Geomodeling
Fully Integrated 3D Interpretation

Release Notes

GVERSE Geomodeling 2017.3

Contents

Introduction

LMKR is pleased to announce the release of the GVERSE® Geomodeling 2017.3.

This document provides an introduction to the GVERSE 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 integrated 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.

Installing GVERSE Geomodeling

GVERSE Geomodeling is installed seamlessly as part of the GeoGraphix installation. For details, refer to the GeoGraphix Installation Guide on the LMKR Support Portal > Knowledge Center > Release Notes and Installation Guides page.

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System Requirements

The following sections list the system requirements.

Software

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

- GeoGraphix Discovery 2017.3
- 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

- 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 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 or 2017.2 to Geomodeling 2017.3 do not require a new license. New users need a valid LMKR license.
- Refer to the LMKR Customer Support > Knowledge Center > System Requirements page for up-to-date information on the requirements.

What's New in GVERSE Geomodeling 2017.3

Modern Graphical User Interface

Experience better usability with the redesigned application window that provides improved docking support and easy to access ribbon controls, optimized for efficiency and productivity.
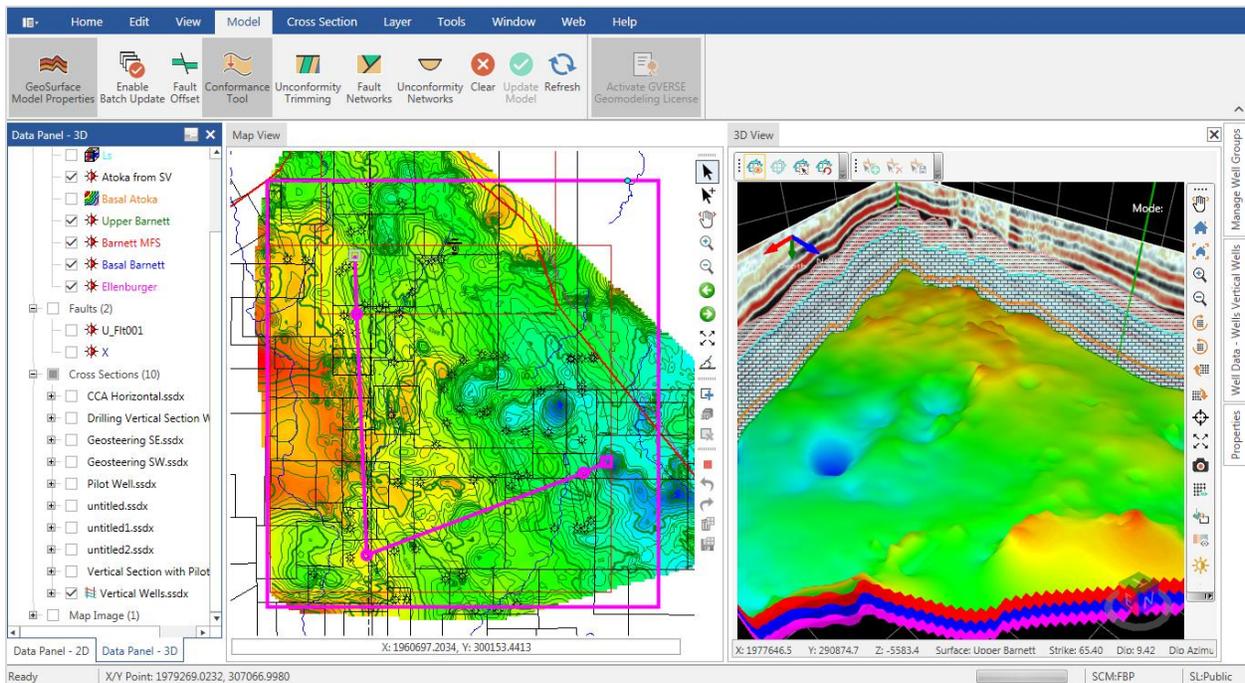

Calculate Wells Length and Percent in Zones

Determine the length and percentage of drilling wells within a target zone and save the calculations in ZoneManager or export the details in an ASCII file. To access the Calculate Well(s) In Zone dialog box, either select **Tools > Calculate** Well(s) In Zone option or right click the selected well(s) and choose Calculate Well(s) In Zone option from the context menu in Map/Cross Section View.

