Well Seismic Fusion™ Software 5000.6.0

Installation Guide

Landmark

Introduction 2

System Requirements 6

Installation 9

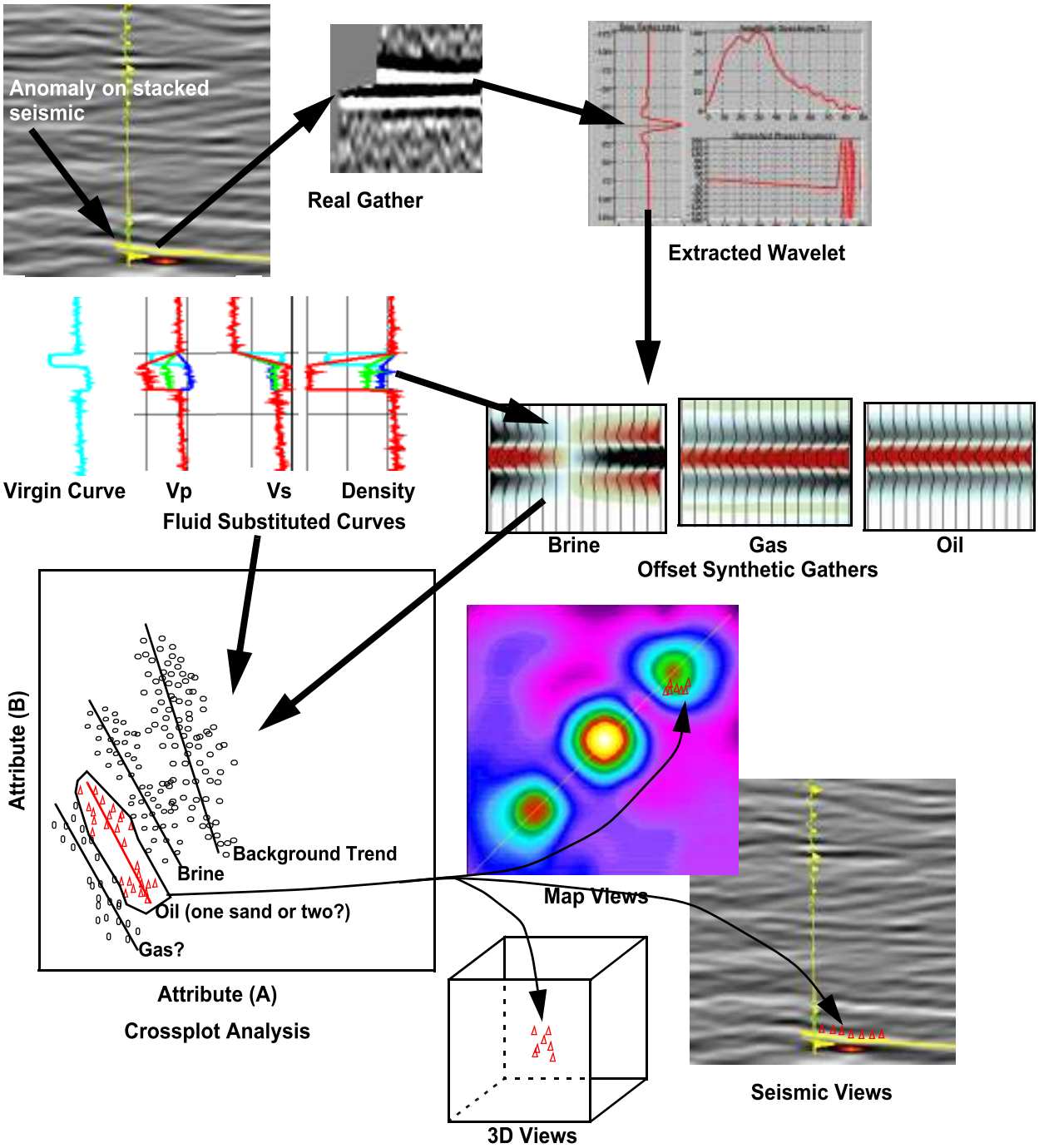
Post-Installation Notes 18

Contacting Landmark Customer Support 32

HALLIBURTON

Introduction

Welcome to Landmark's latest release of the Well Seismic Fusion software. This software provides elegant tools for petrophysical modeling, prestack seismic interpretation, and AVO analysis. The goal of the Well Seismic Fusion software is to use prestack seismic data to discriminate between fluid and lithology types within the reservoir. This version of the software adds a basin analysis workflow and an enhanced well tie workflow to the already powerful pre-stack interpretation/ analysis tools.



This installation guide provides instructions for installing the Well Seismic Fusion software version 5000.6.0.0. It contains the following information:

- Licensing Features required for running the Well Seismic Fusion software
- Well Seismic Fusion Configuration
- Hardware requirements
- Software requirements
- Product dependencies
- Installation procedures for Linux and Windows
- Post-installation procedures

> **Refer to the Well Seismic Fusion Software Version 5000.6.0 Release Notes for What's New and Known Issues.**
>
> The Release Notes contain a summary of the functionality in this release and known issues that affect the Well Seismic Fusion 5000.6.0 software.

The Well Seismic Fusion 5000.6.0 software is delivered using the Landmark Software Manager (LSM), Landmark's download interface, or on DVDs. Software is no longer available on CDs.

For additional information on installing the DecisionSpace Desktop and OpenWorks software, please refer to the DecisionSpace Desktop 5000.6.0 and OpenWorks 5000.0.3.0 Release Notes and Installation Guide. These guides will provide additional system and hardware requirements necessary for setting up the integrated DecisionSpace Desktop environment.

Licensing

The Well Seismic Fusion 5000.6.0 software requires the following licenses:

- WSFUSIONFULL or DSDGEOPH or DSDGEOPHPRESTACK or WSFUSIONBASE or DSDGEOPHINTERP
- OPENWORKS

> **Note**
>
> For 5000.6, a new license key will need to be acquired, and the new lgcx license server will need to be installed.

In order to run the other applications that are part of Well Seismic Fusion's integration workflow, you should also have a DSDGEOPH and a GeoProbe license.

The WSFUSIONFULL/DSDGEOPH/DSDGEOPHPRESTACK license keys allows access to all functionality in the Well Seismic Fusion software. The WSFUSIONBASE/DSDGEOPHINTERP license keys allow access to much of the Well Seismic Fusion software functionality except:

- Automated Prestack ezTracker
- Generation of Patented Prestack Offset Cubes
- Fluid and Porosity Substitution
- Multi-well Crossplot
- Shear Wave Velocity Estimation
- Basin Velocity/Compaction Analysis Workflow
- Intercept-Gradient Scaling
- NMO
- Trim Statics
- AVO algorithms including
  - AVO Angle Gathers
  - AVO Angle Mute
  - Intercept-Gradient and Fluid-Lithology Stacks
  - Polygon Classification Stacks
  - Near-Far and Near-Mid-Far AVO algorithms

Well Seismic Fusion Configuration

The Well Seismic Fusion workflow includes interaction with the following products:

- Adobe Acrobat Reader
- DecisionSpace Desktop 5000.6.0
- Internet Explorer 6+ (Windows)
- GeoProbe 5000.4.1.0+
- LogM
- Mozilla 1.7+ (Linux)
- OpenWorks 5000.0.3.0*
- Oracle*
- ProMAX/SeisSpace 5000.0.3.0+
- SeisWorks 5000.0.2.5

*Through the OpenWorks software, the Well Seismic Fusion software provides access to an Oracle *10g* server (Enterprise edition) running on a Windows 7 Server or a UNIX/Linux server. The Oracle server must have an OpenWorks SID that stores multiple OpenWorks R5000 databases.

