GeoGraphix®

releasenotes

Title

GeoGraphix® 2014.1 Release Notes

Introduction

LMKR is pleased to announce the release of the GeoGraphix® and Discovery™on OpenWorks® 2014.1 software.

This release contains many new features for GeoGraphix. This guide provides important information regarding new improvements, system requirements, and valuable resources that will allow you to get the most out of the GeoGraphix 2014.1 release. The GeoGraphix 2014.1 release contains the 2014.1 version of GeoGraphix software.

To go directly to the new features, defect fixes, known issues and system requirements for the GeoGraphix applications, click on the blue links below:

- New Features
- Fixed Issues
- Known Issues
- System Requirements

Note: If working in a network environment, in order for all computers to work together on shared projects, ALL computers (clients and servers) must be updated to the same version of the software. It is intentional that computers with different versions of GeoGraphix software cannot and should not be connected with each other.

GeoGraphix 2014.1 is an integrated product suite that incorporates shared data management and geological, petrophysical, and geophysical interpretation software. It utilizes a Sybase (GXDB) database in GeoGraphix Discovery mode, or accesses the OpenWorks/SeisWorks (Oracle) database in Discovery on OpenWorks mode. The GeoGraphix software consists of the following:

GeoGraphix Pro is a new upgrade option that provides geoscientists with advanced technologies to enhance their productivity and maximize their existing GeoGraphix investment. GeoGraphix Pro is a licensed upgrade to the GeoGraphix software and requires the purchase of a separate license.

For Release 2014.1, these include:

- **Advanced 3D visualization (Pro 3D)** – enables interpreters to get the most from their data by quickly creating powerful and informative base maps, fence diagrams and seismic backdrops. Using the Pro 3D view you can show IsoMap structural surfaces, cultural layers, wells, seismic data, cross sections and fence diagrams in 3D view.

- **Field Planning** – The advanced field planning tool is designed to reduce the time required for efficient field development. It provides the ability to create, save, analyze and manage multiple field plan scenarios before committing them to the database. Designed for horizontal well plans, the Field Planner includes determination of the optimum location and orientation of wells. These proposed wells can all be visualized by creating a layer for display in GeoAtlas.

DataManager™ includes ProjectExplorer™, Coordinate System Manager™, WellBase™, SeisBase™, QueryBuilder™, LandNet™, LeaseMap™, and ZoneManager™.

- The GeoGraphix and Discovery on OpenWorks project and data management engine

GeoAtlas™

- The map display and montage environment working on Esri MapObjects

IsoMap®

- The gridding contouring engine, featuring 10 powerful gridding algorithms

XSection™

- A fully integrated geological interpretation tool and cross section display tool

PRIZM™

- An interactive petrophysical and log analysis system

smartSECTION® with FrameBuilder™

- The next generation geologic modeling and cross section tool for complex structural and sequence stratigraphic analysis and unconventional well planning and monitoring

Discovery™ 3D

- The 3D scene viewer that uses the most recent video and X-Box tools to display seismic and geologic data in three dimensions

SeisVision™

- The SeisVision comprehensive 2D/3D seismic interpretation system, which also includes a dynamic real-time link to SeisWorks/OpenWorks™

pStaX™

- The post stack processing module for enhancing seismic character and detecting anomalies related to geologic features

SCAN™

- The patented semblance calculation for enhanced fault interpretation

LogM Advanced Synthetics™

- The geophysical application used for interactively editing well logs and evaluating synthetic trace character response

LogM Modeling™

- The 2D forward seismic waveform, ray tracing and structural modeling tool to predict seismic response away from the well

STRUCT™ Model Entry

- The comprehensive forward seismic structural modeling tool that is used to determine the seismic response of complex geologic structures in areas where there is little or no well control

Discovery™ on OpenWorks®

- Enables the GeoGraphix software to access OpenWorks and SeisWorks projects, and uses the OpenWorks and SeisWorks data within the GeoGraphix framework

Xchange Tools

WellXchangePlus™

- Transfer well information to or from two GeoGraphix projects, or between GeoGraphix and OpenWorks

SeisXchange™

- Transfer seismic data between SeisVision and SeisWorks

GridXchange

- Transfer of map point sets and grids from GeoGraphix to OpenWorks

Note: SeisBase, LandNet, LeaseMap, LogM ModelBuilder (LogM Modeling), LogM Well Editor (LogM Advanced Synthetics), Field Planner, and advanced 3D Visualization are not available in the current version of Discovery on OpenWorks.

