Department of the Interior
U.S. Geological Survey

Installation Instructions for LDOPE-1.6 Tools on Windows, Linux, and Mac Platforms

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LP DAAC has offered a set of software tools, originally developed by the Land Data Operational Product Evaluation (LDOPE) group at the Goddard Spaceflight Center to work with MODIS data products. These tools were offered in a number of system platforms, some of which no longer exist in the mainstream. Also, recently, the LDOPE group fixed user-reported software bugs in a couple of the tools. Hence, LP DAAC has consolidated these tools, which are now available to serve three main system platforms: Windows, Linux, and Mac OSX. The LDOPE User Manual is in the process of being updated to reflect these changes. Meanwhile, this document addresses four basic questions to help users get started with implementing these tools on their preferred platform of choice:

- ★ Where can I find the LDOPE Tools?
- ★ What tools are available in the LDOPE suite?
- ★ How do I install the tools for each platform?
- ★ Whom do I contact for additional help?

Please consult the LDOPE User Manual for syntax descriptions and examples for the different tools.

Where can I find the LDOPE Tools?

You can access your preferred package of the LDOPE tools through the following URL: https://lpdaac.usgs.gov/tools/ldope_tools

If you haven't already done so, you need to register (before you can access the tools) through the following URL: https://lpdaac.usgs.gov/user/register

What tools are available in the LDOPE suite?

The LDOPE suite include the following tools:

	Tool name	Description*
1	comp_sds_hist	Print the histogram of SDS values
2	comp_sds_range	Print the observed range, excluding no-data and missing values, of specified SDS
3	comp_sds_stat	Print summary statistics of any SDS
4	comp_sds_values	Print the unique values found in specified SDS of a MODIS land HDF-EOS product
5	convert_l1b_data	Convert MODIS L1B data to Top of Atmosphere reflectance/radiance
6	cp_proj_param	Copy projection metadata into an HDF file that is defined in Sinusoidal projection
7	copy_sds	Copy one or more SDS from an input HDF file to an output HDF file
8	create_mask	Apply relational and logical operators to one or more SDS
9	create_sds_ts_stat	Create a summary statistic HDF file containing one or more output 2D SDS
10	enlarge_sds	The inverse of companion tool *reduce_sds*
11	geolocation	Compute the geographic lat & lon of a MODIS land L2G/L3/L4 pixel coordinate
12	mask_sds	Mask one of more SDS of a MODIS land HDF-EOS data product
13	math_sds	Perform simple arithmetic on 2 input SDS of the same or different MODIS products
14	mosaic_sds	Create a spatial mosaic of SDSs from different L3/L4 MODIS land products
15	read_l2g	Reads the L2G format & writes user-specified layers to output 2D HDF SDS
16	read_meta	Print the ECS core and archive metadata and SDS attributes of any MODIS product
17	read_pixvals	Read MODIS land HDF-EOS data product values at specified pixel locations
18	read_proj_param	Read the projection parameter information of a L2G/L3/L4 MODIS product
19	read_sds_attributes	Print the attributes of one or more SDS of MODIS land HDF-EOS data products
20	reduce_sds	Generate reduced spatial resolution MODIS products by sub-sampling or averaging
21	reduce_sds_rank	Converts multidimensional (3D or 4D) SDS to a series of 2D HDF SDS
22	sds2bin	Convert an SDS of any MODIS land data product to a flat binary image format
23	subset_sds	Create spatial subset SDS from one or more SDS of a MODIS land data product
24	tile_id	Compute the MODIS land L2G/L3/L4 tile id for a given latitude and longitude
25	transpose_sds	Transpose one/more SDS by rotating the SDS 180° in clockwise direction
26	unpack_sds_bits	Decodes requested bit fields and writes them to 2D HDF SDS
27	read_l2g_lite	Places requested observations from any science parameter into different 2D SDS
28	comp_sds_diff_img	Provides a basic capability to compare two versions of a MODIS image

The descriptions provided here are very high-level. Consult the User Manual for details.

Syntax descriptions and examples for tools 1 through 25 are available in the LDOPE
User Manual. You can access the documentation for the last two tools (read_l2g_lite
and comp_sds_diff_img) on the LDOPE Tools page, listed along with the LDOPE
User Manual:

https://lpdaac.usgs.gov/tools/ldope_tools/

How do I install the tools for each platform?