Add/Remove Wells from Geomodel

Update the geomodel by choosing to include or exclude specific wells to/from your interpretation without changing any settings. Simply add or remove wells in a geomodel from either of the views you are working in; Map View, 3D View, or Cross Section View. To remove well(s) from the geomodel; right-click the well(s) you want to remove and select **Remove Well(s) from Geomodel** from the context menu in Map View, or select **Remove Well from Geomodel** from the context menu in 3D/Cross Section View. To add a removed well back into the geomodel, choose **Add Well(s) in Geomodel** from the context-menu.

Fault Aliasing in 3D View

Visualize the relationships between the named fault and unassigned faults in the 3D View. Use the tools available in the **Fault Aliasing** toolbar to alias unassigned faults to the named faults. You can use the **Fault Aliases** tool to select the unassigned faults and then use the **Save Aliases** tool to add them as aliases to the named fault. The relationship is instantly updated in the 3D View. The **Fault Aliasing** toolbar is available on top of the 3D View by default.
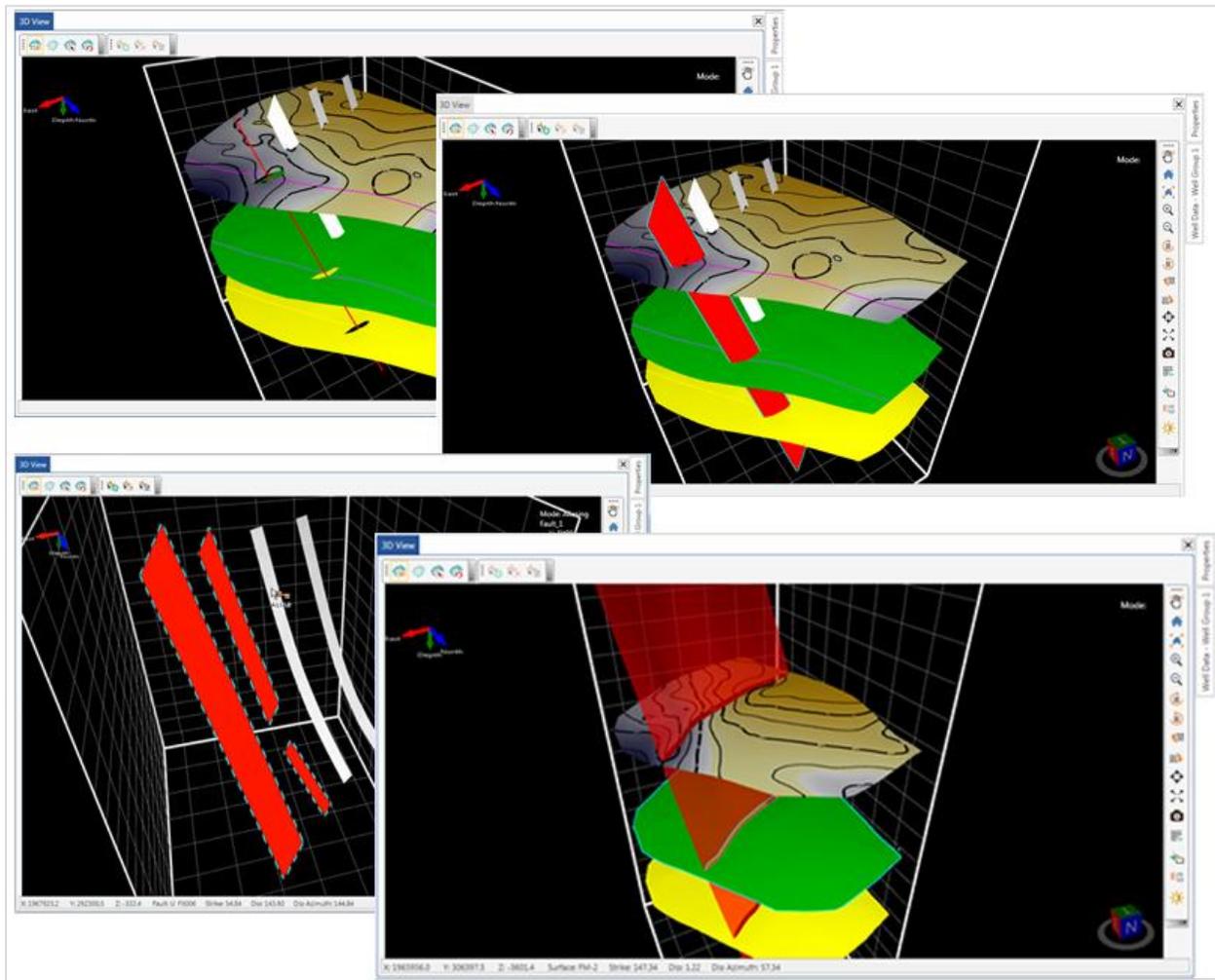