System Requirements

On the following pages, you will find hardware and software system requirements tables for this release of GeoGraphix and Discovery on OpenWorks:

- GeoGraphix Workstation
- GeoGraphix Project Server

System requirements can vary considerably, depending on your computing environment and software objectives. Please contact your Sales Representative or Customer Support if you have questions or need more information about system requirements.

Important Notes:

- ***Clients using Discovery on OpenWorks must upgrade to OpenWorks 5000.8.3.01 and SeisWorks 5000.8.0.2***

- ***Please also refer to the GeoGraphix Customer Support Portal (http://support.lmkr.com) for up-to-date information on system requirements for all GeoGraphix products.***

GeoGraphix Workstation & Laptops

Operating System Requirements		
Supported Operating System	**RAM**	**CPU**
Windows® 7 Professional x64 Or Windows® 7 Enterprise x64 Or Windows® 7 Ultimate x64	4 GB Minimum 8+ GB recommended	Pentium i5/i7 or any Quad Core Processor
Notes		
Note 1 – We recommend using the latest Microsoft service packs and security patches		

Graphics Hardware Requirements		
Application Support Level	**Required Operating System**	**Required Graphics Hardware**
All GeoGraphix Applications including Discovery 3D and advanced 3D visualization	All Supported	DirectX 11 capable hardware (see note 2)
GeoGraphix Applications except for Discovery 3D and advanced 3D visualization	All Supported	All Supported
Notes		
Note 1 – Microsoft DirectX End-User Runtime (June 2010) is required to run Discovery 3D and advanced 3D visualization. Note 2 - To run Discovery 3D, and advanced 3D visualization it is recommended that an NVIDIA DirectX 11 compatible card be used. We recommend using the latest video drivers and MS updates for your system.		

Additional Requirements and Recommendations

- DVD-ROM required for media install. Download install available through Electronic Software Delivery at http://Support.lmkr.com.
- DCOM/Firewalls configured to allow remote access. Only necessary if sharing projects.
- Microsoft .NET 4.0 (or 4.5) runtime required.

GeoGraphix Workstation (continued)

Optional Software Requirements	
For spreadsheet import utility in WellBase, SeisBase, and LeaseMap	Excel 2007 or 2010 (32 or 64 bit)
For Selected Help files	Adobe reader
For Discovery on OpenWorks, GridXchange, SeisXchange	OpenWorks for Windows 5000.8.3.01 – Basic or Full (recommended) Install available on Landmark's LSM (See Notes below), and SeisWorks 5000.8.0.2 (for seismic workflows)
For Esri geo-referenced images and Esri CAD file import in GeoAtlas	Esri ArcGIS Runtime Engine 10.0 (SP 4) or 10.1 (SP 1) (included in the 3rd Party Installer)
For LOGarc™ Version 3.2.1.00 access in smartSECTION	To use the LOGarc™ feature the LOGarc™ Version 3.2.1.00 software must be downloaded from IHS LogTech Canada, LTD and a valid account must be in place. You must have administrator rights to the computer on which you will load the software.
For TracPlanner Xpress in GeoGraphix	WellPlanning for GeoGraphix 2013.0 (contained within the DecisionSpace 5000.0.3.0 install, which is available on the Landmark LSM). Oracle Express Client or Oracle 10g Client 10.2.0.4 (32 bit)

Notes for Discovery on OpenWorks: The OpenWorks Full install requires Hummingbird Exceed. The Oracle client installation in use with the OpenWorks Full installation requires that the "Administrator" option be selected. The "Administrator" option type includes the SQL Plus and the Oracle Database Utilities components, which are needed to run Discovery on OpenWorks, as part of the total OpenWorks package.