All users who have a previously installed version of the LDOPE tools in any of the
three platforms are advised to uninstall them before installing this new version. The

new LDOPE-1.6 version comes with an uninstall routine that users may exercise in the future.

Package: LDOPE-1.6-windows-32-installer.exe

This Windows 32-bit installer installs LDOPE 32-bit binaries, which users may run on both 32-bit and 64-bit Windows OS.

This self-installing software is an executable that users may run directly after downloading the package. Users may run the installer from a DOS command line or by double-clicking the package from Windows Explorer.

When the installer is run without arguments or by instantiating it via Windows Explorer or similar means, the installer should start and display the following window:
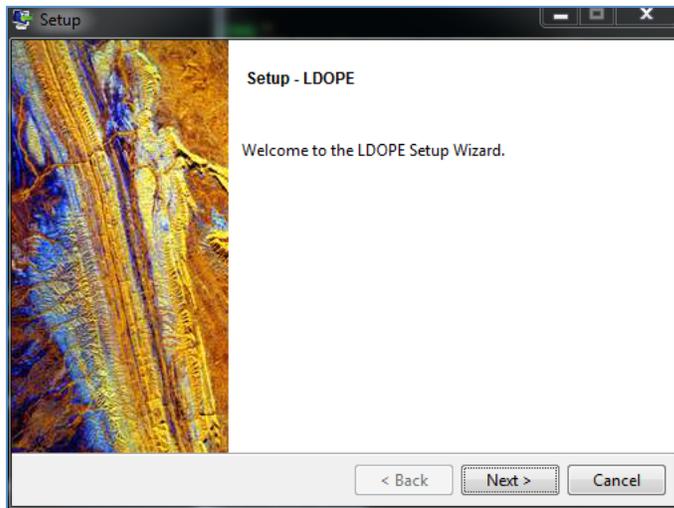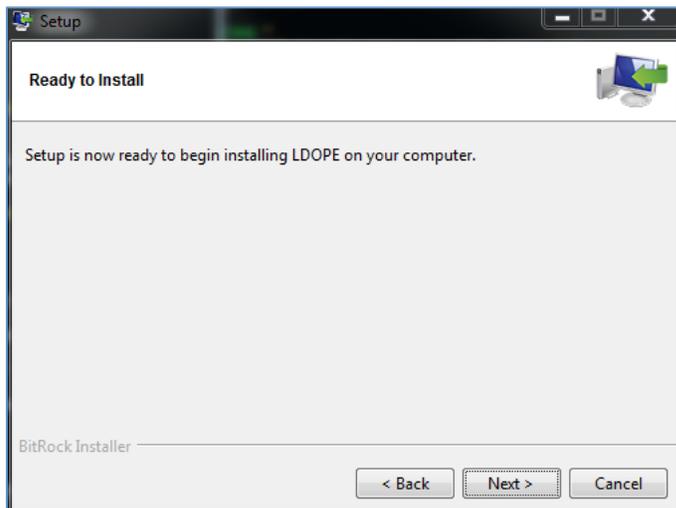

Press the "Next" button, and a window will display, which prompts the user for the installation directory for the LDOPE software:

Note: Some of the screenshots may still refer to "LDOPE 1.5" because they have not been updated. This overall implementation process works the same with the current LDOPE 1.6 as before.
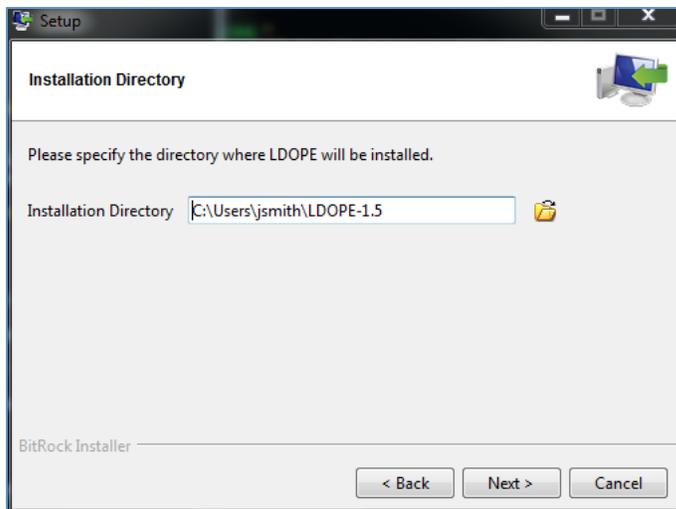
The default installation directory relates to the user's "HOME" directory, which may depend on the version of Windows. Typical values may include: "C:\Documents and Settings*jsmith*\\LDOPE-1.6" on Windows 2K/XP/2003 and "C:\Users*jsmith**LDOPE-1.6"* on Windows Vista/7/2008.