System Requirements

The Well Seismic Fusion software has the following hardware and software requirements.

Hardware Requirements

The table below lists the recommended hardware requirements for client machines running the Well Seismic Fusion 5000.6.0 software. Beginning with the 5000.0.0 release, the Well Seismic Fusion software no longer supports Windows 32-bit or Solaris as an operating system. The Well Seismic Fusion software will run on the minimum requirements listed below. However, performance may not reach acceptable levels with large or complex datasets.

Hardware	**Minimum for Well Seismic Fusion 5000**
Operating System	RedHat Linux Enterprise 5.3 - 64-bit (Full Installation) or Windows 7 64-bit
Processor Type	Intel compatible 64-bit dual processor
Processor Speed	2 GHz or faster
RAM	8.0 GB or greater (16.0 GB or greater w/ GeoProbe)
Hard Disk	10 GB Minimum plus 10-500 GB for each additional prestack project
Display	Dual monitors: Linux - TwinView; Windows 7 - “Extend these displays” setting Resolution:1280 x 1024 Color Depth: True Color (32-bit)
Graphics	**nVidia Quadro FX series
Mouse	3-button mouse

*To find out your operating system level on Linux, perform the following in the root directory:

- “`cat /etc/redhat-release`”

**We expect the Well Seismic Fusion software to run successfully on any nVidia Quadro FX series card. DecisionSpace software does not support running modules on any ATI cards, in either laptop or desktop computers.

For information on hardware requirements for the Oracle/OpenWorks server and SeisWorks/flat file data server machines utilized by the Well Seismic Fusion software, please refer to the *System Requirements* section in the *OpenWorks 5000 Installation Procedures*.

Software Requirements

Linux Clients

The table below lists the Linux software requirements necessary to run client installations of the Well Seismic Fusion 5000.6.0 software.

Software	Version for client
Desktop Environment	KDE (Linux only)
X11	R6.4 (XFree86-devel version 4.1.0) (Linux)
Oracle client*	Oracle *10g* Enterprise Client Edition (required by OpenWorks 5000.0.0 Client) *The 64-bit version of the Well Seismic Fusion software requires a connection to a 64-bit Oracle *10g* client.
OpenWorks client	OpenWorks 5000.0.3.0 Client Installation
LAM (licensing)	Globetrotter LAM Flex 11.4 (Linux)
Adobe Acrobat Reader	Version 9.x+
Exceed**	Hummingbird Exceed 2008, installation recommended in DecisionSpace release notes (Windows only) **Exceed is not an officially supported platform for the Well Seismic Fusion software.

Linux Servers

The following table lists the software requirements for Oracle/OpenWorks server installations and SeisWorks/flat file data server installations utilized by the Well Seismic Fusion 5000.6.0 software.

Software	Version for server
Oracle server	OpenWorks 5000.0.3.0 environment: Oracle10g Enterprise Server Edition (Linux servers) *minimum requirement
OpenWorks server	OpenWorks 5000.0.3.0, server installation, the DecisionSpace software requires projects to be extended to 5000.0.0.
LAM	Globetrotter LAM 11.4 (Linux)
Samba	Version 2.x (necessary for accessing UNIX SeisWorks/flat files from a Windows client system) (Windows only)

Product Dependencies

In order to run the other applications that are part of Well Seismic Fusion's integration workflow, you should also have a DecisionSpace Desktop and a GeoProbe license. Well log curves can come from the OpenWorks database, the LogM software, or LAS. Well picks can only come from the OpenWorks database. Prestack seismic files can come from either SEG-Y, ProMAX, or JavaSeis formatted files; stacked seismic files can come from either GeoProbe or SeisWorks formatted files. Velocity files can come from the OpenWorks database or from ProMAX formatted files.

Installation

The following section provides guidelines for installing the Well Seismic Fusion software on supported environments. If you have problems setting up your environment, please consult with your Landmark onsite or support representative.

Checklist for OpenWorks 5000.0.3.0

The complete installation requires that you perform the following procedures.

1. Install the full recommended Operating System:

   Red Hat Linux Advanced Workstation 5.3 (Full Installation) or Windows 7

2. Install Oracle *10g* and OpenWorks 5000.0.3.0 on the server. (You must install 64-bit Oracle *10g* on a 64-bit server.)

   See the OpenWorks 5000.0.3.0 release notes. The OpenWorks installation includes the installation of Adobe Acrobat Reader 9.x, and LAM.

3. Configure the OpenWorks software so interpreters can see the appropriate projects.

   See the OpenWorks 5000.0.3.0 release notes.

4. Configure LAM.

   See “Obtaining a license to run the software” on page 16.

5. Install the Well Seismic Fusion software by following instructions in “Installing the Well Seismic Fusion software” on page 11.

Permissions needed to install the Well Seismic Fusion 5000.6.0 software

Release 5000.6.0 of the Well Seismic Fusion software on Linux can be installed as either *root* or non-root. On Windows 7, the installation should be performed with administrator privileges.

For all software products, the directory being written to must allow the installer permission to write in order to have a successful install. If you have write permissions on only some files in the directory and not on others, the files to which you do have permissions will be removed, but the other files will not. This combination of old and new files will prevent a successful installation.

For Linux installations, please follow the optional "Post-Installation Notes" on page 18 to add the Well Seismic Fusion software to your executable path.

Installing the Well Seismic Fusion software

On Linux

1. Log into the client machine with a Linux user account that has write permissions for the area where you want to install the Well Seismic Fusion software.

2. Navigate to your home directory or to some other directory where you have execute and write permissions.

   ```
   e.g. cd /temp/disk1
   ```

   where `/temp/disk1` is the download location

3. Download the Well Seismic Fusion software from the LSM into this directory or, after downloading, copy to this directory.

   or

   If you ordered the DVD, mount the DVD relative to your mount path (/etc/fstab or /etc/mtab).

   ```
   mount /mnt/cdrom
   ```

Note: Depending on your system configuration, you may not need to mount the DVD if it gets mounted automatically.

> **IMPORTANT**
>
> Do not execute the install command from within the mounted directory system. If you do, the installation hangs when you are prompted to eject CD 1.

4. Execute the following command for Linux 64-bit:

   ```
   /temp/disk1/WellSeismicFusion_5000.6.0.0_ReleaseLx64.bin
   ```

   If you ordered the DVD:

   ```
   /mnt/cdrom/WellSeismicFusion_5000.6.0.0_ReleaseLx64.bin
   ```

   If this does not work, then try the following on a terminal window:

   ```
   sh /mnt/cdrom/WellSeismicFusion_5000.6.0.0_ReleaseLx64.bin
   ```

   The Install DSD Fusion Release 5000.6.0 dialog displays.