Hummingbird Exceed is not required for the OpenWorks Basic install. If OpenWorks Basic installation is used, the Oracle client installation can use the "Administrator" option, which will include all of the needed components. Or, the Oracle client installation for the OpenWorks Basic installation can use the "Custom" installation type. However, with this install type the following components must be installed:

- Oracle Database Utilities 10.2.0.1.0 or Oracle client 11.2.0.2
- SQL*Plus 10.2.0.1.0, or Oracle client 11.2.0.2
- Oracle JDBC/THIN Interfaces 10.2.0.1.0, or Oracle client 11.2.0.2
- Oracle Net 10.2.0.1.0, or Oracle client 11.2.0.2

After these Oracle components are installed, run the upgrade patch to Oracle 10g 10.2.0.4 (32 bit)

GeoGraphix Project Server

Operating System Requirements		
Supported Operating System	**RAM**	**CPU**
Windows® Server 2008 R2 Standard x64 or Windows® Server 2008 R2 Enterprise x64	8 GB Minimum 16+ GB Recommended	Intel Xeon Processor or Equivalent Quad 2.4GHz 64-bit or better
Notes		
Note – We recommend using the latest Microsoft service packs and security patches.		

Additional Requirements and Recommendations

- DVD-Rom required for media install. Download install available.
- DCOM/Firewall must be configured to allow remote access

Server performance is subject to a large number of variables. It is impossible to give specific recommendations here, but these are some guiding principles to use. In general, multi-user performance of a GeoGraphix project server is best when the server is dedicated to GeoGraphix and not shared with other applications, especially database applications or intensive file-system applications. In addition, consideration should be made for the number of GeoGraphix users and the size and number of concurrently accessed projects. At some point having multiple project servers becomes a better solution than having all users on one server. Generally, somewhere between 10 and 20 users is when a second server might be suggested.

Networking

Networking performance depends on the number of users trying to access a server simultaneously as well as the bandwidth requirements for those users. Recommendations for server bandwidth typically specify server connectivity at a higher bandwidth than an individual user. For instance, users running at 100 Mbit should be accessing a server running on a 1 Gbit backbone. If users are at 1 Gbit, consider running multiple 1 Gbit or fiber connections on the server.

Database Cache

A large database cache is an important factor to consider when dealing with multiple users accessing large databases. The database engine is capable of addressing a practically unlimited amount of cache memory. The best way to size the memory is to estimate the memory requirements for other running applications and allow the database cache to dynamically allocate any remaining free memory. The engine will only allocate what it needs when using dynamic allocation up to the maximum specified.

It is highly recommended that you let the database engine use as much cache memory as it requires on the host server. Increasing database cache memory is the quickest and most effective way to improve database related performance on large network projects.

On a workstation it might be appropriate to reserve 1 to 2 GB for the OS and file system cache and 2 to 4 GB for other running applications. On a dedicated project server, not much memory needs to be reserved for other applications. The ideal maximum varies by project size, number of users, and other load consideration. But as a general rule, the higher you can set the maximum the better.

Storage

A great deal of GeoGraphix's access patterns on a server deal with file I/O. Database access, raster images and seismic data are examples of files that benefit substantially from a fast disk sub-system. Server environments also place a high importance on data integrity and reliability. At a minimum, consider using a RAID 5 (stripe-set with parity) array. As the size of disks increase, you may also want to consider a hot swap drive and/or RAID 6 (striped with dual parity). Using a controller card with its own cache can also help improve performance.

Network Attached Storage (NAS), Storage Area Networks (SAN), and Other Non-Windows Storage Solutions

There are two typical methods used for accessing external storage devices from a project server; iSCSI and CIFS.

iSCSI allocates a block of storage on the external device and makes it appear to be a physical disk on the project server. This has the advantage of a 100% compliant file system. However since the external device sees the allocation as one big file, it can make backing up and restoring of individual files using the external device's capabilities more difficult. Standard backup and restore procedures from the server will still work.

