismic Fusion:** In Prestack Interpretation, the fourth part of the workflow, Well Seismic Fusion lets you interpret prestack seismic just as quickly and efficiently as you interpret poststack seismic.

This workflow does not demonstrate all the functionality of the software

This workflow demonstrates the integration between the applications and does not include all of the software's functionality. There are other possible ways the applications could be used together, as well as separately. Refer to the individual product's online help for more information.

Data Flow

In this section, the four subworkflows of the High-Performance Geoscience Interpretation Workflow are displayed in separate boxes. Each subworkflow lists

- the programs that are being used
- the names of the documents containing the specific instructions for the steps in the subworkflows.

**Subworkflow 1
Dynamic Integration**

GeoProbe, PowerView/PowerCalculator, and Well Seismic Fusion contain the following functionality for dynamic communication and updating of results among the applications:

PowerView/PowerCalculator

- With the smartFault tool, track fault segments directly on semblance data.
- Use interactive cursor tracking to exchange positional information with GeoProbe.

For details, refer to the PowerView and PowerCalculator Online Help.

GeoProbe

- Display GeoProbe Probe outlines in PowerView Sections and Maps.
- Use universal tracking to see where Probes are.
- Compute attributes in memory on Probe faces to improve attribute-parameters testing and reduce data storage.
- With 'data on demand,' view and interpret unlimited volumes of data in 3D space.
- Click once to access prestack seismic interpretation in Well Seismic Fusion.
- Simultaneously analyze multi-attribute/multi-volume seismic, and well and cultural data.

For details, refer to the GeoProbe Online Help.

Well Seismic Fusion

- Drag and drop 3D seismic data, horizons, wells, and log curves between Well Seismic Fusion and the PowerView Inventory Tree or Select Session Data dialog box.
- PD wellbore and seismic x/y locations between Well Seismic Fusion and both PowerView and GeoProbe.
- PD an arbitrary 3D seismic line from the PowerView Section to Well Seismic Fusion.
- Extract wavelets from GeoProbe shared memory volumes.
- View and process GeoProbe .vol files and shared memory volumes in Well Seismic Fusion.
- See location markers in PowerView's Map View for prestack gathers in Well Seismic Fusion.

For details, refer to the Well Seismic Fusion Online Help.

In any or all of these applications...

- Use interpretation notes to capture information about interpretation for future generations. The notes are stored in OpenWorks.
- Note a common look and feel.

Subworkflow 2**Multi-Volume Interpretation and FrameWork Construction**

The goal of this subworkflow is to apply 3D picking techniques to 2D and 3D data to build a sealed structural model.

GeoProbe

- As the interpretation progresses, use ezModel in GeoProbe to construct the framework model in these four steps:
 - Load all interpretation data to the GeoProbe 3D interpretation environment. Use ezFault or swFault in GeoProbe to check faults. Clean and interpolate surfaces.
 - Load initial fault interpretation to the ezModel module to build a fault network. Seal the network based on fault relationships.
 - Trim horizons and add polygons, if needed. The result is a sealed horizon and fault network with polygons.
 - Validate and export. Color-code the fault polygons by the fault attributes of heave, throw, and slip. Test the horizon and fault interpretation for lateral slip along faults; erroneous fault correlations; or incoherent horizon interpretation. Save the model-ready interpretation to SeisWorks, PowerView, and OpenWorks.

For details, see the GeoProbe Online Help.

Subworkflow 3**Basin Scale Interpretation**

This subworkflow involves building a simulation of basin evolution over time to produce qualified play fairway maps.

PowerView

- In the Well Correlation view, set up log curve suite displays, save them, and recall them from OpenWorks. The result is rapid well log interpretation in detailed vertical track style displays that link to 2D and cross-section views.
- Access ESRI shape files and spatial database engines.
- Use interpretation sets to maintain a series of top prospect horizons or grids together with references to the velocity models used to generate them. Add more data as it becomes available so scenarios can be better evaluated.

For details, see the PowerView Online Help.

PowerView 2D Seismic Interpretation and GeoProbe 2D Seismic Visualization

- View and interpret unlimited volumes of 2D or 3D seismic in 2D or 3D space.

For details, see PowerView Online Help and GeoProbe Online Help.

PowerView and Well Seismic Fusion

- Select gather locations directly from PowerView Maps.
- Display prestack and stack seismic data in the same Sections to determine the validity of prospect attributes.
- When an amplitude observation is validated, model it in detail in Well Seismic Fusion.

For details, see the Well Seismic Fusion Online Help.

**Subworkflow 4
Prestack Interpretation**

When Well Seismic Fusion “publishes” prestack seismic data to the OpenWorks catalog, see the same prestack in place. In only hours, discover and use all the Prestack seismic data available to your company. With Release 5000.0.0 functionality, reduce risks in seismic quality and the accuracy of reservoir prediction.

Well Seismic Fusion

- In Well Seismic Fusion, calibrate seismic data to reservoir attributes by creating, accessing, and storing offset synthetics and VSPs in OpenWorks Well Data Manager.
- Also in Well Seismic Fusion, see prestack seismic on the desktop and receive access to reservoir information previously unavailable to interpreters.
- Click on a stack volume in any Landmark application and display the prestack seismic data used to create that stack volume without any knowledge of where the prestack is stored.
- Interpret on the prestack seismic data and create maps of prestack attributes.
- Have the processor or specialist work on the same prestack as the interpreter to enhance the interpretation.

For details, see the Well Seismic Fusion Online Help.