

laslook user manual



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1. Introduction

laslook is a new tool within LAStools, the ultimate tool to handle pointcloud data in the open LAS or LAZ formats.

LAStools is one of the most widespread LiDAR toolsets. While LAStools work as command line tools, laslook is a workbench to integrate LAStools into a modern graphical look and feel.

laslook has three main features:

- Document existing LAStools
- Provide an execution control concerning lastools commands
- Provide a visualization of point cloud data

We expect you to know what pointclouds are and what the general possibilities of lastools are. We will focus on the use of this new user interface (GUI).

2. Installation

The installation is carried out via a setup program (<u>https://downloads.rapidlasso.de/laslook_Setup.exe</u>). Just start the setup and follow the installation progress. After the setup is done the program can be started by the laslook program link.

Versions prior to 1.0.5: After the installation and first start the path to LAStools needs to be entered. (Menu "File > Settings" and enter the path to the "bin" directory of LAStools. Often this is "c:\lastools\bin"). Versions since 1.0.5: The LAStools directory will be detected by the program¹.

If you want to do a silent/remote installation without user interaction you can start the setup program with the following parameter: "/SILENT".

2.1. Requirements

The program runs under 64-bit in MS Windows 10 or 11. To install you need admin rights. If you do not have admin rights see "12.1 Manual installation" on how to do an installation without admin rights.

¹ Therefore, the DOS command "where las2las64" will be executed and evaluated.

3. Overview

After starting the program you will see the main screen. This is more of a working environment than a single window.



In the top left you will see all items of LAStools in the tool browser [1]. Below we have provided a file browser [2] to give you an easy overview about the files you are working with. Below the file browser there is a file preview [3] for the selected file. In the main working area you also have a tabset of different modules [4]. By default you have the 3D viewer opened, the documentation and the argument finder. Below we have our execution area or console window [5].

4. Tool browser

In the list of tools you see every tool with its single line description. Pointing on a cell will give you a hint about the whole description. Selecting a tool will show the Arguments or the selected tool in the "Argument" column. Selecting an argument will show the parameters of this argument and possibly a parameter sample of this argument. In both windows you have a filter field to incrementally filter the items in this list.

The argument filter allows you to combine the filter words by (AND/OR) and allow to limit the filter to tools [T] or module [M] arguments.

This feature give you a very quick overview concerning the available tools and their arguments.

If you want to have a closer look at a tool you can simply switch to the tool documentation view.

5. Tool documentation view

The tool documentation synchronizes with the selected tool. The information you receive you may already know by the "*_readme.md" files, but there are some additional advantages: First we are given a formatted view. The markdown of the readmes is used to colorize the content. Then we can use the structure of the headers to generate a content list. You can click the content entry to jump to the position in the file.

5.1. Application wide search function

Either directly within the editor window or within the filter field you can enter a search term. This term is used to search within the current document as well as in all documentation. The found positions in the file are highlighted. The positions in other files are listed in the global result list. Use F3 or F4 to iterate the matches. A click on the global result column opens the first position in the selected file.

6. Argument select

If the required argument for a task is not known or if the tools for a certain task are not known the global argument database can be queried. This database contains all arguments of all tools with their description and possible parameters. A global search box allows a scan above all arguments and descriptions.



A green dot in the LAStools tool browser shows that the selected argument is given by this tool.



The group filter highlight the groups the selected argument belongs to.

Selecting one or more groups will filter the argument results by these groups.

This argument database, together with the tool documentation, gives you swift reference information about the capabilities of the tools.

7. Console window

The classic lastools are commandline tools. Therefore we have a command window. You most likely know already how to run lastool commands. In principle, it is still exactly the same, but we want to give you a bit more confidence in building the command files. So if you want to use a command you just doubleclick on it via the tool list. Then you doubleclick the data file you want to proceed with out of the file list. Then you can filter and doubleclick the arguments you want to use. Here you can change the default parameters of an argument.



To execute one or more commands use the toolbar at top of the console window.

- press "F5" to run the whole batch
- press "Ctrl-Return" to just run the selected command.

- select the "execute selection" command to run the selected lines.

One or more process will be started and the new execution threads will be opened. All execution tasks are listed at the right. You can abort a single thread or all threads using the context menu or the button on the task frame.

7.1. Task run order

Normally the mechanism behind the console parser tries to parallel your tasks. If you don't want this you just click on "sequential". If a batch can't run through, it will stop at this position. Press Shift-Escape or click "abort all" to reset the execution stack.