The user may accept the default or change the directory to specify an alternate location. Press the "Next" button to continue. Another window will display, which will state that the installer is ready to install LDOPE:

Press the "Next" button to continue. The installer will install the LDOPE software into the specified directory, and then display another window informing that the installation is complete:

Press "Finish" to complete the installation.

Command line install:

As part of running the installer from the command line, users may add several arguments to further define the installation process. To display help for these arguments, add "—help" to the installer command:

LDOPE-1.6-windows-32-installer.exe --help

The above command should show the following information:

LDOPE 1.6
Usage:

 --help   Display the list of valid options

 --version   Display product information

--unattendedmodeui <unattendedmodeui> Unattended Mode UI
                 Default: none
                 Allowed: none minimal minimalWithDialogs

--optionfile <optionfile>   Installation option file
                 Default:

--debuglevel <debuglevel>   Debug information level of verbosity
                 Default: 2

Allowed: 0 1 2 3 4

--mode <mode>   Installation mode
                  Default: win32
                  Allowed: win32 unattended

--debugtrace <debugtrace>   Debug filename
                  Default:

--installer-language <installer-language> Language selection
                  Default: en
                  Allowed: en ar bg ca da nl et fr fi de el es es_AR he hr hu it ja ko pl pt_BR pt ro ru
no sl sk sq sv tr zh_TW zh_CN va cy cs

--prefix <prefix>   Installation Directory
                  Default: C:\Users\jsmith\LDOPE-1.6

Please note that the primary arguments are the "--mode" and "--prefix" switches.

The "—mode" switch allows two options, "win32" and "unattended". If "win32" is
selected, then the normal GUI install described above is invoked. Otherwise, if
"unattended" is selected, the installer will install the LDOPE software into the
default installation directory with no further user interaction. The "—prefix"
argument is used to change the default installation directory, which users are likely to
use with the "—mode" switch set to "unattended" mode. An example command to
install LDOPE into a directory called "C:\apps\LDOPE-1.6" without further user
interaction is as follows:
LDOPE-1.6-windows-32-installer.exe --mode unattended –-prefix C:\apps\LDOPE-1.6

The installer should place the installed LDOPE bin installation directory name into
the user's "Path" environment variable, and it should create an environment variable
called ANCPATH that points to the installed LDOPE "ANCILLARY" directory, as
well as install the LDOPE binaries, source, and documentation.

Uninstall:

The uninstaller is available in the same directory where LDOPE was installed. A shortcut is created that is called "Uninstall LDOPE.lnk", which invokes the "uninstall.exe" binary, also located in the same directory. Invoking either one should work, although using the shortcut is recommended since it displays a window for verification of the uninstall process that accomplishes the removal of the package as requested by the user; otherwise it does not.

LDOPE does NOT show up in the "Control Panel -> Programs and Features" (or identified in "Control Panel -> Add/Remove Programs" on older Windows versions) as it is intended for installation by users and not administrators. If it does show up in the Control Panel, the user may need Administrator privileges to uninstall it.

The uninstaller should remove the LDOPE installation directory and everything beneath it, remove the ANCPATH environment variable, and remove the installed LDOPE bin directory from the PATH.

Package: LDOPE-1.6-windows-64-installer.exe

This Windows 32-bit installer installs LDOPE 64-bit binaries. Users should only use this package to install the LDOPE tools on 64-bit Window OS.

All information provided above for the Windows 32-bit installer is applicable to the 64-bit version as well.

## Package: LDOPE-1.6-linux-32-installer.run

This Linux 32-bit installer installs LDOPE 32-bit binaries. Users may use it on both 32-bit and 64-bit Linux systems. If installing on a 64-bit system, users may find it necessary to have the appropriate 32-bit compatible libraries installed prior to running the installer and before the LDOPE executables can run.

This self-installing software is an executable that users may run directly after downloading the package. Users may either run the installer from a Shell command line or by clicking the package from a file manager (Dolphin, for example).