5. After reading the Introduction, click **Next**.

   The Release Notes and Installation Guide pane displays.

   Select the **Launch Release Notes** and **Launch Installation Guide** checkboxes. These documents will open in separate windows. You can read them now or save them to a location to read later.

6. Click **Next**.

   The License Agreement pane displays.

   Read the License Agreement and, if you agree, select the **I accept the terms of the License Agreement** option.

   Note: If you do not accept the terms of the License Agreement, you will not be able to proceed with the installation. You will only be able to click the **Previous** or **Cancel** button.

7. Click **Next**.

   The Choose Install Set pane displays.

   Well Seismic Fusion is the only software in this install.

8. Click **Next**.

   The Choose Install Folder pane displays.

   Specify the location where the Well Seismic Fusion software version 5000.6.0 will reside on your machine. Enter the path directly in the text box, or click the **Choose** button to browse to a location in your directory.

   Note

   Ensure that the installation directory has at lease 900 Mb of free space to install the Well Seismic Fusion software.

   Also ensure that the default drive (usually the home directory for the user login) has at least 500 Mb of free space. Space on the default drive is necessary for temporary files created during the installation.

9. Click **Next**.

   The Desktop icon pane displays.

   Check the box if you want the desktop shortcut.

10. Click **Next**.

    The Pre-installation Summary pane displays.

11. Verify the information and click **Install**.

    During the installation, a progress bar displays.

12. Click **Done** to close the installation program.

    The Well Seismic Fusion Desktop software installation is now complete. See "Post-Installation Notes" on page 18 for additional installation settings.

    It is not necessary to reboot after the installation.

13. Browse to your Well Seismic Fusion directory (unless you are using the Desktop icon) to launch the application.

14. Enter the following at your command prompt:

```
./LaunchWSFDesktop.sh
```

Before running the Well Seismic Fusion software, ensure the post-installation items have been completed.

On Windows 7

1. Log into the client machine with a Windows user account that has write permissions for the area where you want to install the Well Seismic Fusion software.

2. Download the Well Seismic Fusion software from the LSM
   or
   If you ordered the DVD, load the DVD and follow the installation instructions.

   The Install Well Seismic Fusion Release 5000.6.0 dialog box displays.

3. Read the Introduction pane and click **Next**.

4. Select the **Launch Release Notes** and **Launch Installation Guide** check boxes. These documents open in separate windows. You can read them now or save them to a location to read later.

5. Click **Next**.
   The License Agreement pane displays.

6. Read the License Agreement and, if you agree, select the **I accept the terms of the License Agreement** option.

7. Click **Next**.
   The Choose Install Set pane displays Well Seismic Fusion.

8. Click **Next**.
   The Choose Install Folder pane displays.

   The location for the installer is one of the following:

   - The installer locates the %OWHOME%\WellSeismicFusion5000.6.0 default path
   - If the installer does not locate the %OWHOME%, the default path is *C:\Landmark\WellSeismicFusion5000.6.0*
   - Or, you can enter your own installation path

   The default path is *C:\Landmark\OpenWorks\WellSeismicFusion5000.6.0.* If however, the installer does not locate the OWHOME variable, the default path used is *C:\Landmark\WellSeismicFusion5000.6.0.*

   Select the Install location.

   Ensure that the installation directory has at least 1.1 GB of free space to install the DecisionSpace Desktop software suite. Also, ensure that the default drive (usually the home directory for the user login) has at least 0.5 GB of free space. Space on the default drive is necessary for temporary files created during the installation.

9. Click **Next**.
   the Desktop icon pane displays.

   Check the **Start Menu Shortcut** box if you want to create a shortcut in the Programs folder. Check the **Desktop Shortcut** box if you want the desktop shortcut.

10. Click **Next**.
    The Pre-installation Summary pane displays.

11. Verify the information and click **Install**.

    During the installation, a progress bar displays. When the installation process is complete, the final screen appears.

12. Click **Done** to close the installation program.

    The Well Seismic Fusion software installation is now complete.

Launching Well Seismic Fusion on Windows 7

You can launch the Well Seismic Fusion software using one of the following methods:

- Double-click the Desktop icon
- From the Windows Start menu, select **All Programs > Landmark > Fusion 5000.6.0**.

Well Seismic Fusion launches with a small progress meter in the upper left corner of your monitor.

Well Seismic Fusion opens the DecisionSpace Session Manager dialog box.

- If you are using previously saved session from a prior release of Well Seismic Fusion, you can select one of the sessions listed under Available Sessions.
- If you have not saved previous sessions, or this is your first time using the Well Seismic Fusion software, select the New Session tab. For more information regarding creating or opening sessions, click the Help button on the DecisionSpace Session Manager dialog box.

Upgrading the Well Seismic Fusion software

To upgrade a Well Seismic Fusion software installation in the same location where you had previously installed it, we recommend that you first uninstall or rename the previous installation, then install the current version as described above.

Obtaining a license to run the software

Before running the released version of the Well Seismic Fusion software, you must obtain a license file from Landmark Graphics Corporation. For 5000.6 the classic Well Seismic Fusion licenses WSFUSIONFULL and WSFUSIONBASE and the DecisionSpace licenses DSDGEOPH, DSDGEOPHINTERP and DSDGEOPHPRESTACK use the new “lgcx” license server. You can request the license file from the following address:

http://www.lgc.com

then select Technical Support, followed by License Management

If you have any questions, call your Landmark Customer Services Representative, or see:

http://www.lgc.com

You must have the hostid for your system in order to request a license. To obtain the hostid, enter the following:

Linux Systems

```
$OWHOME/lam/bin/lmhostid
```

Windows Systems

```
>ipconfig /all
(and look for the physical address of the Ethernet adapter)
```

Installing the software license

Upon receiving the license request, a Landmark representative will generate and return your license. The license will contain information such as product name, version, expiration date, number of copies, encrypted key. For example, a license for five versions of the Well Seismic Fusion software would be similar to the example below:

```
FEATURE WSFUSIONFULL licsrv 5000.000 10-jan-2008 5 AKEY42AAD7898675309F VENDOR_STRING="Ewing Oil”
```

Once you receive your license, you must add it to your license.dat file (typically in the $OWHOME/lam directory on Linux) and restart the license manager. After the license manager has been restarted, your newly installed software will be able to run.

For more information on managing the LAM, refer to the *LAM 5000.3.0 Guide* or to the *OpenWorks 5000.0.3.0 Installation Notes* which are included in the Release 5000.6 version of OpenBooks.

Post-Installation Notes

Configuring the OpenWorks Environment (Linux)

To successfully launch the Well Seismic Fusion software from the OpenWorks menu, you need to ensure that Fusion is in the "path". To check the Fusion path, view *$HOME/.lgclogin* (for c-shell) or *$HOME/.lgcprofile* (for bash shell). These files are located in the OpenWorks users home directory.

