

# Geomodeling 2019.3

Fully Integrated 3D Interpretation



## GVERSE<sup>®</sup> Geomodeling

### Fully Integrated 3D Interpretation

GVERSE<sup>®</sup> Geomodeling is a sophisticated integrated solution for subsurface geological/reservoir modeling. Detailed analysis of the reservoir is always crucial prior to field and well planning. With GVERSE Geomodeling, making an informed decision is much easier as this application supports numerous types of data sources for a comprehensive understanding of the petroleum system.

The integrated application combines geological, geophysical, petrophysical, GIS, and engineering data in a single environment, with real-time 3D visualization of the developing geomodel that helps interpret the results from different domains of geosciences and formulate optimized and cost-effective field development solutions.

Surface relationships are modeled in a dynamic real-time environment. The geosurface model can be configured to generate surface conformance relationships, unconformity trimming, channel geometries, subcrop mapping, fault offset and automatic fault polygon generation, as well as gross, net, and net/gross reservoir maps. Additionally, ZoneManager attributes from any source can be modeled directly in Geomodeling and kept up-to-date with new data as it is saved to ZoneManager.

## Key Benefits

### Real-time Integrated Visualization of Results

GVERSE Geomodeling provides an integrated real-time map view, cross section view, and 3D visualization of the developing geomodel. GVERSE Geomodeling integrates petrophysical, geophysical, drilling, and GIS data into the interpretation to observe the real time effect of what-if scenarios on a developing geomodel.

### Quick and Easy

As compared to traditional tools, GVERSE Geomodeling allows geoscientists to load, integrate, interpret, and display large datasets with minimum time and effort required.

### Flexibility

Features like the ability to Quick Pick surface tops and fault cuts on cross sections and the map view, clip the 3D grid, develop fence diagrams, create modeling regions, and define well group annotations to offer greater flexibility in the interpretation workflow. Docking windows and panels provide the freedom to arrange the workspace as desired. Saving the interpretation configuration of the workspace enables the user to resume the work from where they left off after closing the previous session.

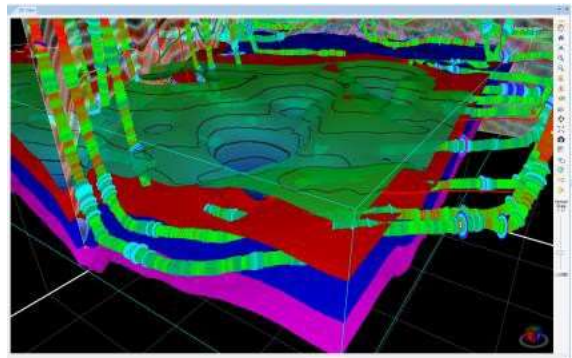
## Key Features

### Integration

Observe the multi-disciplinary relationships in your geomodel with tightly integrated and synchronous Map, Cross Section and 3D views. GVERSE Geomodeling is designed for the geoscientists who work on integrated data sets that include geological, petrophysical, geophysical, drilling, and GIS data. It includes an integrated map, cross section, and 3D view of the geomodel which enables you to work in 2D or 3D views simultaneously. Use the GeoSurface Model tool to efficiently source and generate surfaces and faults and model complex geometries such as unconformities, channels, and subcrop maps, conformance relationships among surfaces, and fault offset and automatic fault polygon generation on all the views of GVERSE Geomodeling.

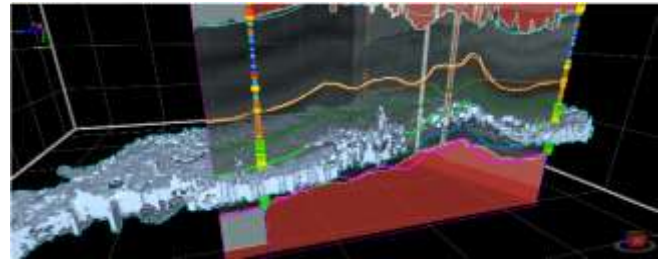
### Integration with GVERSE Petrophysics

Considering the importance of petrophysics in understand the reservoir, the application facilitates the representation of petrophysical properties (i.e. porosity, saturation and geomechanics etc.) based on GVERSE Petrophysics models. These petrophysical modeling results can be displayed on the fence diagrams as curves to better understand the character of the reservoir or on presentation templates on the cross section view.