Using CIFS for external storage devices depends greatly on the vendor's implementation of the CIFS protocol used by the Windows platform. In general, a 100% compliant implementation of CIFS for a performant system is required. In particular, vendor's implementation of the "File Change/Notify" functionality has been problematic. Devices based on Windows Storage Server should be 100% compatible since it shares its components with Windows. Implementations based on UNIX/Linux are where problems occur due to the fact that the kernel level support is not present. Due to these uncertainties with CIFS implementations LMKR does not technically support CIFS.

Compatibility with OpenWorks Software

The Discovery™ on OpenWorks® (DOW) software directly links a GeoGraphix application to the data in an OpenWorks® project, and provides a shared project environment for interpretation applications. Landmark Software has delivered the OpenWorks and DOW software for Release 5000 and will continue to provide updates and enhancements to these products. When planning your uptake of Release 5000 and verifying your workflow, you should consider version compatibility between the OpenWorks software and the Discovery on OpenWorks software.

In the compatibility table below, the table indicates the level of compatibility of previous releases and of upcoming scheduled and planned releases. This table will be updated as new releases are planned. The objective is to provide closely coupled compatible versions of the software to allow you to more easily take up current releases.

LMKR performs full release testing for those combinations indicated as Release, R, in the table, but may not exercise full release testing on other version combinations. For these iterative releases, LMKR performs compatibility testing between the OpenWorks and DOW software (indicated as Compatibility, C, in the table). See the table below for the level of testing for each version combination. Although LMKR does not anticipate any integration issue, In these cases it is recommended that customers also verify compatibility in their own environment.

LMKR supports the versions listed as Release in the table. However, while LMKR has completed compatibility testing, LMKR/GeoGraphix Support may not be able to fully support the versions listed as Compatibility in the table. When customers request support for a Compatibility environment, LMKR/GeoGraphix Support works on a best effort basis to troubleshoot any issues, and if an issue needs additional attention, LMKR/GeoGraphix Support reports such issues to LMKR Research & Development. LMKR/GeoGraphix Support Team cannot guarantee any resolution service levels associated with issues from a compatibility environment.

Combinations which have not been tested, either in the full release or in a compatibility environment, are indicated by U (untested). P indicates the indicated versions are probably incompatible, as the OpenWorks version has a newer development kit (devkit) than that of the indicated DOW version. Blank cells in the table indicate that OpenWorks and GeoGraphix are incompatible and will not operate together.

For the most current version of this information and an overview of suggested compatibility test paths please refer to LMKR Technical Support Solution Document KBA-65218-F9D7D5.

Compatibility Table

		Discovery on OpenWorks						
	OW License 5000	DOW License 5000.02						
	GeoGraphix Version	2014.0	2013.0	2012.0.0	5000.0.2.5	5000.0.2.1	5000.0.2.0	5000.0.1.1
OpenWorks Version	OW 5000.8.3.01	**C**						
	OW 5000.8.1.1		**R**					
	OW 5000.8.0.0			**R**				
	OW 5000.0.3.5			C	**R**			
	OW 5000.0.3.0			C	C	**R**		
	OW 5000.0.2.9			**U**	**U**	**U**	**U**	
	OW 5000.0.2.8			**U**	**U**	**U**	**U**	
	OW 5000.0.2.7			**U**	**R**	**R**	**R**	
	OW 5000.0.2.2							**R**
	OW 5000.0.2.0							
	OW 5000.0.1.7							
	OW 5000.0.1.6							
	OW 5000.0.1.5							
	OW 5000.0.1.4							
	OW 5000.0.1.2							
	OW 5000.0.1.1							
	OW 5000.0.0.3							**R**

Legend

R = Release level full testing

C = Compatibility level basic testing

U = Untested

P = Probably incompatible since OW and GeoGraphix are running different OW devkits

