RELEASE NOTES

Geomodeling

Fully Integrated 3D Interpretation

Release Notes

GVERSE Geomodeling 2017.2

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Introduction

LMKR is pleased to announce the release of the GVERSE™ Geomodeling 2017.2.

This document provides an introduction to the Geomodeling features and benefits. It also lists the system requirements necessary to install and run the software.

What is GVERSE Geomodeling?

GVERSE Geomodeling introduces an integrated environment for geological/reservoir modeling that incorporates existing mapping and cross section features of smartSECTION® with the 3D view.

The application is part of the GVERSE application suite by LMKR (http://www.lmkr.com/gverse).

LMKR GVERSE consists of geoscience and engineering solutions focused on workflow optimization and enhancing productivity of teams working on diverse geological and geophysical projects.

Main Features

The main features of the Geomodeling application as follows:

- **Integrated 3D Visualization Environment**
  GVERSE Geomodeling introduces an integrated map, cross section, and 3D view of a geomodel which enables you to work in 2D or 3D views simultaneously. Observe the real time effect of topography and subsurface geology in your geomodel with tightly integratred and synchronous Map, CrossSection and 3D views. Designed for the geoscientists who work on integrated data sets that include petrophysical, geophysical, drilling, and GIS data.
- **Well Data Visualization and Management**
  GVERSE Geomodeling provides simple and flexible methods to create geomodel based on filtered set of wells. Wells can be filtered by spatial selection or by predefined filters created in GeoGraphix®.
- **Display Surface Tops, Fault Cuts and Well logs in 3D View**
  Enhance the understanding of your reservoir by displaying log curves, surface tops and fault cuts along the wells in 3D view. With these features you can characterize your reservoir on the basis of log curves and surface geometries.
- **Interpolation**
  Multiple interpolation methods are available to help diagnose interplay between lithofacies, depositional trends as suggested by the log curve response. Advance your understanding of the reservoir by analyzing different geological sections and identifying lithofacies, stratigraphic sequences, and depositional trends from the interpolated logs.
- **Clipping Planes**
  In a complex geomodel, clipping plays a significant role in examining interrelationships and intrarelationships between 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 trajectory of wells as they are drilled through geomodel surfaces.

- **Fence**
  Construct a true geomodel of the region by creating fence diagrams. This feature assists in construing and representing litho-stratigraphic relationship, pinchouts and truncations of units, unconformities, structural and stratigraphic traps and any other geological associations that exist in a region.
- **Displaying Petrophysical Model on Fence**
  Considering importance of Petrophysics, GVERSE Geomodeling represents petrophysical models (porosity, saturation and geomechanics etc.) based on statistical methods. These petrophysical modeling results are used to populate the fence diagrams to comprehend and analyze general behavior of the reservoir and future prospects.
- **Coblending Fence with Seismic**
  Justify the reservoir behavior by means of harmonizing acoustic impedance contrast with interpolated curve, lateral lithofacies variation, and relating structural geometries from both cross sections and seismic sections. Regional behavior of the reservoir can be quickly analyzed by applying co-blended Interpolated computed or raw curve responses over entire seismic.
- **Perforation Postings**
  Display Completion, Perforation Stage and Perforation along the wellbore path in 3D View to identify the productive zones of the targeted formations. Display of satellite image along the perforation data also helps to determine potential environmental hazards and plan areas for future prospect accordingly.

Benefits

- **Real-time Integrated Visualization of Results**
  GVERSE Geomodeling provides an integrated real-time map view, cross section view, and 3D visualization of a developing geomodel. Integrate petrophysical, geophysical, drilling, and GIS data into the interpretation and observe real time effect on a comprehensive geomodel.
- **Quick and Easy**
  As compared to traditional tools, GVERSE Geomodeling allows geoscientists to load and display large datasets with minimum time and effort required.
- **Scalability**
  GVERSE Geomodeling provides support for modeling surfaces created from wide range of datasets. Cross sections with high amount of wells and large aerial extents are handled in an efficient manner.
- **Flexibility**
  Features such as the ability to quick pick on Main Map view, clipping of 3D gird, developing fence diagrams, and creating regions and groups for wells offer greater flexibility in Interpretation workflows. Docking windows and panels provide the freedom to arrange the workspace as desired and saving complete state of the workspace facilitates the user to resume the work from where they left off.