Auto Grouping of Wells of a Cross Section

All wells existing in a cross section are automatically grouped into a well group which is listed under the Cross Sections node in Data Panel 3D. This allows for better usability and for applying desired properties selectively to the wells of a particular cross section.

Microseismic Display and Animation

With Microseismic display in 3D View, analyze hydraulic fracturing stages, pressures, slurry and proppant characteristics, and corresponding seismic events in the treatment well. Select a well that has the Microseismic data, right click and choose **Show Microseismic** from the context menu to display microseismic events. To display the Microseismic Timeline dialog box, choose **Show Microseismic Timeline** option from the context menu of the selected well(s) in 3D View.
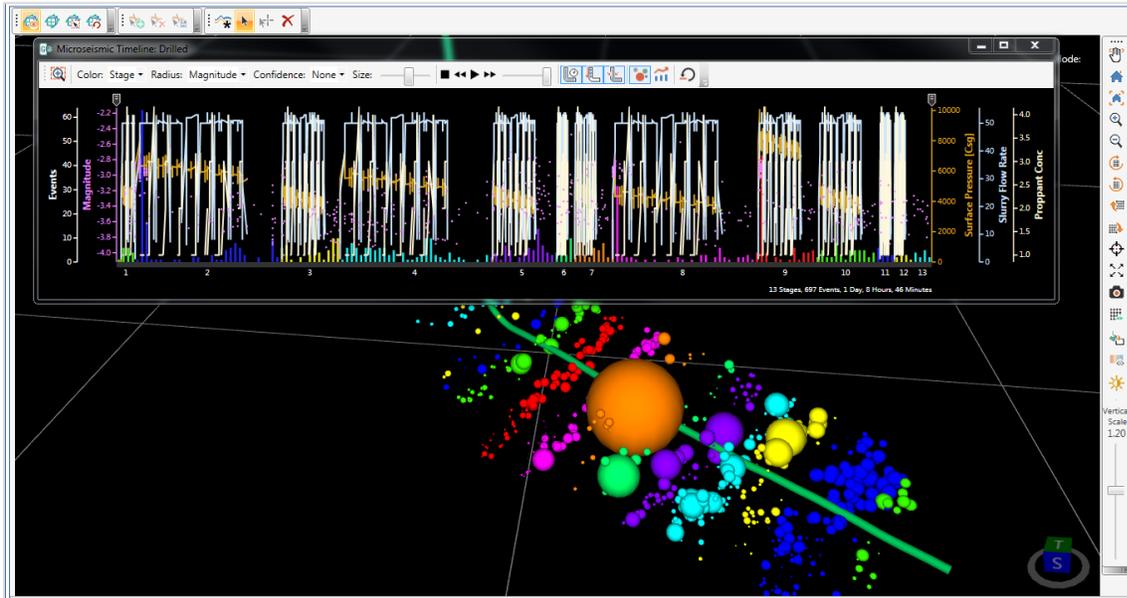
Picking Options Tools