When the installer is run without arguments (for example: ./LDOPE-1.6-linux-32-installer.run) or by instantiating it via a file manager or similar means, the installer should start and display the following window:
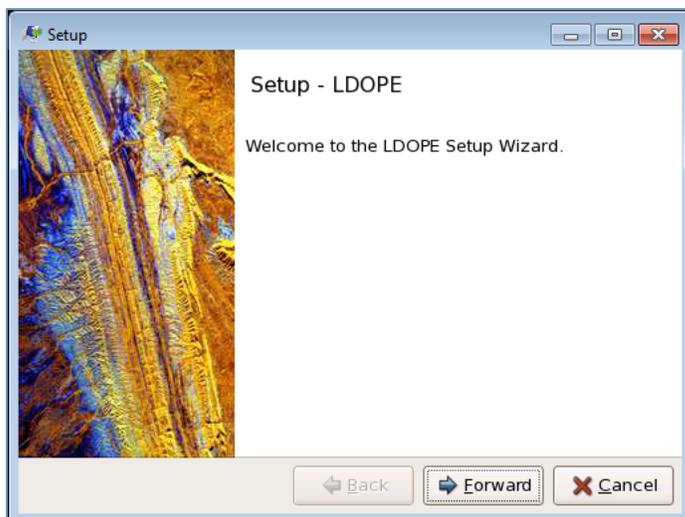
Press the "Forward" button, and a window will display, which will prompt the user for the installation directory for the LDOPE software:
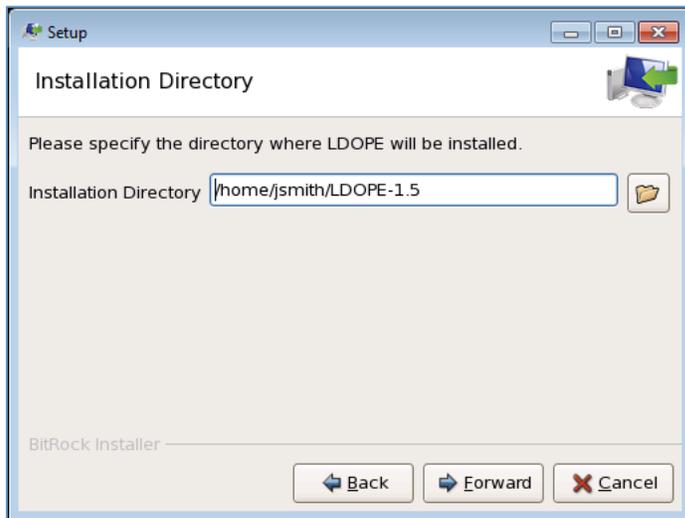
The default installation directory is the user's "HOME" directory, where typical values may look like: "/home/jsmith/LDOPE-1.6" or "/u/jsmith/LDOPE-1.6"

The user may accept the default or specify an alternate directory where LDOPE is installed. Press the "Forward" button to continue. Another window will display, which states that the installer is ready to install LDOPE:

Press the "Forward" button to continue. The installer will install the LDOPE software into the specified directory, and then display another window informing that the installation is complete:

Press "Finish" to complete the installation.

Command line install:

As part of running the installer from the command line, users may add several arguments to further define the installation process. To display help for these arguments, add "—help" to the installer command:

./LDOPE-1.6-linux-32-installer.run --help

The above command should show the following information:

LDOPE 1.6
Usage:

 --help   Display the list of valid options

 --version   Display product information

--unattendedmodeui <unattendedmodeui> Unattended Mode UI
                 Default: none
                 Allowed: none minimal minimalWithDialogs

 --optionfile <optionfile>   Installation option file
                 Default:

 --debuglevel <debuglevel>   Debug information level of verbosity

Default: 2
Allowed: 0 1 2 3 4

--mode <mode>   Installation mode
                Default: gtk
                Allowed: gtk xwindow text unattended

--debugtrace <debugtrace>   Debug filename
                Default:

--installer-language <installer-language> Language selection
                Default: en
                Allowed: en ar bg ca da nl et fr fi de el es es_AR he hr hu it ja ko pl pt_BR pt ro ru
no sl sk sq sv tr zh_TW zh_CN va cy cs

--prefix <prefix>   Installation Directory
                Default: /home/jsmith/LDOPE-1.6

Please note that the primary arguments are the "--mode" and "--prefix" switches.