System Requirements

The following sections list the system requirements for the Geomodeling.

Software

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

- GeoGraphix Discovery 2017.2
- LMKR License Management Tool 2016.1 for GVERSE Geomodeling license
  The LMKR License Management Tool (LMT) must be installed to configure the 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

- 2 GB RAM Minimum
- 4 GB RAM 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 Discovery license version 2017.1
- GVERSE Geomodeling license version 2017.1
  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.

Notes:

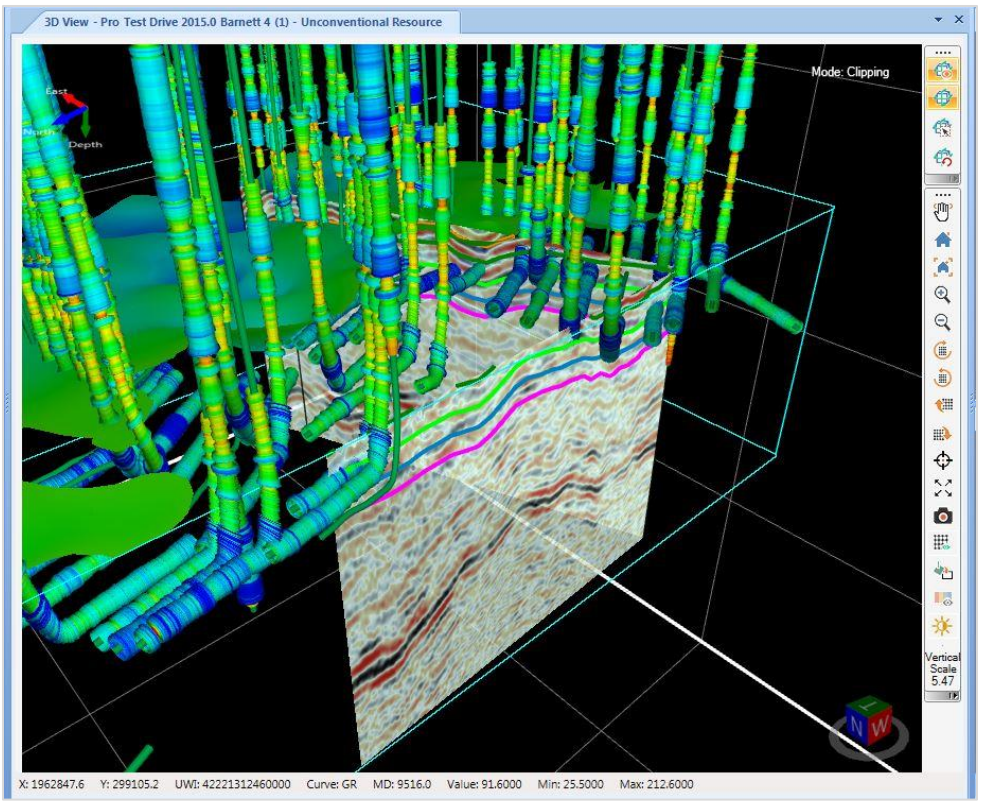
- Users upgrading from Geomodeling 2017.1 to Geomodeling 2017.2 do not require a new license. New users need a valid LMKR license.
- Refer to the LMKR Customer Support Portal (http://support.lmkr.com/) for up-to-date information on the requirements.