> **Note**
>
> The following examples assume you have installed the Well Seismic Fusion software to $OWHOME/WellSeismicFusion.

The .lgclogin should look like:

```
if ( -d ${OWHOME}/WellSeismicFusion) then
  setenv FUSION_HOME ${OWHOME}/WellSeismicFusion
  set path = ( ${path} ${FUSION_HOME} )
endif
```

The .lgcprofile should look like:

```
if [ -d ${OWHOME}/WellSeismicFusion ]; then
 FUSION_HOME="${OWHOME}/WellSeismicFusion"
  export FUSION_HOME
  PATH=${FUSION_HOME):$PATH
fi
```

After editing either the *.lgclogin* or *.lgcprofile*, be sure to "source" the edited file prior to launching the OpenWorks software.

In addition to verifying the *.lgclogin* or *.lgcprofile*, the launcher.dat may need to be edited to launch the Well Seismic Fusion software.

The *launcher.dat* reflects the structure of the OpenWorks launcher. A Well Seismic Fusion session can be launched from under the high-level Applications menu, or from the sub-level Seismic Interpretation or Attributes & Velocity menus. In each of these listings in the launcher.dat, the Well Seismic Fusion entry should look like the following:

```
"Well Seismic Fusion" "LaunchWSFDesktop.sh 2>$HOME/run/WellSeismicFusion.err 1>&2 &"
```

For additional references (or to update your existing *.lgclogin*, *.lgcprofile*, and/or *launcher.dat*), the `$OWHOME/templates` directory contains complete examples of each file which reflect the above changes.

To successfully launch the SeisSpace software from a Well Seismic Fusion session, you need to ensure that the "seisclient" launch script is in your path. Many installs of the SeisSpace software place the "seisclient" script in $OWHOME/bin, which is already in the default path.

Configuring the OpenWorks Environment (Windows 7)

To successfully launch the Well Seismic Fusion software from the Windows DecisionSpace Desktop, you need to ensure that FUSION_HOME is set. The default location for FUSION is typically C:\Landmark\OpenWorks\WellSeismicFusion5000.6.0.

You may also want to boost DSDESKTOP_MEMORY to 4096m.

Launching the Well Seismic Fusion software

Linux

The Well Seismic Fusion software can be launched using any of the following methods on Linux:

- Choose Well Seismic Fusion from the Applications menu on the OpenWorks launcher (after "Configuring the OpenWorks Environment (Linux)" on page 18).
- If the Well Seismic Fusion software is installed to /disk2/OpenWorks/WellSeismicFusion, type the following at the command prompt:

  ```
  /disk2/OpenWorks/WellSeismicFusion/LaunchWSFDesktop.sh
  ```

- If you installed the DecisionSpace software while logged on as yourself (not as *root*) and you chose to create a desktop shortcut icon during the installation, double-click on the desktop icon labeled "Fusion" and select **Run** in the "Run or Display?" dialog.

> **Note**
>
> In order to launch the DecisionSpace software using the desktop icon on Linux, your *$HOME/.login* must be configured to source *$HOME/.lgclogin*.

Windows

The Well Seismic Fusion software can be launched using any of the following methods on Windows:

- Choose All Programs > Landmark > Fusion 5000.6 from the Windows Start menu.
- Double-click on the Fusion 5000.6 icon on the desktop.

- From a command prompt, execute "`LaunchWSFDesktop.bat`".
- Launch from the DecisionSpace Desktop Workflow Catalog.

Upgrading data for a Well Seismic Fusion R5000 session

External data from existing R2003.19 Well Seismic Fusion projects must be upgraded to the new R5000 data model. External data is data that the Well Seismic Fusion software used to store in its "tabledata" directory, such as crossplots, polygons, offset synthetics, prestack seismic, prestack horizons, and 3D velocity models.

The following scripts to upgrade the Well Seismic Fusion external data are provided under $FUSION_HOME/modules/fusion/config/bin.

- SavePromaxDatasetsToOW.sh
- UpgradeCrossplotData.sh
- PublishScannedData.sh
- UpgradePolygonData.sh
- UpgradeVelocityData.sh

> **Note**
>
> Due to the new prestack ezTracker and the patented prestack offset attribute cube, upgrading R2003.19 or R5000.0.0.3 prestack horizons in not supported in this release.

Upgrading prestack horizons from 5000.4 to 5000.6

Use the following procedure to upgrade prestack horizons created in Well Seismic Fusion 5000.4 to the OpenWorks database for Well Seismic Fusion 5000.6 on Linux.

1. Set your FUSION_HOME for the installation. FUSION_HOME is typically $OWHOME/WellSeismicFusion5000.6.0.

2. To see the help for publishing (upgrading) horizons, type the following at the prompt:

   ```
   $FUSION_HOME/modules/fusion/config/bin/PublishPrestackHorizon.sh -help
   ```

   This script publishes prestack and synthetic horizons that were created in Well Seismic Fusion R5000.4 to OpenWorks R5000.0.3.0 for R5000.6. A log file is created in your current directory as *published_R5000_4_PrestackHorizon_<DATA>.log*.

3. To publish the horizon data, type a call in the following form at the prompt

   ```
   $FUSION_HOME/modules/fusion/config/bin/PublishPrestackHorizon.sh
   ```
   district OWproject

For example, if district = DENVER and OWproject = FUSION, type the following:

```
$FUSION_HOME/modules/fusion/config/bin/PublishPrestackHorizon.sh
DENVER FUSION
```

For Windows, R5000.6 will save prestack horizons to the OpenWorks database. No script is provided to update prestack horizons created in R5000.4. Connecting to GeoProbe projects

Linux Only

On Linux, to successfully connect to your GeoProbe projects and display or create GeoProbe volumes from within a Well Seismic Fusion session, you need a *$HOME/.geoprobe_pref/ projectsR5000.dat* file. The *projectsR5000.dat* file is a GeoProbe-generated file that the Well Seismic Fusion software reads to get a list of GeoProbe projects. The *projectsR5000.dat* file is automatically created by GeoProbe. You will also need to select a "GeoProbe project" from the Session Parameters in the DecisionSpace Session Manager when you launch a DecisionSpace session.

The GeoProbe/Well Seismic Fusion connection was developed in conjunction with several clients. The addition of GeoProbe access broadens the range of visualization options while working with prestack seismic data. The combination of viewing seismic data interpretation in a SeisWorks/ DecisionSpace Desktop session and Well Seismic Fusion for 2D views and now GeoProbe for 3D views increases insight into the data and decreases workflow time. The GeoProbe/Well Seismic Fusion connection was designed primarily to supplement the existing workflows requiring access to the OpenWorks and SeisWorks software. The GeoProbe/Well Seismic Fusion connection is not intended to replace the need for the SeisWorks software. Please contact Landmark support for options to use the GeoProbe software with a Well Seismic Fusion session without the SeisWorks software.