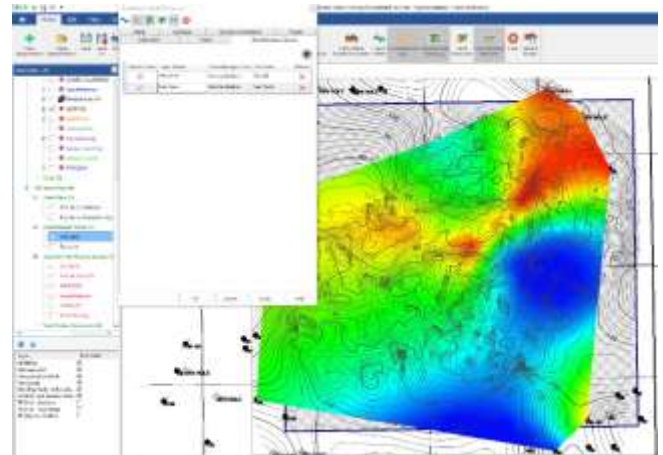
### Integration with GVERSE Geophysics

Incorporate your seismic interpretation into your geomodel with dynamically depth converted horizons, faults, and seismic backdrops on cross sections and fence diagrams. Update the velocity model with interpreted interwell points from your smartSTRAT geosteered well for the most up-to-date depth conversion possible. Display depth converted seismic geobodies in cross section, fence diagrams, and in 3D.



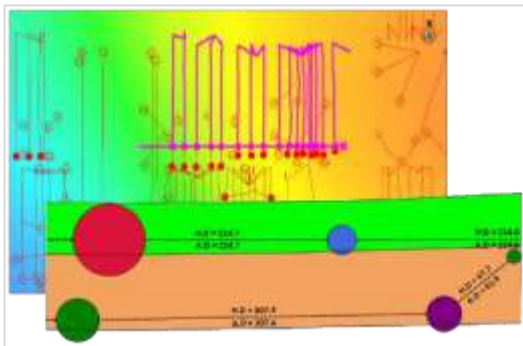
### Integration with ZoneManager

Create on-the-fly property maps sourced from ZoneManager attributes. ZoneManager integration allow interpreters to integrate Geomodeling with data from any source that is stored in Zonemanager zones.



### Block Diagrams

GVERSE Geomodeling allows you to create block diagrams or gun sight sections that show intersection point of horizontal wellbore with the line of section as it drills through the target formations. In block

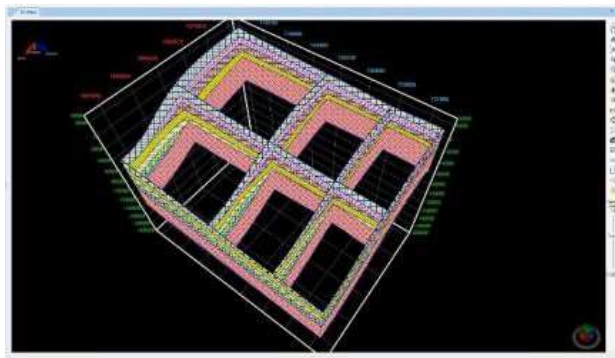
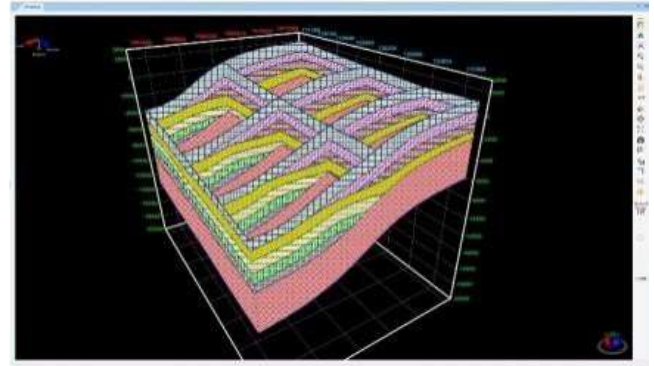


diagrams, the line of section is laid perpendicular to the wellbore path and in the cross section view they show penetration point of the horizontal wellbore drilling inside the target horizon. This helps the drillers in planning inside the drilling section unit as distances between wells can be shown in the block diagram.