What's New in 2017.2

Clipping Options Toolbar

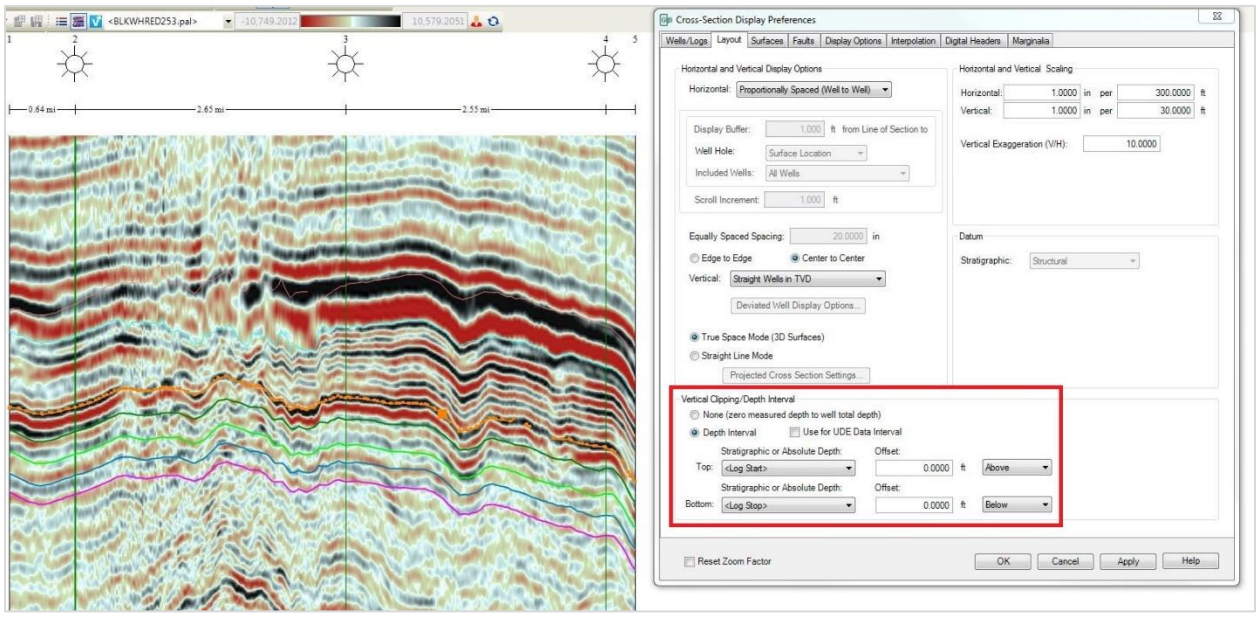
Working in the 3D View with multiple layers is made easier with the **Clipping Options** toolbar.

You can use the options to enable or disable clipping mode, select the objects to be clipped, and view the boundaries of objects as you clip them.