Standard environment variables needed to run the Well Seismic Fusion software:

- LM_LICENSE_FILE
- OWHOME
- ORACLE_HOME

Optional environment variables include:

- DS_HELP_BROWSER set path to browser executable, such as /usr/bin/netscape
- ERR_LEVEL default = 3
- LGC_DATA_HOME default = see page 17
- LGC_JAVA_XMX default = 5120m
  [amount of Java-Heap memory given to Well Seismic Fusion]
- DSDESKTOP_MEMORY(should set to at least 4096m)

- LGC_JAVA_XSS default = 4m [amount of stack memory reserved for each thread]
- FUSION_RECOVERY_MESSAGES default = quiet [display error pop up dialogs]

Setting optional environment variables

Some of the seismic processing algorithms in the Well Seismic Fusion software require "scratch" disk space. By default, the Well Seismic Fusion software writes its scratch files to your `<OW_PROJ_DATA>/<OW_project>/Fusion_Data/tabledata/scratch` directory. (Note, `<OW_PROJ_DATA>` is the OpenWorks project directory at any of the paths listed in your *owdir.dat* file.). If you want to override this default location, you need to link the scratch directory to where you would like the scratch files to be written.

If you want to use the Well Seismic Fusion software to access ProMAX gathers that span onto "secondary" storage, you need to tell the Well Seismic Fusion software where the ProMAX "config_file" is located. You can point the Well Seismic Fusion software directly to the config_file by setting the PROMAX_ETC_CONFIG_FILE_HOME variable. For more information, consult FAQ 5 accessed on the main menu, Help > Well Seismic Fusion > FAQs, then select "seismic data requirements."

The LGC_DATA_HOME environment variable can be set to a user-specified path for storing the files output by most DecisionSpace software products. The default location for LGC_DATA_HOME is *%USERPROFILE%\Landmark\DecisionSpace* on Windows 7 and `$HOME/Landmark/DecisionSpace` on Linux. The files controlled by this variable include output message logs, session files, image files (.jpg, .bmp, .tif, etc.), annotation data, and UI defaults. Colorbars are in $HOME/.lgcpalettes on Linux, and *%USERPROFILE%\.lgcpalettes* on Windows. For more details, please refer to the "Where output messages and files are stored" section on page 25.

The LGC_JAVA_XMX environment variable can be set to a user-specified amount of memory when the default value of 5120 Mb is insufficient. LGC_JAVA_XMX specifies how much "heap" memory is reserved specifically for the Java Virtual Machine (JVM), as opposed to the memory available for non-Java or "native" code. The larger the XMX value (up to the limit of your hardware), the more efficiently the Well Seismic Fusion software can run. If your system has over 8GB of memory, you should consider raising this value to 500 Mb less than the total physical memory. If you change this variable value, the value should be defined in the form:

5120m

where "m" stands for megabytes, "k" for kilobytes, and no letter stands for bytes.

The LGC_JAVA_XSS environment variable specifies how much "stack" memory is reserved for each interface or processing thread spawned by the Well Seismic Fusion software. The default value is 4 Mb.

If you notice the Well Seismic Fusion software performing slowly, you may want to set FUSION_RECOVERY_MESSAGES to “loud”. This will turn on a diagnostic error dialog that will pop up whenever Fusion encounters an unknown situation. By default FUSION_RECOVERY_MESSAGES is set to “quiet” and all unknown error messages are simply written to the default error log file. Below are the options for the error display dialog:

- *quiet*: (default) Do not show recovery dialog, log errors in the output log file.
- *loud*: Show the recovery dialog with options to continue, exit or see error exception details.
- *fallout*: log error and immediately exit the Well Seismic Fusion software.

To increase the OpenWorks error output to the WellSeismicFusion5000.6-#.err file in the 5000.6 environment, you need to change the error level environment variable as described below:

1. Shut down any open Well Seismic Fusion session.

2. Navigate to <Fusion Installation location>/modules/dsinfra/config.

3. Make a copy of the existing logging.properties file. For example,

   ```
   mv logging.properties logging.properties.orig
   ```

4. Edit the logging.properties file, setting com.lgc.ow.level equal to ‘ALL’.

5. Run the Well Seismic Fusion software.

6. The increased error output may cause slower performance in your Well Seismic Fusion session. Once the errors are captures, you should move the original logging.properties file back in place. For example,

   ```
   mv logging.properties logging.properties.all

   mv logging.properties.orig logging.properties
   ```

Where output messages and files are stored

Session files

Session files are stored under your *%USERPROFILE%* directory on Windows or in your *$LGC_DATA_HOME* directory on Linux. Typically these are `$HOME/Landmark/WellSeismicFusion5000.6` on Linux, *%USERPROFILE%\Landmark\DecisionSpace* on Windows 7.

Error messages and files

On Linux, if you have configured your launcher.dat as described in these release notes, the output messages are written to your `$HOME/run/WellSeismicFusion50000.4-x.err` file, where "`x`" is a number from 0 to 9. Each time you start a new session, the .err file version number is incremented by 1 up to a maximum value of 9, at which time the 0 error file version is deleted and re-used.

On Windows, output messages are written to %USERPROFILE%\Landmark\DecisionSpace\logs.

Selecting a browser for online help

When opening DecisionSpace help for the first time, you will get a "Help Select Browser" dialog in which you can specify the browser to use for viewing DecisionSpace online help. If you choose the "make default" option, the browser you selected will always be used to view the online help.

You can override your default browser selection by setting DS_HELP_BROWSER to the browser you would like to use. To remove your default setting, remove `$HOME/.java/.userPrefs/com/lgc/infra/pres/awcomponents/services/prefs.xml`.

Changing the error messages reporting level

To change the OpenWorks error level output to the WellSeismicFusion5000.6-#.err file, you need to edit your `<Fusion_Installation_location>/modules/fusion/config/logging.properties` file. Use the following workflow to change the error output:

1. Shut down any open Well Seismic Fusion session.

2. Navigate to /modules/dsinfra/config.

3. Make a copy of the existing logging.properties file (for example, `mv logging.properties logging.properties.orig`).

4. Edit the logging.properties file, setting com.lgc.ow.level equal to 'ALL'.

5. Run Well Seismic Fusion.

6. The increased error output may cause slower performance in Well Seismic Fusion. Once the errors are captured, you should move the original logging.properties file back in place (for example, `mv logging.properties logging.properties.all`
`mv logging.properties.orig logging.properties`

Valid values for `.com.lgc.fusion.level` are:

- ALL - show all log messages
- FINEST - show highly detailed tracing log messages
- FINER - show fairly detailed tracing log messages
- FINE - show tracing log messages
- INFO - show general informational log messages
- WARNING - show only log messages that indicate a potential problem
- SEVERE - show only log messages that indicate a serious failure
- OFF - show no log messages

The default logging property level is INFO.

> **Note**
>
> It is extremely helpful to rename and save the error file for later analysis if you experience problems while running the Well Seismic Fusion software. Please rename and save the error file before restarting Fusion, or this file may get lost.

Sticky parameters

The Well Seismic Fusion software keeps track of your parameter selections on a project-by-project basis. For example, if you key in a set of Backus averaging parameters for a set of log curves, the Well Seismic Fusion software will remember your parameter selection and the next time you run the Backus averaging algorithm, your previous parameters will be used as the default parameters. These are known as “sticky parameters.”