A blank cell indicates that OW and GeoGraphix are incompatible

New Features

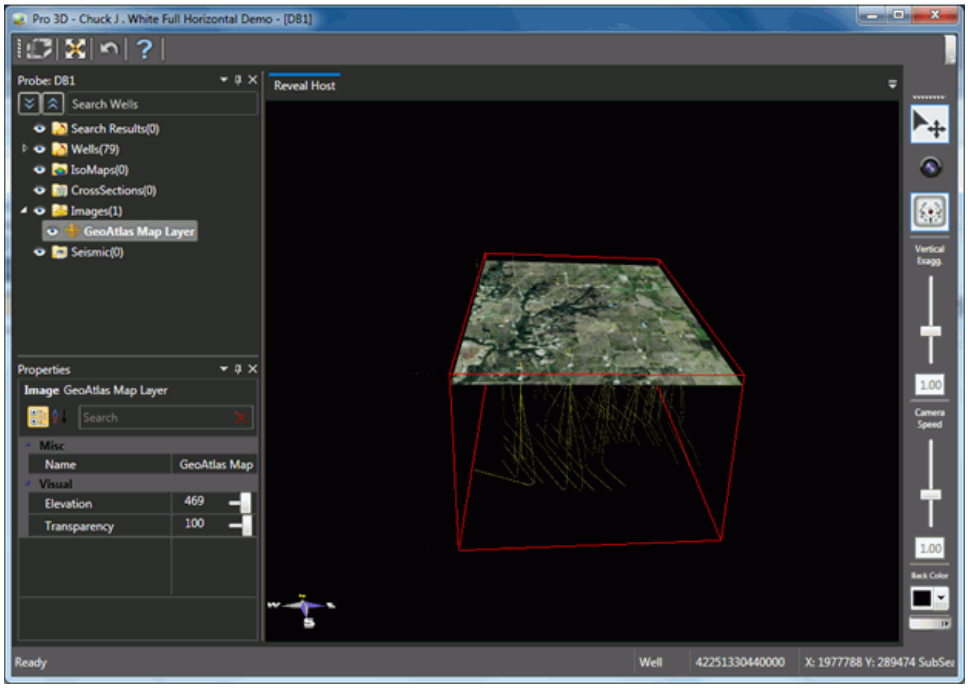
This section contains a brief description of the exciting new features included in the 2014.1 release.

GeoGraphix Pro

GeoGraphix Pro is a licensed upgrade to the GeoGraphix software and requires the purchase of a separate license.

Advanced 3D visualization (Pro 3D)

The 2014.1 release includes a new, improved advanced 3D interface. The new panels and toolbars added in the application makes the application more interactive and easy to use.

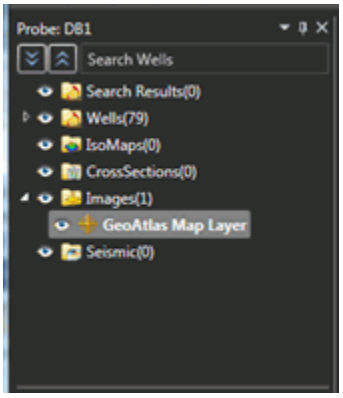


Advanced 3D Toolbar

The advanced 3D Toolbar is located on the right side of the window. It contains controls which are useful in changing the appearance of the 3D scene.

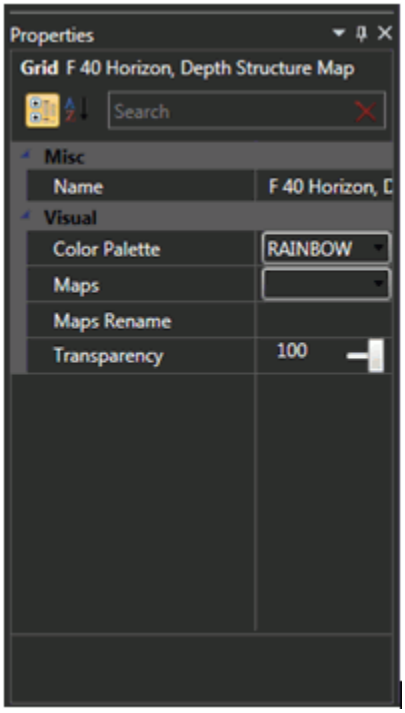
Preview Pane

The Preview Pane is located on the left of the 3D view window. It lists the objects by category and enables you to change the appearance of objects.