The "—mode" switch allows four options, "gtk", "xwindow", "text" and
"unattended". Selection of "gtk" or "xwindow" invokes the normal GUI installation
described above. The "gtk" mode (the default) requires the GTK (GIMP Toolkit)
libraries present in the system and "xwindow" mode is considered a lightweight
graphics execution mode. The "text" mode provides full interactivity with users in
the command line, and is equivalent to any GUI mode but the pages are displayed in
text mode in a console. If "unattended" is selected, the installer will install the
LDOPE software into the default installation directory with no further user
interaction. The "--prefix" argument is useful to change the default installation
directory, which users are likely to use with the "--mode" switch set to "unattended"
mode. An example command to install LDOPE into a directory called
"/home/jsmith/apps/LDOPE-1.6" without further user interaction is as follows:

LDOPE-1.6-linux-32-installer.exe --mode unattended –-prefix /home/jsmith/apps/LDOPE-1.6

An example of running the installer in "text" mode:

LDOPE-1.6-linux-32-installer.exe --mode text

Assuming that LDOPE was installed in the users "HOME" directory, the installer
should add two lines to the existing login scripts (for instance, .bashrc and .profile):

```
export PATH=/home/jsmith/LDOPE-1.6/bin:$PATH
export ANCPATH="/home/jsmith/LDOPE-1.6/ANCILLARY"
```

The installer may add the following information to the .cshrc login script, if it exists:

```
set path=( "/home/jsmith/LDOPE-1.6/bin" $path )
setenv ANCPATH "/home/jsmith/LDOPE-1.6/ANCILLARY"
```

The installer should place the installed LDOPE bin installation directory name into the user's "Path" environment variable, create an environment variable called ANCPATH that points to the installed LDOPE "ANCILLARY" directory, as well as install the LDOPE binaries, source, and documentation. After installation, the user may need to log in again, or start a new shell.

Uninstall:

The uninstaller, called "uninstall" is located in the LDOPE installation directory. Similar to the installer, users may run "uninstall" via a command line or GUI. The command line provides options that are viewable by adding the "--help" argument to the command. Users may also employ the "--mode" switch; the available modes are the same as described for the installer.

To uninstall using the GUI, click "uninstall" in the LDOPE installation directory using the file manager.

To uninstall from the command line (while in the LDOPE install directory):

./uninstall --mode text

Or to run the GUI from the command line:

./uninstall

The uninstaller should remove the LDOPE installation directory and everything beneath it, remove the ANCPATH environment variable, and remove the installed LDOPE bin directory from the PATH.

The uninstall removes all the added lines from .bashrc, .profile, and .cshrc, and removes all the directories under LDOPE-1.6, but leaves an empty LDOPE-1.6

directory, which users may need to remove manually.

Package: LDOPE-1.6-linux-x64-installer.run

This Linux 32-bit installer installs LDOPE 64-bit binaries. Users should only use this package to install the LDOPE tools on 64-bit systems. This installer runs the same as the "LDOPE-1.6-linux-32-installer.run" package.

Package: LDOPE-1.6-osx-installer.app.zip

This zip file contains a MacOS "Application", which is actually a directory containing other directories and files. Users need to first unzip this file prior to installation. The installer itself checks for i386 and ppc platforms but should run on 64-bit systems as well. The LDOPE executables themselves are Universal Binaries that support i386, x86_64, and ppc architectures.

To unzip the package, run the following command:

unzip LDOPE-1.6-osx-installer.app.zip

This will produce a directory called "LDOPE-1.6-osx-installer.app" and is considered an application bundle. Users may run the installer from a Shell command line or by clicking the package from the file manager.

For command line installations, the actual installer is located at "/Users/jsmith/LDOPE-1.6-osx-installer.app/Contents/MacOS/" (assuming the package was unzipped in the user's "HOME" directory) and is called "installbuilder.sh".