Sticky parameters are kept in a file called “SerializedProperties” in the `<OW_PROJ_DATA>/<OW_project>/Fusion/your userid/` directory. On Linux, OW_PROJ_DATA is the directory that exists at the path indicated when you run “lgc_getowdir” at the command prompt.

If you are working offline, or if you have not yet selected an OpenWorks project, the Well Seismic Fusion software keeps your sticky parameters in a file called “prefs.xml” at $HOME/Landmark/DecisionSpace/sessionparameters on Linux.

For more global type sticky parameters (like the path to your session files), the Well Seismic Fusion software keeps them in xml format under `[userhome]/Fusion/SerializedProperties` on Linux.

Well Seismic Fusion computed log curves

Well Seismic Fusion computed log curves are stored in memory until you select to save them to the OpenWorks database via the Save icon in the inventory tree or via *Data > Save Data*.

Well Seismic Fusion computed stacked seismic and horizon data

The Well Seismic Fusion software stores its output stacked seismic and horizon data in the SWProj directory pointed to via <dir.dat>.

Well Seismic Fusion computed prestack seismic data

The Well Seismic Fusion software stores its output prestack seismic data in the `<dir.dat>/fusion_seismic` data directory. If the `fusion_seismic` directory is not specified in the <dir.dat>, prestack seismic data created in a Well Seismic Fusion session will be written to the OTHER_FILES file system. The pointers to the prestack data are kept in the OpenWorks database.

Well Seismic Fusion created prestack horizon data

The Well Seismic Fusion software stores its output prestack horizon data in the `<dir.dat>/fusion_horizon` data directory. If the `fusion_horizon` directory is not specified in the <dir.dat>, prestack horizon data created in a Well Seismic Fusion session will be written to the OTHER_FILES file system.

Well Seismic Fusion created crossplot and polygon data

The Well Seismic Fusion software stores its output crossplot and polygon data in the `<OW_PROJ_DATA>/<OW_project>/Fusion_Data/crossplot` data directory.

Crossplot reference models

The standard reference models are not stored anywhere. They are created in memory. User-defined reference models are stored in `$HOME/Fusion`.

Well Seismic Fusion created shale overlays and basin trend functions

The Well Seismic Fusion software stores its shale overlays and basin trend functions in the `<OW_PROJ_DATA>/<OW_project>/Fusion_Data/1D_probe` data directory.

Synthetic Seismograms and VSP data

The Well Seismic Fusion software stores its output synthetic seismogram data (for both normal-incidence and offset synthetics) in the OpenWorks database. 2D offset vertical seismic profiles (VSPs) are also stored in the OpenWorks database. To view these data in the OpenWorks database, launch the Well Data Manager.

Additional metadata for normal incidence synthetics is stored in the <OW_PROJ_DATA>/<OW_project>/Fusion_Data/synthetics data directory. The additional meta data includes the correlation windows and additional log curves that were in the view when the synthetic was being generated.

Corridor stack VSP data needs to be loaded via OpenWorks import utilities into a 1D synthetic. 2D VSPs and offset synthetics that were created outside the Well Seismic Fusion software can be stored in the OpenWorks database by selecting “Tools >Seismic Algorithms > Data Loading > Load VSP and Offset Synthetics Wizard” in a Well Seismic Fusion session.

Wavelets

User-defined wavelets are also stored in the OpenWorks database. To view these data in the database, launch the Well Data Manager. Choose “File > Set Top Level Focus”, then select **Wavelet** from the list and click **OK**.

Configuring the PD (Pointing Dispatcher) Variables

For Linux

When you launch Fusion from the OpenWorks command menu on Linux, you automatically have PD configured correctly if PD_USE_SESSION_MGR is set to YES in `$OWHOME/conf/lgcenv.cf`. If PD_USE_SESSION_MGR is not enabled, please refer to OpenWorks PD documentation.

When you launch the OpenWorks software on Linux using an instance number (such as `startow -i 1234`), a PD service is started that is specific to that OpenWorks instance. All applications launched from that OpenWorks instance will communicate with each other via the PD service specific to that OpenWorks instance. DecisionSpace software can be launched from the OpenWorks software in two ways:

1. Add DecisionSpace to .lgclogin and launcher.dat as described on page 14 in the Release Notes, and launch the DecisionSpace software from the OpenWorks menu via the Applications menu.

2. Open a terminal window from the OpenWorks menu bar using *System > Terminal Window*, navigate to your Fusion installation, and type LaunchWSFDesktop.sh.

If the Fusion software is launched in any other way, it will start its own PD service and it will not communicate with an OpenWorks session that was launched using an instance number. In this case, it will also not communicate with any other software (such as a SeisWorks session) launched from that Openworks session. To connect the Fusion software to a specific instance of PD, set the environment variable OW_INSTANCE_NUMBER to the OpenWorks instance number before launching the Fusion software.

Printing from Acrobat Reader

These Release Notes are in pdf format and can be accessed online using **Help > Well Seismic Fusion > Release Notes**. You must have Adobe® Acrobat® Reader® installed. The release package includes an Adobe® Acrobat® Reader® CD.

It may be simpler for you to print these Release Notes than to use them online while you are trying to install. When printing ranges of pages in Acrobat Reader, you must use the status bar at the bottom of Acrobat Reader to get the most accurate indicator of which page you are viewing. The page numbers at the bottom of an online page or other page number references in the online document are not the page numbers that Acrobat uses when you select a range of pages in its Print dialog. This situation is especially true in online books, where the table of contents uses one page numbering scheme and the body of the book uses another.

For example, to print a section from the Release Notes, follow a procedure similar to the following:

1. In the bookmark pane of Acrobat, select the name of the section that you want to print.
2. Note the page number in the status bar.
3. Display the last page in the section.
4. Note the page number of the last page in the status bar.
5. Select **File > Print** to display the Print dialog.
6. Enter the page numbers that you noted in the **From** and **To** text boxes in the Print dialog.
7. Click **OK**. Acrobat will then print the pages of the section.