Properties Pane

The Properties Pane is located just below the Preview Pane on the left of the advanced 3D window. It defines the appearance of the selected item in 3D view. Select an item in the Preview Pane to display its options in the Properties Pane.



General Toolbar

The General Toolbar is located on top left of the advanced 3D window. It contains tools that aid you in viewing objects in 3D view.

Status Bar

The Status Bar is located at the bottom of the 3D viewer. It shows the information of objects selected on the scene.

Show Microseismic

This release includes the Show Microseismic option which displays the Microseismic data.

Display Seismic Traces

In 2014.1, advanced 3D enables you to add the seismic traces on the seismic display.

Wiggle Fill for the Seismic Traces

The 2014.1 release of advanced 3D includes the Wiggle Fill option. This option enables you to fill in the amplitudes of the seismic traces.

Display Log Templates

The advanced 3D 2014.1 now displays the log template of PRIZM along the wells.

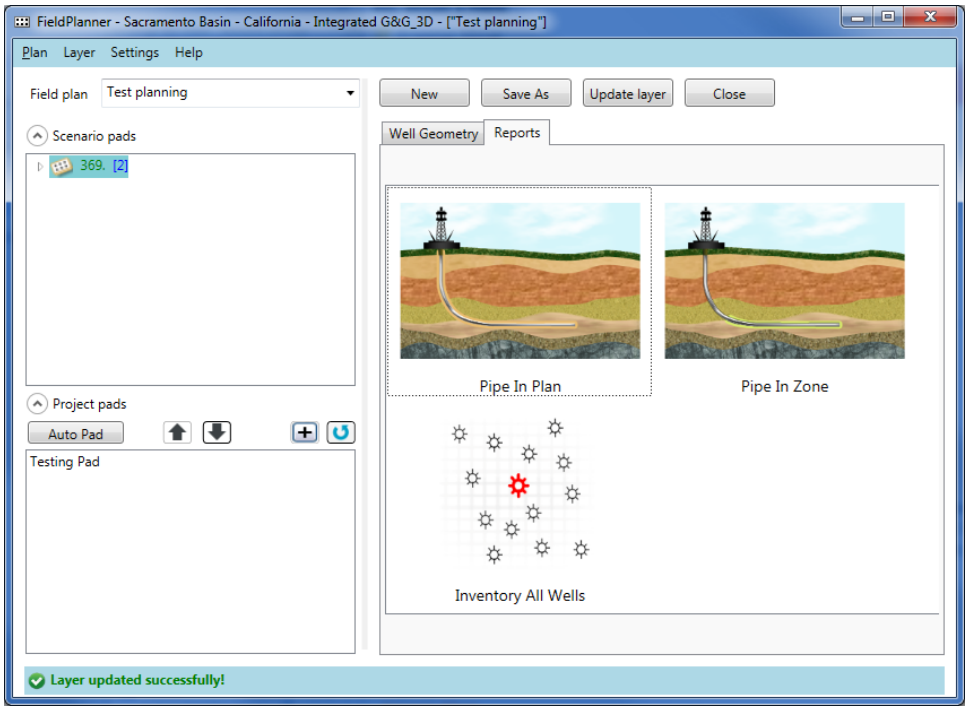
Display Curve Spectrum

The advanced 3D now displays the Curve Spectrum along the displayed wells.

Field Planning

Reports Tab

The 2014.1 Field Planner includes a Reports tab. You can generate three Excel reports that calculate total pipe in the plan, total pipe in the zone, and an inventory of existing wells within a user-specified distance from any proposed well. These reports enable you to compare field plans on a cost-benefit basis.



Create Auto Pad

The Create Auto Pad feature enables you to automatically create a Well Pad with user-defined dimensions, instead of selecting an existing pad from a WellBase layer.