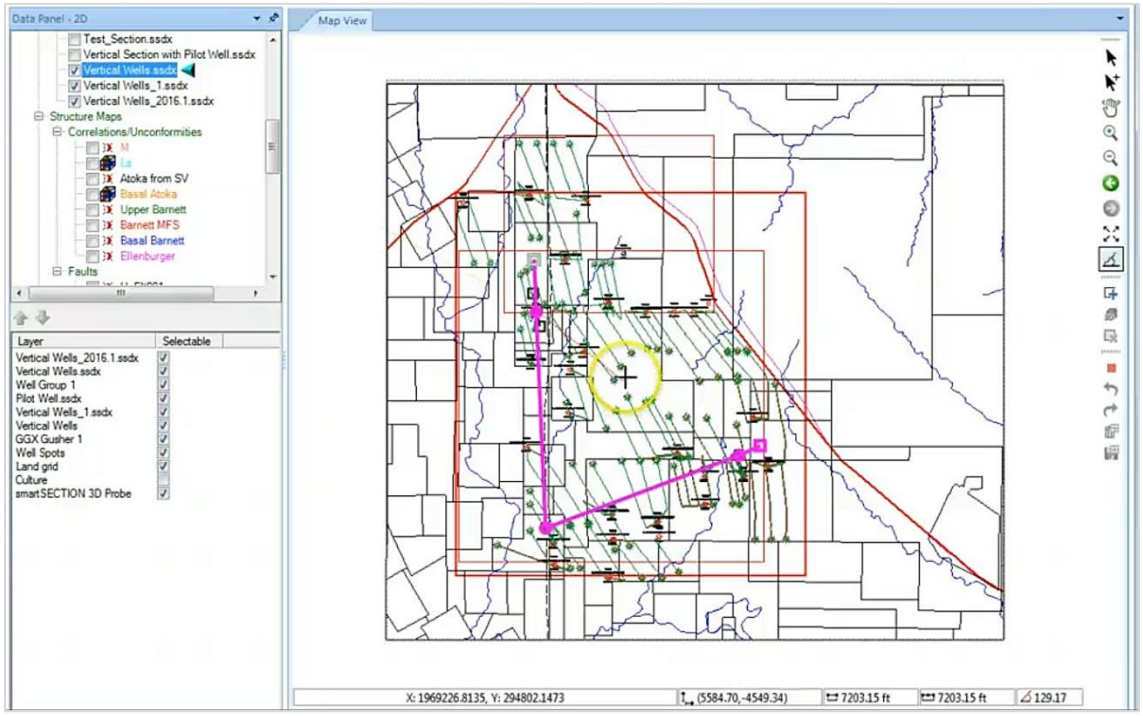
Log Start\Stop and Stratigraphic Datum Clipping Options

Clipping option is added to the Layout tab of the **Cross Section Display Preferences** dialog box. You can now choose to clip the log from the top or bottom so that it starts and ends where curve data starts and ends. To clip the logs, go to **Cross Section Display Properties** dialog box and enter the desired values in the **Vertical Clipping/Depth Interval** group box.