Absolute and horizontal distances between wells drilling inside the same target can be determined very easily in a block diagram. Likewise, Drilling Section Unit (DSU) boundary distances between corner wells and section boundary can also be determined in block diagram. Additionally, you can add formation thickness, distance filtering on the basis of formations and wellbore custom properties to get the complete picture of drilling wells and their placement inside the respective target formations.

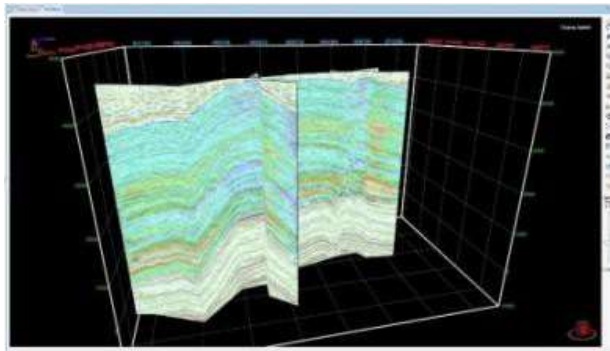
### Fence Diagrams

Facilitate a better understanding of the reservoir by creating fence diagrams of the open cross sections. This feature assists in analyzing and representing litho- stratigraphic relationships, pinchouts and truncations of units, unconformities, structural and stratigraphic traps within the reservoir.



### Co-blending

Validate the reservoir behavior by co-blending seismic attributes against interpolated curve properties, lateral lithofacies variation, and related structural geometries on cross sections and fence diagrams.



### Interpolation

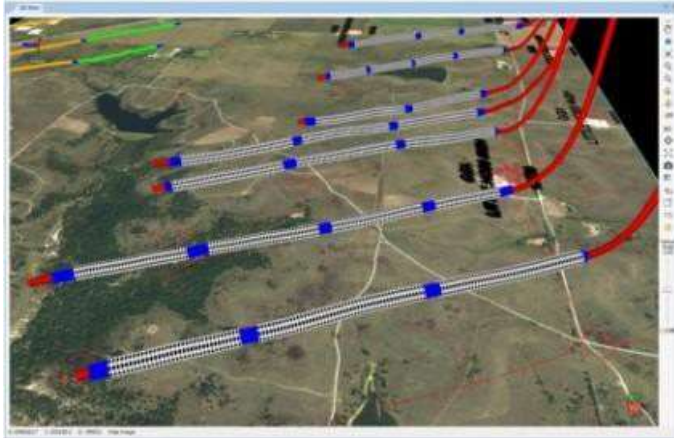
Advance your understanding of the reservoir by analyzing different geological sections and identify lithofacies, stratigraphic sequences, and depositional trends from the logs. GVERSE Geomodeling interpolation helps you understand the interplay between lithofacies and depositional or structural trends.

### Clipping Planes

In a complex geomodel, clipping can play a significant role in examining the relationships among surfaces and faults. Using GVERSE Geomodeling clipping tool, you can easily clip planes vertically or horizontally to keep a specific portion of the scene's geometry in focus and analyze the trajectory of wells as they are drilled through geomodel surfaces.

### Completion and Perforation Postings

Display **Completions** stages and **Perforation clusters** along the wellbore path in **3D View** to identify the productive zones of the targeted formations.