7.2. Verbose mode

Usually all commands run in verbose mode (-v argument). If you do not want this just unselect the "verbose" checkbox.

7.3. Console output

To every task we get a corresponding output frame.

During execution you will see the output of the tool.

If an error occurs the output and the editor line become red. If the command execution was successful the output will become green.

Use the "pin" button to pin a result. This result will then stay open; also if you run new commands. Unpin the result to close the result window.

7.4. Batch files

laslook is a workbench for LAStools and good for testing commands as well as for your daily work. If you have automated workflows it may be useful to test commands here. To run them you will certainly still use your classic commandfiles. Which is why you have an option to save the content of your console to a commandfile. You can either give a name by dialog or you just enter a comment at the first line and that name will be used. If you enter a first commandline such as

:: test.cmd

the file will be saved as test.cmd if you select "Save as command file...".

7.5. Console wrapper

Usually commands will be started as tasks. DOS commands have to be started within their own console. This is done automatically. If you want to start a special command within your own console you can do this just by entering "!C" prior to the command.

!C lasinfo -i lake.laz

8. File browser

Working with the console always belongs to the files we have in our project.

At the left side you will see all files within our project directory.

This is an integrated file browser. You can select files by click, mouse wheel, or cursor movement.



As soon as you have selected a file, the file information window shows an initial preview of the file. LAS-files are shown in a manner you are familiar with from lasinfo: Textfiles are shown as text, pictures as picture. In any case, you have the option to display the hex content of a file. The preview supports LAS/LAZ, textfiles, and common picture formats. The browser is synchronized with the console: As soon as a new output is generated the browser will show this file. In the toolbar it is possible to

- change the directory in several ways
- show the directory history
- filter files by name
- filter files by "LAS/LAZ" only
- sort them by name, size or date of change

You can hide files you do not want to have in the list and make them visible again.

Using the context menu of a single entry you can

- insert this file into the console,
- copy the filename to the clipboard,
- show the file in your windows file manager,
- open the file with the external assigned application,
- remove (delete) the file from disk or
- reload the file in the 3D viewer.

If the file is a command batch the file can be loaded in the console window.

9. 3D viewer

If you select a file in the file browser it will also appear in the 3D viewer. At first viewing we only read some thousand points of a file. This simple trick makes the first view extremely fast, and it is often enough to view just a smaller sample of your data to rate the quality of a pointcloud or a result.



If you want do see all points you just press "Show all data", and the full file will be loaded.

9.1. Colorization

For each file you can decide how the points will be colorized.



If a colorization by value is selected it is also possible to select the color scheme.

The color schemes are configurable by the user (See "color tables").

Additionally, you can change the point size of the points and the background of the view.

9.2. Camera settings

View direction is modified best by mouse: Just klick and move to change the direction. Z orientation will be fixed upwards by default. Shift-Click move will move the pointcloud within the xy plane. Ctrl-Click will move the cloud within the z plane. Right-Click move will move the center of your view to another position. This defines the zoom centre of your view. Zoom is done best by mouse wheel.

All view properties can be viewed and changed at the 3D control panel.

More properties, like Z zoom, can be achieved via the control panel.

In addition you can change all view settings easily by keyboard. The most important thing to note here is that the numpad should be set with numlook OFF.

- Cursor keys will move.
- Plus/Minus (+/-) will zoom.
- Shift will decrease step size.
- Ctrl-Cursor will move the centre.
- Slash (/) will toggle between top/left/right views.
- Centre (5) will reset the view.

9.3. Multi file view

A standalone feature is the capability of showing more than one file at the same time.



As soon the multi view option [1] is active the files will not be synchronized automatically [2]. Instead you will see a view icon [3] next to each file. If we want to show this file in view simply click this icon or select the function in the context menu.

By default all files are shown centred, because we do not know if the files have a common range base. You can easily move the single pointclouds as shown before with Shift-Click-Move. If we know or expect files with a common base we can also remove the checkbox at "Centered" [4] and click "Align automatically" [5]. The files will be aligned at their original positions.

If you lose your orientation its best to centre all datasets [4] and reset your camera [6].

If you select one or more files in the multiple file list the color settings will affect the selected files.

9.4. Selecting details

Oftentimes you may want to work out a detail in your data.



This can be done easily within the viewer. It is important to know that we always work with our view centre. This is where the axes run.



Usually best is to start with top view. Then move by xy to the horizontal centre of our target to explore using a right-click move.

Then we move a touch sideways to see our current height.

Use Ctrl-leftclick-move to set the height to the center of your target.