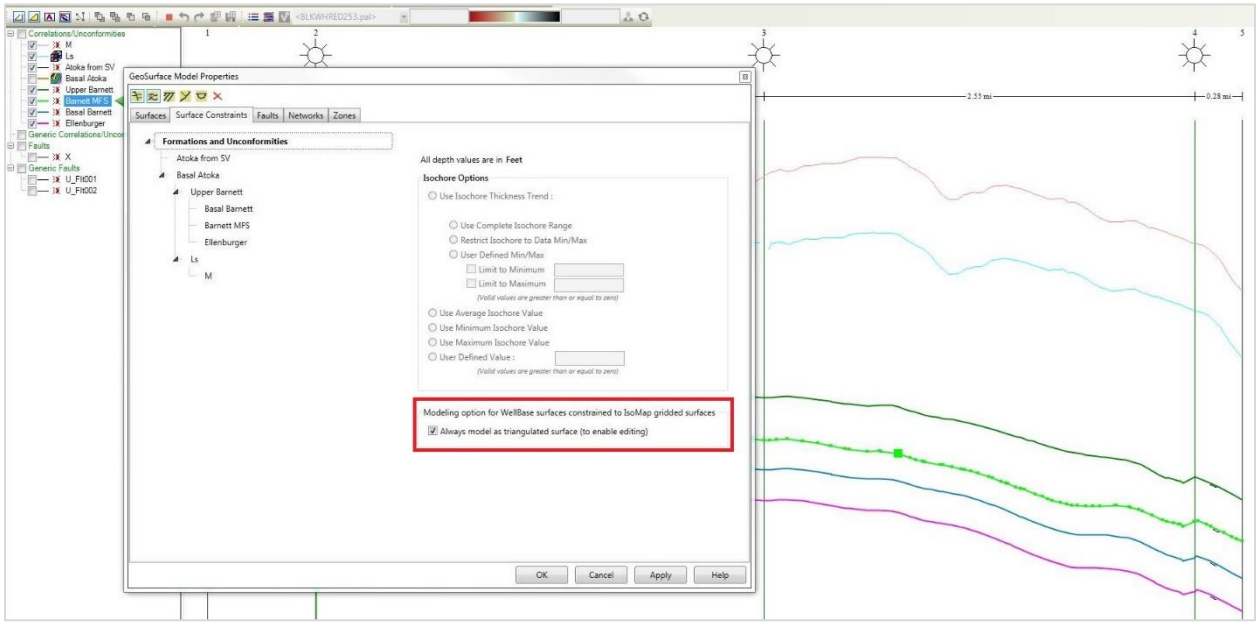
Distance and Angle Tool

The Distance and Angle tool is added to the **Map View** toolbar. You can use it to measure distance and angle between two wells in the Map View.



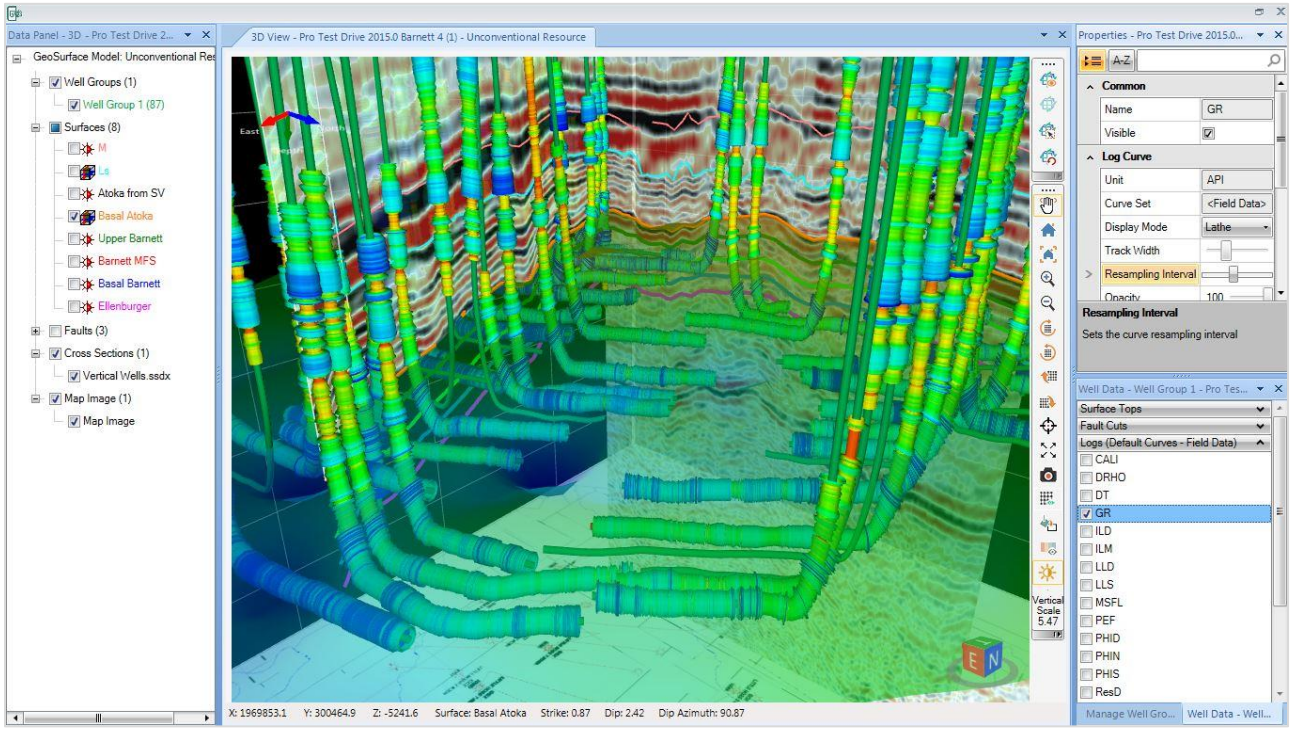
Modeling Option for Surfaces

An option for modeling the WellBase point surfaces as Triangulated Surfaces is added to the **Surface Constraints** tab of the **GeoSurface Model Properties** dialog box. When this option is selected, the interwell points of the well-base point constrained surface are visible in the cross section view.