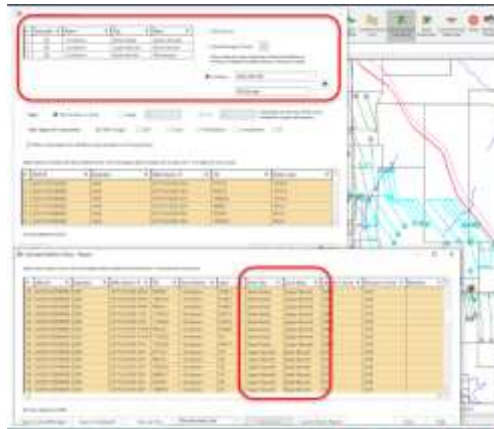
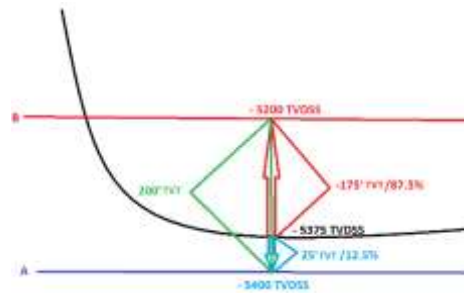


### Opening XSection Cross Sections in GVERSE Geomodeling

Setup the loading of XSection cross-sections within the AOI of the active interpretation. This import feature validates the data in the file and tries to match the stratigraphic column, surfaces, faults, and even the file name until conflict dialogs are displayed where the user can easily define the desired stratigraphic columns, surfaces, faults, and file name manually.

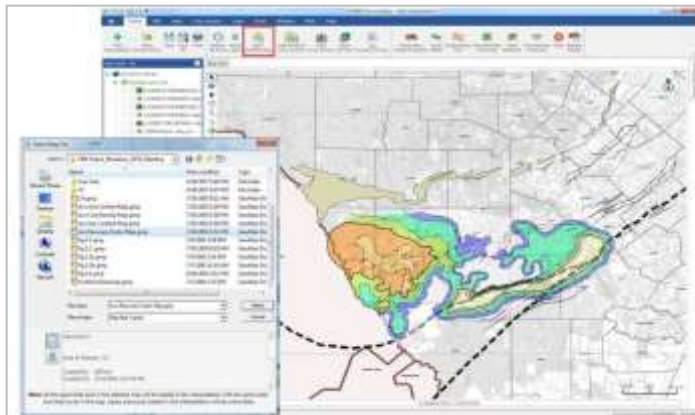
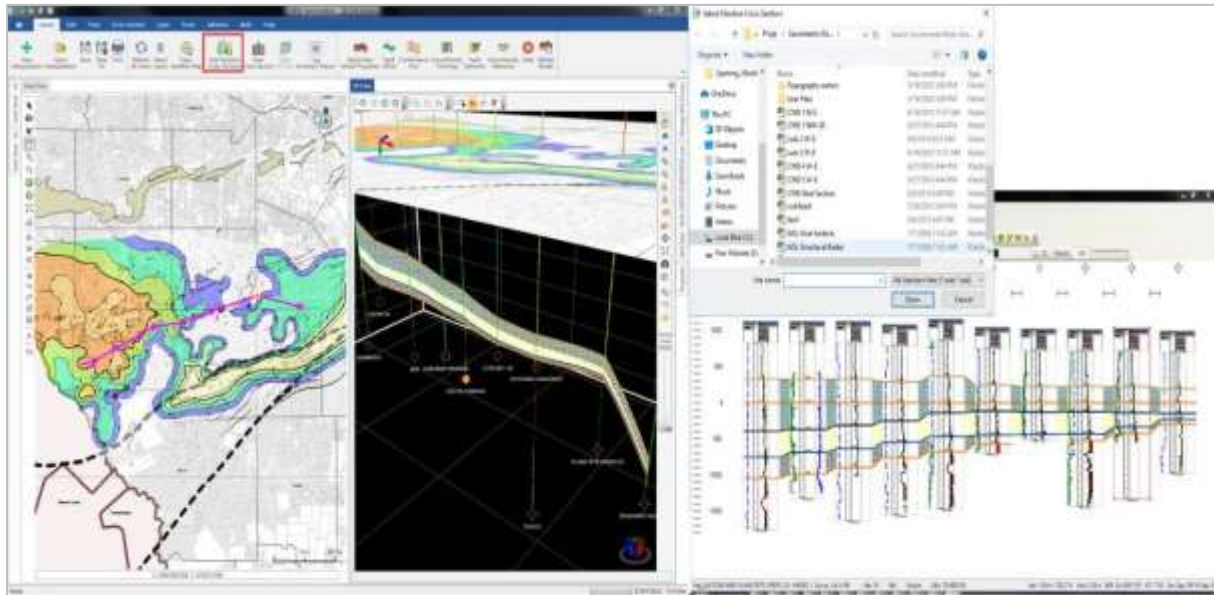
### Calculate the length and percent of the horizontal well in zone for multiple zones and geobodies