Add, remove, or modify surface tops and fault cuts on wells in the 3D View, using the tools available on the **Picking Options** toolbar. The picking cursor, when placed on a well, displays the depth in MD and the curve value if a curve is applied on the well. You can also use the **Select** tool to click and drag a pick to change its depth. The **Picking Options** toolbar is available on top of the 3D View by default.
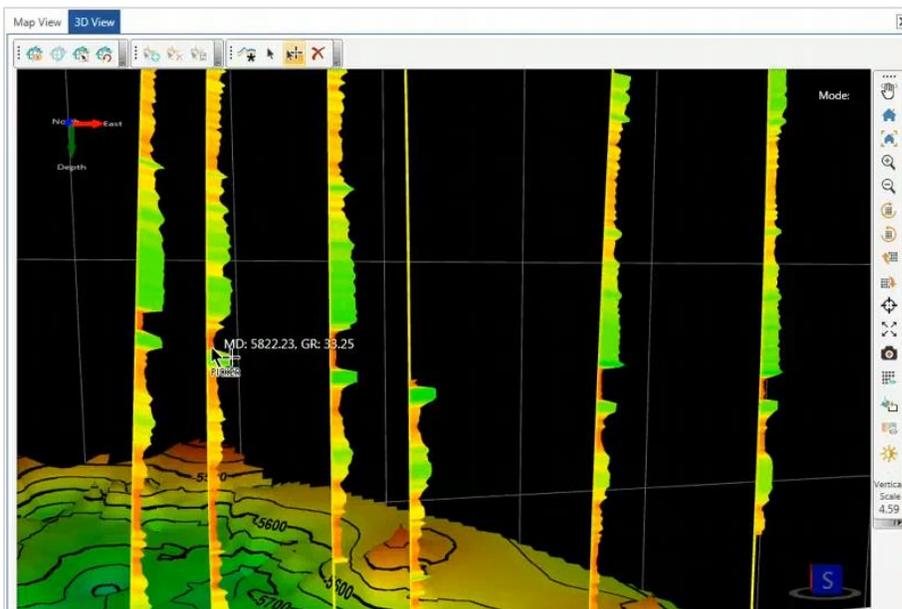
Cross Section Navigation Panel