New Icons in the Pad/Slot Tree

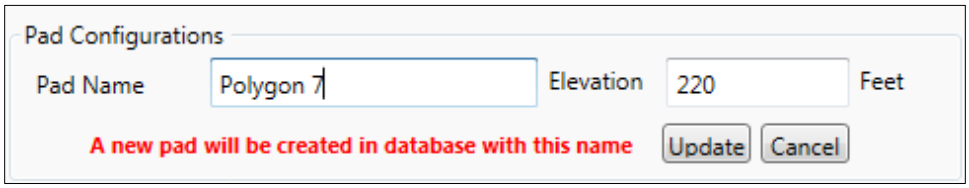
New icons and font types in the pad/slot tree now illustrate when a survey has been calculated and when a calculated survey has been saved to the project database. Proposed wells in the tree list will show in a bold font when a survey has been calculated for that well. A database icon will appear next to the well name when the survey has been saved to the database.

Re-size the Field Planner Application

The Field Planner application window can now be resized by placing the cursor on either the edge or corner of the dialog box and dragging the box to a new size.

Renaming Well Pad

You can now rename the Well Pads and change the elevation of both wells and Well Pads from the Field Planner application.



Fixed Issues

Following customer reported bugs were fixed in this release.

ID	Title
GeoAtlas	
37751	Cannot print overlapping images in GeoAtlas, only the top layer is printed
42392	GeoAtlas is not rendering transparency as set in ESRI
40705	ArcGIS Server and WMS imports are not reading selected import coordinates
53952	Proportional symbols, Pie charts, Unique Value are applied to the map only after the Preview button is clicked.
53891	Spatial filters unusable if more than one user is on Citrix and users are sharing the same project - causes errors in smartSECTION and ESRI shutdown errors
smartSECTION	
54301	Data Migration Utility – Error when importing sif/tif files
IsoMap	
54874	Surface Substitution causes IsoMap and GeoAtlas to hang/crash
SeisVision	
56163	SV64 crashes on exporting arbitrary/predefined lines as segy files
56271	Exported IsoMap faults (in depth) have positive subsea values when they should be negative.
56400	Import of a Horizon file in SiesWorks format (TVDSS) causes the horizon to shift location.

Known Issues

Following is a known issue in this release and is a work in progress.

ID	Issue	Workaround
52452	Field Planner Error on creating a new plan.	Restart Field Planner. This error appears only on the first attempt in a new installation.
53331	Value of Well stick/Deviated path buffer is not retained on updating Field Planner layer.	No workaround available
52816	Cannot cut and overwrite data in the Proposed	No workaround available
49034	Concurrent Access – Error message appears and update layer fails on some computers using Check Out Active Layer process	No workaround available
49036	WellBase Live Layer is not being updated on a network project in either GXDB or DOW	No workaround available
54038	Update Field Plan Layer process causes displayed map to appear blank on network projects	No workaround available
53647	Well Stick/Deviated buffer is not drawn correctly according to the well spacing provided in field Planner in a project with different Database and Map Display units	No workaround available
54018	Recently used map list is not getting populated under the Print Preview option with ArcGIS runtime 10.1 installed	The list will be populated if you close all maps and then click open the File Menu.
52756	Layer Display Attributes window is hidden inconsistently when working with different exclude SQL queries	No workaround available
56060	"U" shaped well in XSection does not display to deepest TVD	No workaround available
52380	XSection Converter – The converter dialog box makes the project selection with an option for an AOI. By default , .xsd files are not saved to the AOI folder, but to the Global folder	Copy the XSection AOI .xsd file from the Global folder to the respective AOI folder within the project.
53590	LYR File – Advanced Rendering – Labeling displayed on the map is not displayed in Page View when transparency is applied to the layer	Although they are not visible in Page View, labels show on the printout.