Calculate the length and percent of the well in multiple zones and geobodies for the well bore, DSTs, Perfs, Core, and Completions in faulted or eroded zones. Create a well survey point report defining the position of the well bore within the zone



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### Opening GeoAtlas Maps

Mimic your GeoAtlas workflow by being able to open any GeoAtlas map in the map view of Geomodeling. Quickly change between saved GeoAtlas maps without having to select individual layers for display.

## Release Highlights 2019.3.

### Integration with ZoneManager Attributes

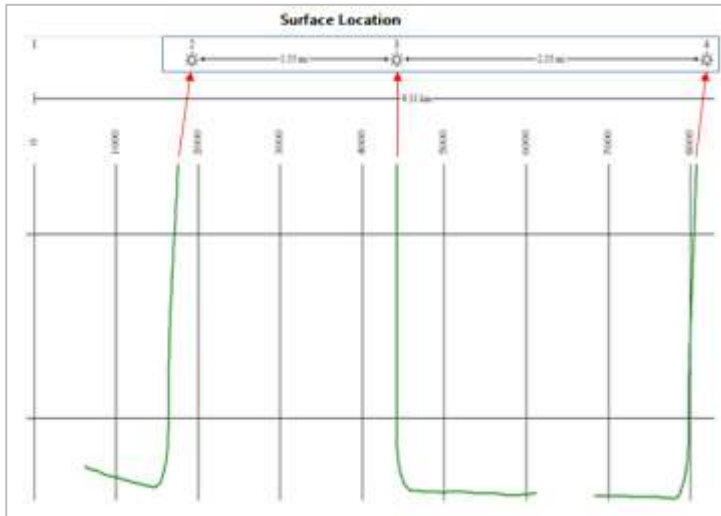
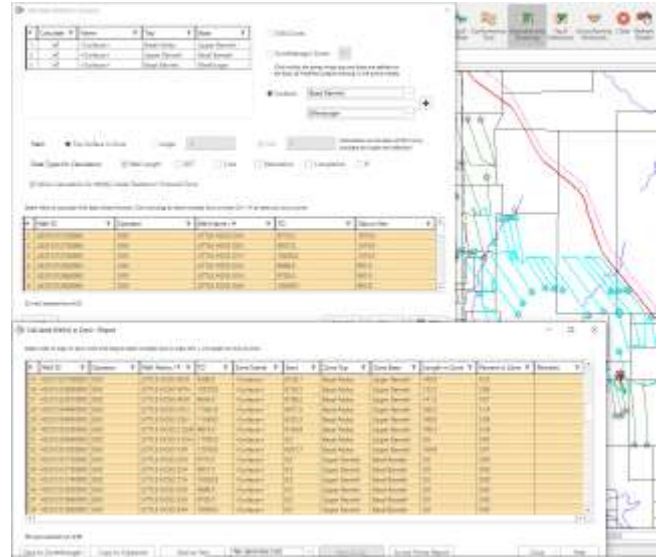
Create on-the-fly property maps directly from ZoneManager zone attributes. This new feature enhances the ability to integrate property maps from any source into your geomodel.

### Display Depth-converted Seismic Geobodies

Display depth converted seismic geobodies in cross section, fence diagrams in 3D.

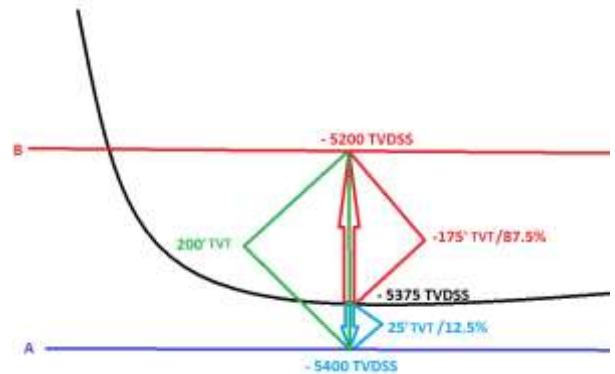
### Calculate Length and Percent of the Well in Zone for Multiple Zones

Calculate the length and percent of the well bore, DSTs, Perfs, Core, and Completions in the zone of interest.