All the open cross sections in an interpretation display in the Cross Sections Navigation Panel on top of the Map/3D View, which makes it easier to navigate through the multiple open cross sections. To directly maximize a cross section window, simply click once on its respective tile in the navigation panel. The navigation panel is available on the **Windows** tab of the main application window.
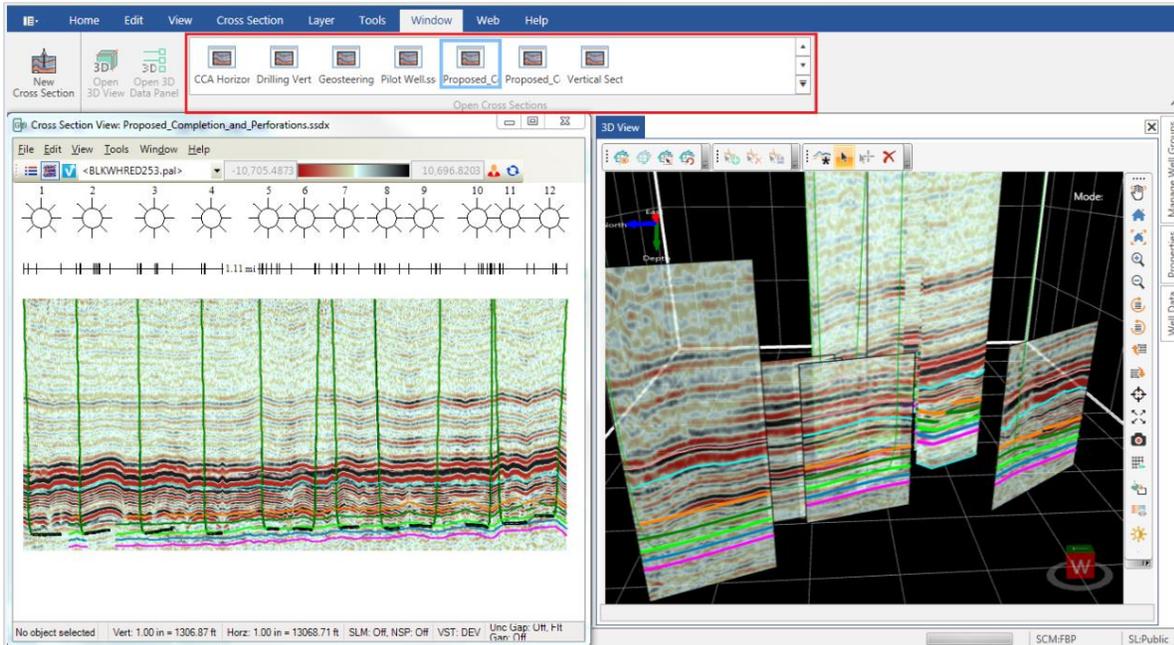
Improved Cross Sections list in 3D Panel.

A list of all cross sections is available in Data Panel - 3D for better usability. Differentiating between open and close Cross Sections or Fences is easier with the help of cross section annotation symbols added next to open cross sections or fences. To view the list of cross sections in an interpretation, activate 3D View and expand the **Cross Sections** node in the **Data Panel – 3D.**
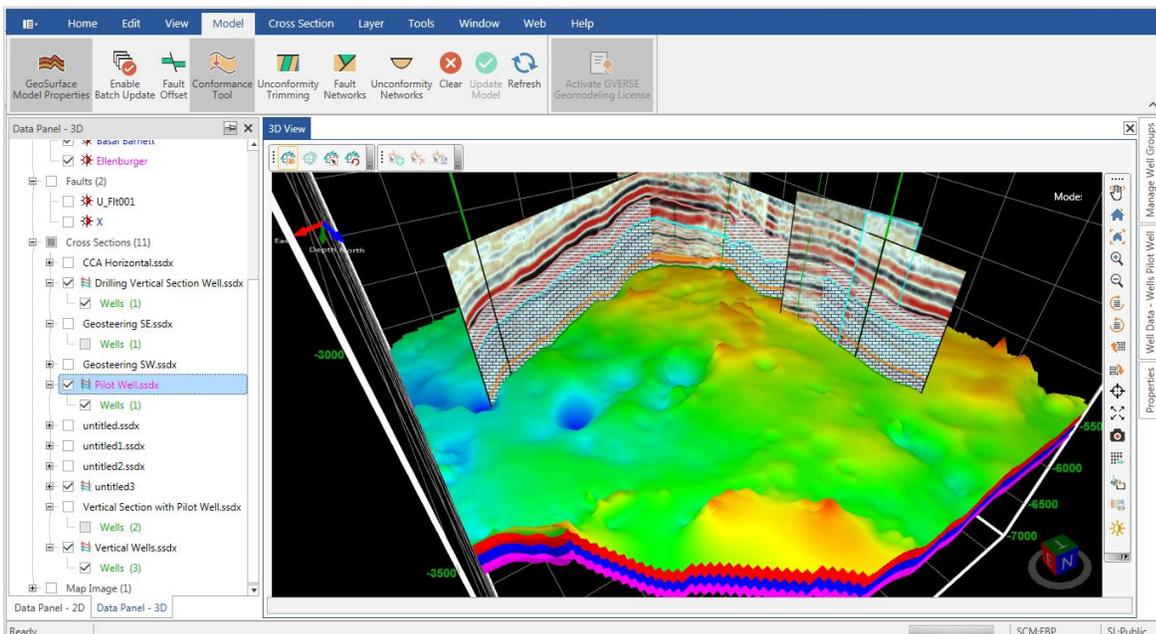
3D Cursor Tracking