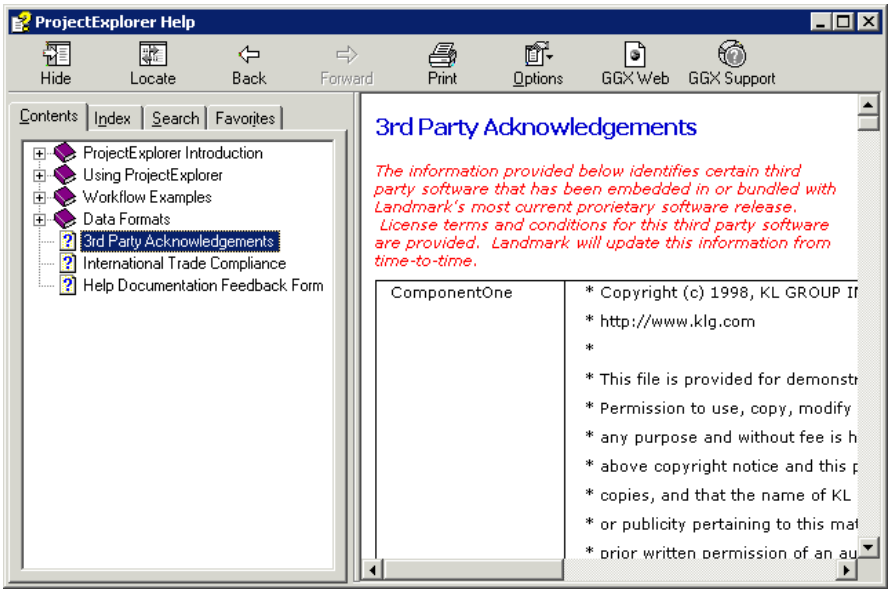
Third Party Applications

Halliburton and LMKR use various third-party applications in the development of its software.

Halliburton and LMKR acknowledge 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 GeoGraphix Help files. To access the third party applications:

1. In any GeoGraphix application select Help >> Contents.

2. On the Help window contents page locate the Third Party Acknowledgements Help topic as shown 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 ECCN's provided in Release Notes represent Halliburton'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:

FHOUEXP@halliburton.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

CCATS (Commodity Classification Automated Tracking System) - the tracking number assigned by the U.S. Bureau of Industry and Security (BIS) to products formally reviewed and classified by the government. The CCATS provides information concerning export/re-export authorizations, available exceptions, and conditions.

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 ECCN/CCL Number, License Type, and the CCATS Numbers for this product are included in the table below. Also included is the date the table was last updated.

Product/Component/R5000	ECCN/CCL Number	License	CCATS Number	Last Date Updated
Discovery	5D002	ENC	G063964	11/5/2009
Landmark Software Manager (LSM)	5D002	ENC	G058319	2/11/2008
OpenWorks	5D002	ENC	G054746	2/11/2008
LMKR License Manager	EAR99			10/1/2012

Contacting Technical Support

If you have questions or issues that cannot be answered by the LMKR Help Systems, you can contact LMKR Customer Support via web: support.LMKR.com , email: support@lmkr.com or telephone at our various worldwide office locations:

The Americas	Europe, Middle East & Africa
8am-6pm CST *Excluding bank holidays [Monday – Friday] Toll Free (US/Canada): + 1 855 GGX LMKR Colombia: + 57 1381 4908 United States: + 1 303 295 0020 Canada: + 1 587 233 4004	UAE (Dubai GMT+4): 8am - 5pm [Sunday – Thursday] *Excluding bank holidays + 971 4 3727 999 UK: 8am - 5pm [Monday - Friday] *Excluding bank holidays + 44 20 3608 8042 Egypt: [Sunday – Thursday] *Excluding bank holidays + 0800 000 0635
Asia Pacific & Australian Continent	**Southwest Asian countries**
Malaysia (Kuala Lumpur GMT+8): 9am - 6pm [Monday – Friday] *Excluding bank holidays +60 32 300 8777	Pakistan (Islamabad GMT+5): 9am - 6pm [Monday – Friday] *Excluding bank holidays + 92 51 209 7400

Helpful Internet Links

Name	Website Address
LMKR home page	http://www.lmkr.com
LMKR Support Portal	http://support.lmkr.com
Landmark Support Portal	http://css.lgc.com/InfoCenter/index?page=home
Landmark Software and Services home page	http://halliburton.com/landmark
SyBase home page	http://www.sybase.com
Microsoft SQL Server home page	http://www.microsoft.com/sqlserver
Oracle home page	http://www.oracle.com

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Internet: www.lmkr.com/geographix

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