When the installer is run without arguments or by instantiating the installer via a file manager or similar means, the installer should start and display the following window:

Press the "Next" button, and a window will display, which prompts the user for the installation directory for the LDOPE software:
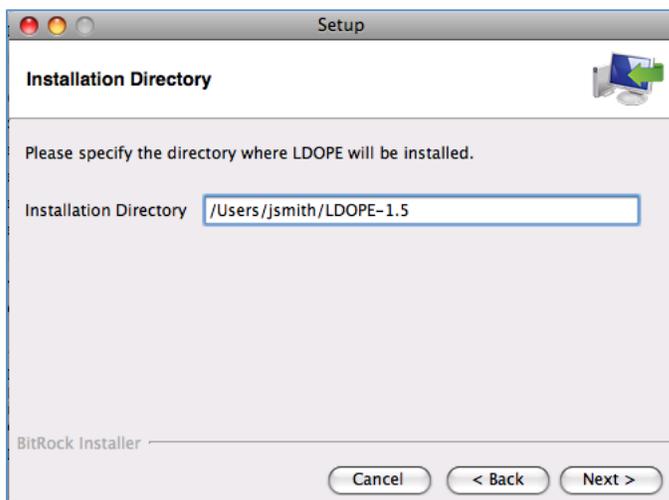
The default installation directory is the user's "HOME" directory, where a typical value may look like: "/Users/jsmith/LDOPE-1.6".

The user may accept the default or change the directory to specify where LDOPE is installed. Press the "Next" button to continue. Another window will display that informs that the installer is ready to install LDOPE:
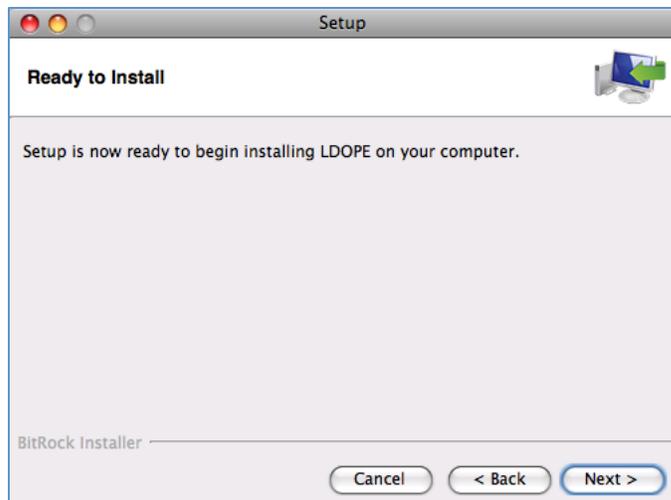
Press the "Next" button to continue. The installer will install the LDOPE software into the specified directory followed by another window informing that the installation is complete:

Press "Finish" to complete the installation.

Command Line Install:

To install from the command line, go to the following directory (the following example assumes that the package was unzipped in the user's "HOME" directory):

/Users/jsmith/LDOPE-1.6-osx-installer.app/Contents/MacOS

A script called "installbuilder.sh" exists in this directory, which checks for platform and OS version and eventually picks one of the three executables that exist in this directory called osx-10.2, osx-intel, and osx-ppc. One could call any one of these

executables directly if the "installbuilder.sh script fails.

When running the installer from the command line, users may add several arguments to further define the installation process. To display help for these arguments, add "--help" to the installer command:

./installbuilder.sh --help

The above command should display the following information:

```
LDOPE 1.6
Usage:

 --help                  Display the list of valid options

 --version                Display product information

--unattendedmodeui <unattendedmodeui> Unattended Mode UI
                 Default: none
                 Allowed: none minimal minimalWithDialogs

 --optionfile <optionfile>    Installation option file
                 Default:

 --debuglevel <debuglevel>     Debug information level of verbosity
                 Default: 2
                 Allowed: 0 1 2 3 4

 --mode <mode>               Installation mode
                 Default: osx
                 Allowed: osx text unattended

 --debugtrace <debugtrace>     Debug filename
                 Default:

 --installer-language <installer-language> Language selection
                 Default: en
                 Allowed: en ar bg ca da nl et fr fi de el es es_AR he hr hu it ja ko pl pt_BR pt ro ru
no sl sk sq sv tr zh_TW zh_CN va cy cs

 --prefix <prefix>          Installation Directory
                 Default: /Users/jsmith/LDOPE-1.6
```

Please note that the primary arguments are the "--mode" and "--prefix" switches.