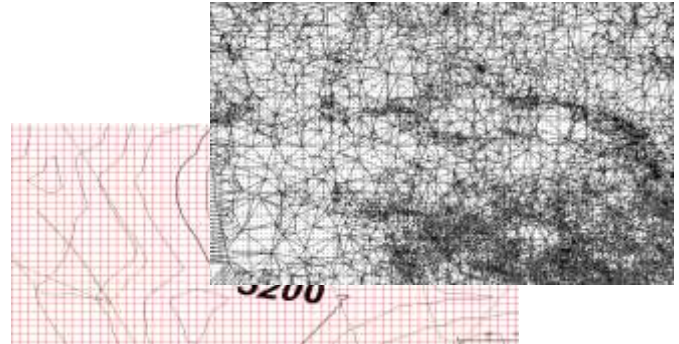
### Well Survey Point in Zone Report

Create a report of the Well Survey in the Zone for: Zone Top, Zone Base, Zone TVT, Zone Top TVTSS, Top TVT Offset, Top Offset %, ZoneBase TVDSS, Base TVT Offset, and Base Offset %



### View Surface Mesh Triangles or Grids

Display either the triangles on modeled surfaces or grids of seismic or IsoMap surfaces on the map.



### Surface Well Intersections

You can now turn on the **Surface Well Intersections** from the GVERSE Geomodeling toolbar that displays intersection points as (pies) on the wells intersecting the active surface in the Map View. This is very useful in removing the unnecessary wells from the model or cross-sections.

GeoSurface Model Properties

Wells Surfaces Surface Constraints Faults Networks Zones

Model Zone	Layer Name	Top	Base	Attribute	Interval Data	Depth	Remove
<input checked="" type="checkbox"/>	Top	K2a	K2c	Gross	(None)	TVT	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Intermediate	K2c	K2c	Gross	(None)	TVT	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Base	k6b	K2c	Gross	(None)	TVT	<input checked="" type="checkbox"/>

OK Cancel Apply Help

### Export and Import Inter-well Point

Export inter-well points from the geomodel for use in other interpretation projects or 3<sup>rd</sup> party applications. Import inter-well points into the model to better integrate the Geomodeling Interpretation with geosteering applications.



# Requirements

The following sections list the system requirements for the GVERSE Geomodeling.

## Software

The software that must be installed on the system running the application are as follows:

- GeoGraphix 2019.3
- LMKR License Management Tool 2019.2 for GVERSE® Geomodeling license.
- Microsoft DirectX End-User Runtime (June 2010)
- Adobe Reader for selected help files (optional)

## Operating System

To run the application, you need one of the following operating systems installed on your system:

- Windows® 7 Professional x64
- Windows® 7 Enterprise x64
- Windows® 7 Ultimate x64
- Windows® 10 Professional x64
- Windows® 10 Enterprise x64

**Note:** It is recommend to use the latest Microsoft® service packs and security patches. Geomodeling specifically requires Windows platform update KB2670838 installed on the machine, in case the operating system is Windows 7.

## Hardware

- System: 8 GB (16+ GB recommended)
- Graphics Card: 2 GB (4 GB recommended)
- DirectX 11 capable hardware

**Note:** We recommend using the latest video drivers and Microsoft updates for your system.

## Licenses

The following licenses are required to run the application:

- GeoGraphix license version 2019.3
- GVERSE® Geomodeling license version 2019.3

The GVERSE® Geomodeling license is required to enable Model 3D view and Contours on Map view. Also note that FrameBuilder™ is part of the GVERSE® Geomodeling license.

**Note:** Refer to the Customer Support Portal (<https://www.gverse.com/support>) for up-to- date information on the requirements.