Identify your position inside the model by tracking cursor in all views. Cursor tracking is available for 3D view, Map View, Fence, and Cross Section View. The 3D Cursor Tracking feature is toggled on or off by selecting View > 3D Cursor Tracking from the main application window**.**

GVERSE® Geomodeling 2017.3 Release Notes
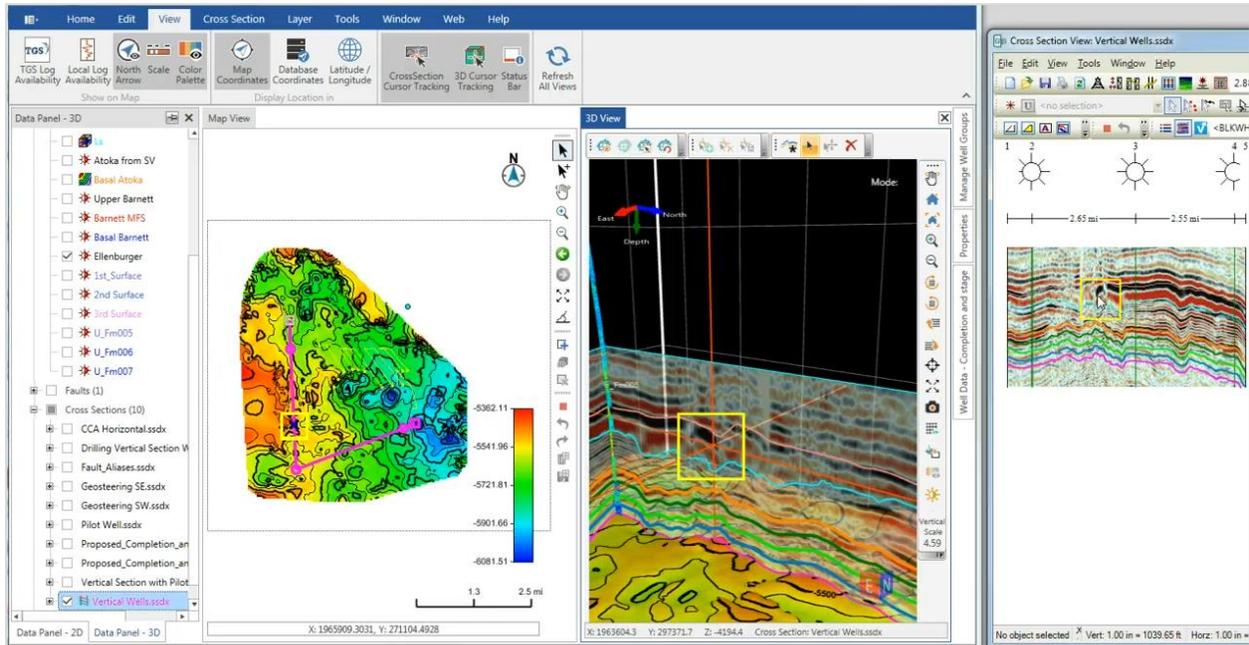
Third Party Acknowledgements

LMKR acknowledges that certain third party code has been bundled with, or embedded in, its software. The licensors of this third party code, and the terms and conditions of their respective licenses, may be found in the help file.

To access the 3rd party license agreements:

1. To access the online help, click the **help** tab located on the tab commands bar.

    The Help window displays.