> **Note**
>
> For Acrobat Reader to function properly on some Linux installations, you must the environment variable “LANG” equal to “C”. (`setenv LANG C`)

Displaying Acrobat Reader help from your Linux browser

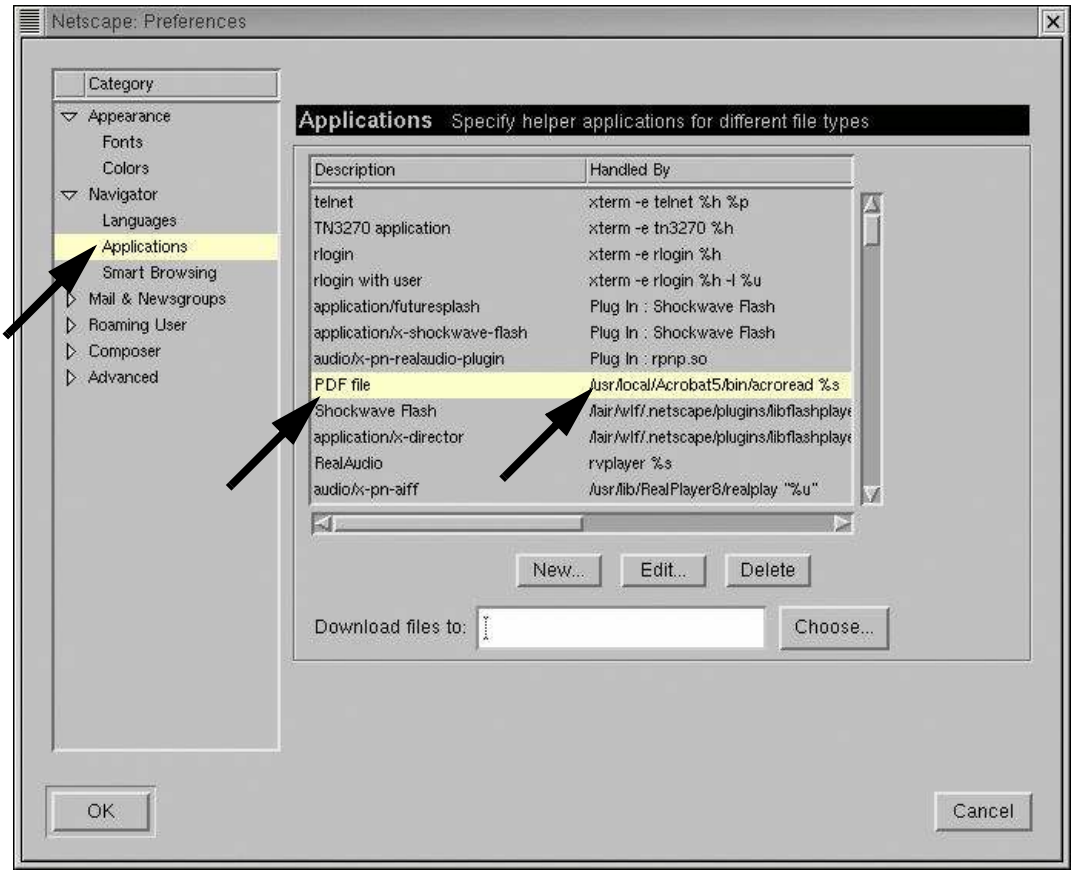
Ensure that you have Adobe Acrobat Reader loaded on your Linux system. The latest version of Acrobat Reader is available via a free download from www.Adobe.com. After installing Acrobat Reader, ensure that the executable is in your path. For example:

```
cd /usr/bin

ln -s acrobat_install_directory/bin/acroread acroread
```

1. From Mozilla 1.7+ select **Edit > Preferences**.

2. Under **Navigator > Applications**, add an entry for `PDF file` and change the Handled By column to `acrobat_install_directory/bin/acroread %s`.



This will allow your browser to launch Acrobat Reader in order to read pdf files. Depending on your version of Mozilla, you may or may not need the "%s" in the Handled By column.

If you want the pdf file to be displayed within your browser, you will need to install a pdf-reader "plug-in" on your browser. Most media plug-ins are available for free on the internet.

Contacting Landmark Customer Support

Landmark software operates Technical Assistance Centers (TACs) in Australia, the United Kingdom, and the United States. Additional support is also provided through regional support offices around the world.

- Support Via Web Portal
- Technical Assistance Centers
- Regional Offices
- Helpful Links

Support Via Web Portal

Support information is always available on the Landmark Customer Support internet page. You can also submit a support request directly to Landmark Customer Support though the Landmark Customer Support Portal:

http://css.lgc.com/InfoCenter/index?page=home

To request support in the Landmark Customer Support Portal:

1. In the **PIN** and **Password** text boxes in the Please Sign In area, enter your registered personal identification number and password.

2. Click the **Sign In** button.

3. In the Case & Defect Information area, click the **Create A New Case** link.

4. In the **Create Case** area, fill in the necessary information. Provide details about your technical concern, including any error messages, the workflow steps where the problem occurred, and attachments of screen shots that display the problem. To help understand the concern, you can also attach other files too, such as example data files.

Click the **Submit** button. A support analyst in the nearest Technical Assistance Center will respond to your request.

Technical Assistance Centers

Asia, Pacific 8:00 am - 5:00 pm Local Time Monday-Friday, excluding holidays	**61-8-9481-4488 (Perth, Australia)** **Toll Free 1-800-448-488** Fax: 61-8-9481-1580 Email: apsupport@lgc.com
Europe, Africa, Middle East 9:00 am - 5:30 pm Local Time Monday - Friday, excluding holidays	**44-1372-868686 (Leatherhead, UK)** Fax: 44-1224-723260 (Aberdeen, UK) Fax: 44-1372-868601 (Leatherhead, UK) Email: support@lgc.com
Latin America (Spanish, Portuguese, English) 7:00 am - 5:00 pm Local Time	**713-839-3405 (Houston, TX, USA)** Fax: 713-839-3646 Email: soporte@lgc.com
North America 7:30 am - 5:30 pm Central Standard Time Monday - Friday, excluding holidays	**713-839-2200 (Houston, TX, USA)** **Toll Free 1-877-435-7542** **(1-877-HELP-LGC)** Fax: 713-839-2168 Email: support@lgc.com

Regional Offices

For contact information for regional offices, see the Contact Support page located at:

http://css.lgc.com/InfoCenter/index?page=contact&section=contact

If problems cannot be resolved at the regional level, an escalation team is called to resolve your incidents quickly.

Helpful Links

Name	Website Address
Landmark Software & Services home page	http://www.halliburton.com/landmark
Landmark Support Portal	http://css.lgc.com/InfoCenter/index?page=home
Oracle home page	http://www.oracle.com
FLEXNet Publisher (Flexera Software, Inc.)	http://www.flexerasoftware.com
Microsoft SQL Server home page	http://www.microsoft.com/sqlserver
Adobe Acrobat Reader	http://www.adobe.com
Microsoft SQL Server Express home page	http://www.microsoft.com/express/sql

3rd Party Acknowledgments

Halliburton 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 at the following location:

$FUSION_HOME/help/com/lgc/dspx/third_party.pdf

The following additional information is provided in accordance with the software manufacturer's terms of usage:

Sun Microsystems: Java Runtime Environment (JRE)	Copyright © 2002 Sun Microsystems, Inc. All Rights Reserved. 4150 Network Circle, Santa Clara, California 95054 U.S.A. Sun Microsystems, Inc. Binary Code License agreement This product includes code licensed from RSA Security, Inc. Some portions licensed from IBM are available at http://oss.software.ibm.com/icu4j/