Dockable Data Panel 2D/3D

Data Panel 2D and 3D are dockable and can be placed anywhere on your workspace. Grab the top bar of the data panel and drag it to the desired location for your ease of use.



Posting Properties

A new field Confidence is added to the **Posting Properties** dialog box. You can use it to show confidence data on the cross sections.

International Trade Compliance

This application is manufactured or designed using U.S. origin technology and is therefore subject to the export control laws of the United States. Any use or further disposition of such items is subject to U.S. law. Exports from the United States and any re-export thereafter may require a formal export license authorization from the government. If there are doubts about the requirements of the applicable law, it is recommended that the buyer obtain qualified legal advice. These items cannot be used in the design, production, use, or storage of chemical, biological, or nuclear weapons, or missiles of any kind.

The ECCNs provided here (if available) represent LMKR's opinion of the correct classification for the product today (based on the original software and/or original hardware). Classifications are subject to change. If you have any questions or need assistance please contact us at support@lmkr.com.

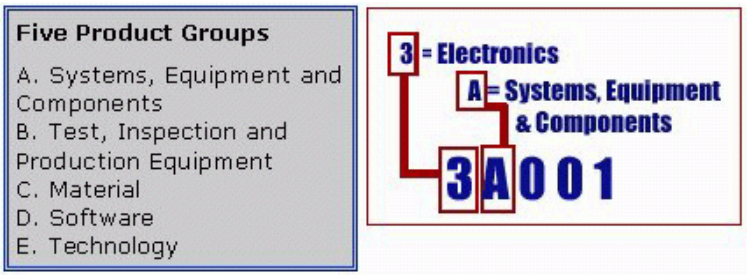
Under the U.S. Export Administration Regulations (EAR), the U.S. Government assigns your organization or client, as exporter/importer of record, responsibility for determining the correct authorization for the item at the time of export/import. Restrictions may apply to shipments based on the products, the customer, or the country of destination, and an export license may be required by the Department of Commerce prior to shipment. The U.S. Bureau of Industry and Security provides a website to assist you with determining the need for a license and with information regarding where to obtain help.

The URL is: http://www.bis.doc.gov.

Definitions

ECCN - Export Control Classification Number - The ECCN is an alpha-numeric code, e.g., 3A001, that describes a particular item or type of item, and shows the controls placed on that item. The CCL (Commerce Control List) is divided into ten broad categories, and each category is further subdivided into five product groups. The CCL is available on the EAR Website.

The below illustration is a sample:



The ECCN number (if available) and License Type for this product are included in the table below. Also included is the date the table was last updated.

Product/Component/R5000	EAR Number	License	Last Updated On
GVERSE Geophysics	EAR99	EAR	11/28/2017

Contacting LMKR Support

LMKR is committed to providing the highest level of technical customer support in the industry. With an average tenure of more than thirteen years, our highly trained and experienced staff of technical analysts is comprised of geoscientists, engineers, land professionals, petrophysicists, and system specialists.

Please refer to our Customer Support timings mentioned below to ensure that you have access to our support analysts assigned to your region. When getting in touch with LMKR support, please remember that real-time support will not be available during bank holidays or after office hours. If you do get in touch with LMKR Support outside of work hours, please leave a voice message with a brief description of the issue that you are facing. Your voice message will be used to automatically create a support case for you. This will enable our analysts to attend to your issue and provide you with a resolution as soon as possible

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Helpful Links

Name	Website Address
LMKR Homepage	http://www.lmkr.com
LMKR GVERSE	http://www.lmkr.com/gverse
LMKR Support Portal	http://support.lmkr.com