2. In the **Contents** pane, locate the **Third Party Acknowledgements** help topic as shown in the image below.
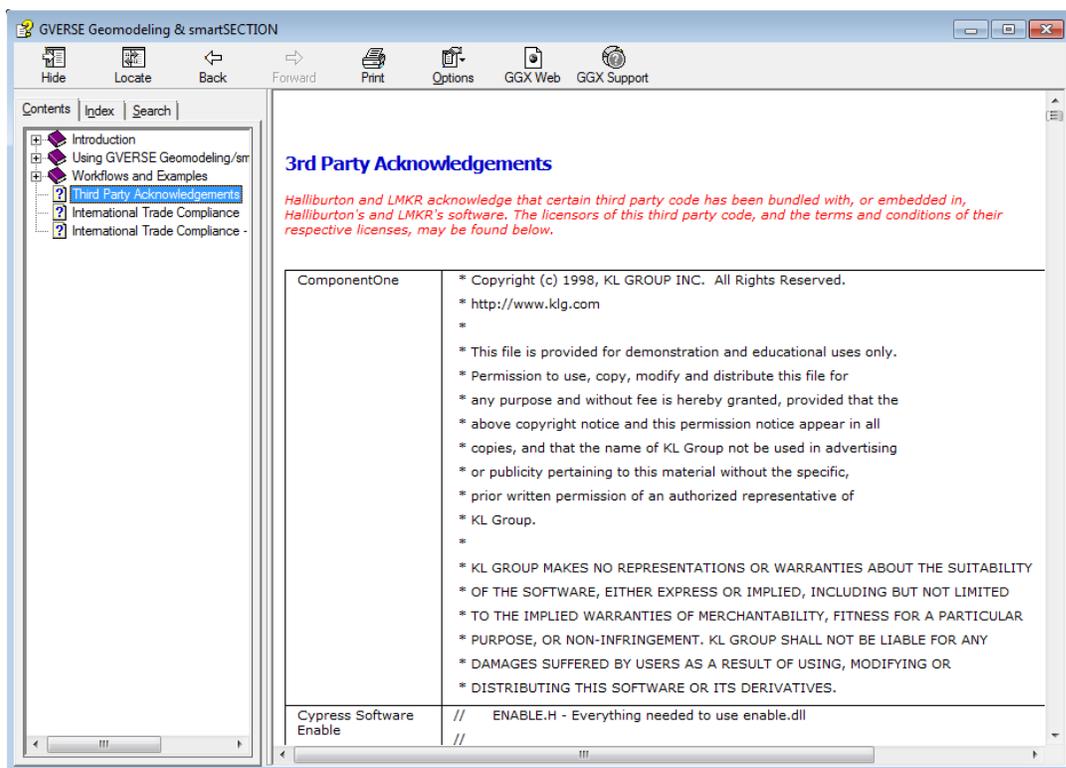
International Trade Compliance

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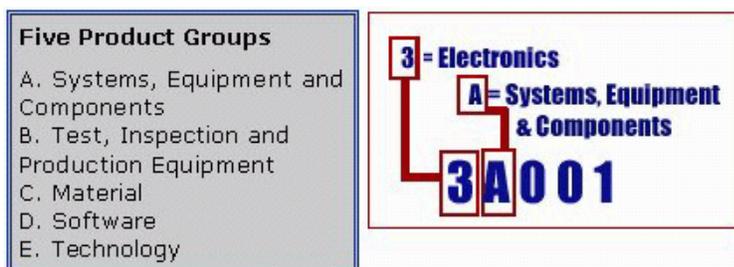
The ECCN number (if available) and License Type for this product are included in the table below. Also included is the date the table was last updated.

Product/Component/R5000	EAR Number	License	Last Updated On
GVERSE Geomodeling	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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Monday – Friday 8 am-6 pm CST* Toll Free (US/Canada) : +1 855 GGX LMKR (449 5657) **Colombia:** +57 1381 4908 **United States:** +1 303 295 0020 **Canada:** +1 587 233 4004 *Excluding bank holidays*	**UK:** Monday - Friday 8 am – 5 pm* +44 20 3608 8042 **UAE:** Sunday - Thursday (Dubai GMT+4) 8 am – 5 pm* +971 4 3727 999 *Excluding bank holidays*
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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