Sun Microsystems: Java Runtime Environment (JRE)	Copyright © 2002 Sun Microsystems, Inc. All Rights Reserved. 4150 Network Circle, Santa Clara, California 95054 U.S.A. Sun Microsystems, Inc. has intellectual property rights relating to technology embodied in the product that is described in this document. In particular, and without limitation, these intellectual property rights may include one or more of the U.S. patents listed at **http://www.sun.com/patents** and one or more additional patents or pending patent applications in the U.S. and in other countries. This document and the product to which it pertains are distributed under licenses restricting their use, copying, distribution, and decompilation. No part of the product or of this document may be reproduced in any form by any means without prior written authorization of Sun and its licensors, if any. Unless otherwise licensed, software code in all technical materials herein (including articles, FAQs, samples) is provided under the (**http://java.sun.com/xml/jaxb/users-guide/examples/users-guide/License-BSD.html**) License. Third-party software, including font technology, is copyrighted and licensed from Sun suppliers. Sun, Sun Microsystems, the Sun logo, Java, the Java Coffee Cup logo, J2EE, J2SE, Java Naming and Directory Interface, Enterprise JavaBeans, EJB, JavaServer Pages, and JSP are trademarks or registered trademarks of Sun Microsystems, Inc. in the U.S. and other countries. UNIX is a registered trademark in the United States and other countries, exclusively licensed through X/Open Company, Ltd. Federal Acquisitions: Commercial Software - Government Users Subject to Standard License Terms and Conditions. DOCUMENTATION IS PROVIDED “AS IS” AND ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT, ARE DISCLAIMED, EXCEPT TO THE EXTENT THAT SUCH DISCLAIMERS ARE HELD TO BE LEGALLY INVALID.

International Trade Compliance

This software 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 in the Release Notes represent Landmark Graphics' 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**.

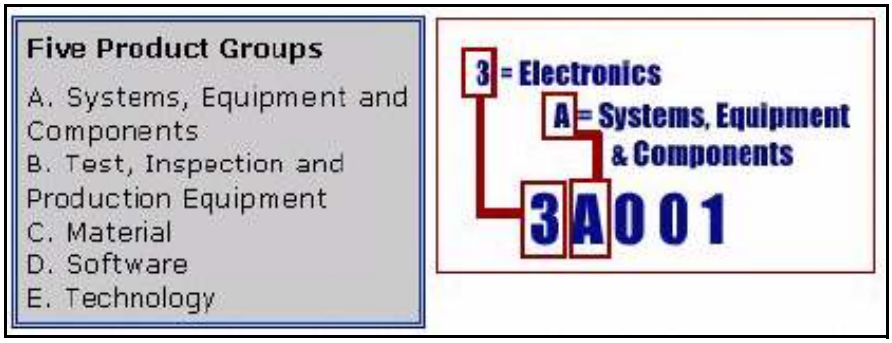
Under the U.S. Export Administration Regulations (EAR), the U.S. Government assigns your organization or client, as exporter/importer of record, responsibility for determining the correct authorization for the item at the time of export/import. Restrictions may apply to shipments based on the products, 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 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 Number	License	CCATS Number	Date Last Modified
3D Drill View KM	5D002	ENC	G054690	2/11/2008
Advanced Data Transfer (ADT)	5D002	ENC	G062651	2/11/2008
AssetConnect	5D002	ENC	G056693	2/11/2008
AssetConnect Component	5D002	ENC	G062845	2/11/2008
AssetJournal	5D002	ENC	G058160	2/11/2008
AssetSolver	5D002	ENC	G055504	2/11/2008
AssetView	5D002	ENC	G054690	2/11/2008
Corporate Data Archiver (CDA)	5D002	ENC	G055789	2/11/2008
Corporate Data Store (CDS)	5D002	ENC	G054426	2/11/2008
DecisionSpace DMS Utilities	5D002	ENC	G054691	2/11/2008
DecisionSpace Infrastructure (DSI)	5D002	ENC	G054690	2/11/2008
DecisionSpace Software Development Kit (SDK)	5D002	ENC	G054690	2/11/2008
DecisionSpace Universal Launcher	5D002	ENC	G061904	2/11/2008
DecisionSpace Well Seismic Fusion	5D002	ENC	G052728	2/11/2008
DeskTop VIP	5D002	ENC	G048061	2/11/2008
Discovery 2007	5D002	ENC	G055172	2/11/2008
DMS	5D002	ENC	G031851	2/11/2008
Engineer's Data Model (EDM)	5D002	ENC	G060075	2/11/2008
Engineer's Data Model Software Development Kit (EDM SDK)	5D002	ENC	G060075	2/11/2008

GeoData Load	5D002	ENC	G049393	2/11/2008
iWellFile	5D002	ENC	G057687	2/11/2008
Landmark Software Manager (LSM)	5D002	ENC	G058319	2/11/2008
Master Data Store (MDS)	5D002	ENC	G052818	2/11/2008
Nexus	5D002	ENC	G047832	2/11/2008
OpenWire	5D002	ENC	G060665	2/11/2008
OpenWire Server	5D002	ENC	G063199	2/11/2008
OpenWorks	5D002	ENC	G054746	2/11/2008
Project Administrator (PA)	5D002	ENC	G055789	2/11/2008
PowerCalculator	5D002	ENC	G062458	2/11/2008
PowerExplorer	5D002	ENC	G053418	2/11/2008
PowerGrid	5D002	ENC	G051477	2/11/2008
PowerHub	5D002	ENC	G053418	2/11/2008
PowerHub DevKit for webservices	5D002	ENC	G061424	2/11/2008
PowerView	5D002	ENC	G054248	2/11/2008
PreR5000	5D002	ENC	G061893	2/11/2008
ProMAX/SeisSpace	5D002	ENC	G054429	2/11/2008
Reference Data Manager (RDM)	5D002	ENC	G054426	2/11/2008
Team Workspace	5D002	ENC	G045985	2/11/2008
WebApps	5D002	ENC	G055789	2/11/2008
WellPlanning	5D002	ENC	G054690	2/11/2008
WellSolver	5D002	ENC	G055504	2/11/2008
WOW	5D002	ENC	G055789	2/11/2008
Z-Map Plus	5D002	ENC	G060832	2/11/2008

Halliburton | Landmark Software & Services
2107 City West Blvd., Building 2, Houston, Texas 77042-3051, USA
P.O. Box 42806, Houston, Texas 77242, USA
Phone:713-839-2000, FAX: 713-839-2015
Internet: www.halliburton.com/landmark

Trademarks

Note

The information contained in this document is subject to change without notice and should not be construed as a commitment by Halliburton. Halliburton assumes no responsibility for any error that may appear in this manual. Some states or jurisdictions do not allow disclaimer of expressed or implied warranties in certain transactions; therefore, this statement may not apply to you.

Third Party Software

Halliburton 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 at the following location:

$FUSION_HOME/help/com/lgc/dspx/third_party.pdf

Disclaimer

The programs and documentation may provide links to external web sites and access to content, products, and services from third parties. Halliburton is not responsible for the availability of, or any content provided on, third party web sites. You bear all risks associated with the use of such content. If you choose to purchase any products or services from a third party, the relationship is directly between you and the third party. Halliburton is not responsible for: (a) the quality of third party products or services; or (b) fulfilling any of the terms of the agreement with the third party, including delivery of products or services and warranty obligations related to purchased products or services. Halliburton is not responsible for any loss or damage of any sort that you may incur from dealing with any third party.