The "--mode" switch allows four options, "osx", "text" and "unattended". Selecting "osx" invokes the normal GUI installation process described above. The "text" mode provides full interactivity with users in the command line, and corresponds to a GUI mode but the pages are displayed in text mode in a console. If "unattended" is selected, the installer will install the LDOPE software into the default installation directory with no further user interaction. The "--prefix" argument is useful to change the default installation directory, which users are likely to use with the "--mode" switch set to "unattended" mode. An example command to install LDOPE into a directory called "/Users/jsmith/apps/LDOPE-1.6" without further user interaction is as follows:

./installbuilder.sh --mode unattended –-prefix /Users/jsmith/apps/LDOPE-1.6
An example of running the installer in "text" mode:

./installbuilder.sh --mode text

Assuming that LDOPE was installed in the users "HOME" directory, the installer should add two lines to the existing login scripts (for instance, .bashrc and .profile):

export PATH=/Users/jsmith/LDOPE-1.6/bin:$PATH
export ANCPATH="/Users/jsmith/LDOPE-1.6/ANCILLARY"

The installer may add the following information to the .cshrc login script, if it exists:

set path=("/Users/jsmith/LDOPE-1.6/bin" $path)
setenv ANCPATH "/Users/jsmith/LDOPE-1.6/ANCILLARY"

The installer should place the installed LDOPE bin installation directory name into the user's "Path" environment variable, create an environment variable called ANCPATH that points to the installed LDOPE "ANCILLARY" directory, install the LDOPE binaries, source, and documentation, and create a file called "environment.plist" in "$HOME/.MacOSX". After installation, the user may need to log in again, or start a new shell.

Uninstall:

The uninstaller is available in the directory where the user installed LDOPE. Similar to the installer, users may run "uninstall" via a command line or GUI. The uninstaller is constructed as an application bundle that the file manager may see as

"uninstall". The command line uninstall is actually located in "/Users/jsmith/LDOPE 1.6/uninstall.app/Contents/MacOS/" and is called "instalbuilder.sh" (assuming LDOPE was installed in the user's "HOME" directory). The "installbuilder.sh" script provides command line options that users may view by adding the "--help" argument to the command. Users may also employ the "--mode" switch; the available modes are the same as described for the installer.

To uninstall using the GUI, click "uninstall" in the LDOPE installation directory using the file manager.

To uninstall from the command line (while in the LDOPE install directory, and then going into the "uninstall.app/Contents/MacOS/" directory):
./installbuilder.sh --mode text

Or to run the GUI from the command line:

./installbuilder.sh

The uninstaller should remove the LDOPE installation directory and everything beneath it, remove the ANCPATH environment variable, and remove the installed LDOPE bin directory from the PATH, and remove the "environment.plist" file from the "/Users/jsmith/.MacOSX" directory.

Package: LDOPE-1.6-source.zip

Recommended for developers, and not general users, this package does not have an installer. It provides a zipped file that just contains the source code. The Linux "Makefile" is included, which should provide a good starting point for developers to build on other platforms. Developers may also use this package to build binaries for the supported systems (Windows, Linux and Mac OSX), although they would probably need to tweak the Makefile available in this package. Developers also need to remain aware of LDOPE dependencies, for instance, with HDF4, HDF-EOS2 libraries etc.

The existing LDOPE 1.6 packages were compiled using the following libraries:

1. HDF4 v4.2.6
2. HDF-EOS v2.18
3. zlib v1.2.6
4. szip v2.1
5. jpeg v6b

The HDF4, zlib, szip, and jpeg libraries are available from the HDF Group (http://www.hdfgroup.org/). The HDF-EOS libraries are available from the HDF-EOS site (http://hdfeos.org/). Please note that a General Cartographic Transformation Package (GCTP) library is included in the HDF-EOS package.

Test Datasets

In addition to the executable packages, a separate test_data folder also exists. It contains test datasets that were used to evaluate the "unpack_sds_bits" tool. Users may access these test datasets from the unpack_test_data folder, which contains the following sub-folders:

1. test_data_input
2. test_data_output
3. test_data_scripts

Whom do I contact for additional help?

For additional help regarding the LDOPE tools installation or use, please contact the LP DAAC:

LP DAAC User Services
U.S. Geological Survey (USGS)
Center for Earth Resources Observation and Science (EROS)
47914 252nd Street
Sioux Falls, SD 57198-0001

Phone Number: 605-594-6116
Toll Free: 866-573-3222
866-LPE-DAAC
Fax: 605-594-6963

Email: lpdaac@usgs.gov
Web: https://lpdaac.usgs.gov