Now we can easily zoom into the target and move around it.

9.5. Selections

Sometimes you may want to separate a whole band of data. This is possible by activating the "Section" function.



You can define the section using the mouse or by entering the dimensions in the edit. Click "Exclusive" to limit the view to the planes.

Additional functions are:

fock the planes.

Show or hide the plane visualization.

Q recalculate the data (e.g. after change of dimension or colorization).

9.6. Sections (Cut function)

As of version 1.0.5, it is possible to display the view in sections.



Activate the cut function by select one of the X/Y/Z cut planes. First you will see the cutting plane to define your cut position.





Uncheck "Show cut surface only" to limit your view to the cut plane.

The view will be updated immediate changing the position of your view. You can select the width of your cut (positive and negative) and also the turn and pitch angle of the view cut.

10. Notes

The note function gives you the possibility to save notes to a project. Notes can be formatted as normal text or in markdown notation¹.

11. Extended functions

These were some of the basic functions of laslook. If we check the main menu, however, there are some additional functions.

11.1. Project management

First, we have project management. This feature makes is useful for saving different tasks of work in different projects. A project contains the working folder, the console content, and possibly also some notes about the project. This way you can easily switch between tasks. The project history gives you fast access to recent projects. If you save a project it is saved by default in the application directory. Optionally, you can save your project anywhere else.

Project files have the extension "*.laspro" and are stored as Text in JSON Format.

11.2. Window management

Independent of the project management you also have a window manager.

1 https://en.wikipedia.org/wiki/Markdown

Sub-Windows can be dragged and released by mouse.



Just drag and place sub-windows to the place where you want to have them.

To save a certain windows layout use the menu function

"File > Save window layout ..."

To load a certain windows layout use the menu function

"File > Load window layout ..."

To load the default window layout choose "File > Reset window layout"

The default layout is stored in file "layout_default.lay"

The current layout will be saved as "layout_current.lay" at the program end and will be loaded at startup.

Set your environment however you like and save your favourite settings.

11.3. Program settings (Configuration)

Program settings allow the configuration of certain values.

Settings concentration					
× Settings					
National language:	Auto 👝 German 🖂 English 🚥 Spanish				
LAStools directory	C: \LAStools\gui				
Save automatically					
Number of points for preview: 100 🗢 Thousand					
Project history	12 🔶 Entries				

The most important setting is the LAStools directory. This is the directory where laslook expect the binary files of LAStools.

11.3.1. Interface language

The application can run in different languages. By default, language is detected during startup. The language can be set to English, Spanish or German.

11.4. Execution statistics

All execution of LAStools commands are stored in a local SQLite database. This gives you an overview of recent actions and the option to find a previous argument setting. You can delete unwanted entries and you can also enter notes relating to certain commands. An online filter function gives you the option to find files, commands, arguments, or notes swiftly and efficiently.

The execution statistics also offer an option for automatic task planning and scheduling in future versions.

11.5. Color tables

The color table lets you define your own color schemes for coloring point clouds.

X Color tables						
+ = -	Q >	<				
ColorMap	Description	^	Definition of color t	able		
Blue to red	Blue to red range		Name	Red layer		
Grayscale	Grayscale range		Description	Sample: red layer at certain value		
PointClass	Point classification colors		+ -	O Circle O Direct O < O >		
Rainbow	Full color range		0.0 ±	^		
Red layer	Sample: red layer at certain value					
			125.0 🚽			
			128.0 🙏			
			131.0 🛓			
			255.0 🖕			

color tables are used to map an input value to a color.

The numbers according to each color will be interpolated within the color range of your data. Therefore the rainbow color range has a mere value of 0 and 1, whereas the default pointclass colormap has an entry for each possible pointclass to avoid interpolation. You can add a new color table by clicking on the "plus"(+) button. Then, give a name and optional description. Now you can add one or more color points. You have the option to define a hard limit between the colors or, alternatively, a gradient between the colors. The gradient can follow a circular color wheel or a straight line between the colors.

11.6. Logfile (Protocol function)

If a problem occurs it is recommended check the program logfile.

The logfile can be shown by the main menu "File > Log".

The entries can be exported to a text file (Contextmenu "Export...").

If a problem occurs during startup you can use start parameter "-log2file".

The log entries will be written to a file "laslook.log" in your user data directory (usually "C:\Users\Public\Documents\rapidlasso\laslook").

A regular log looks something like this:

```
1 18:10:27 257 . Language file [C:\lastools\gui\laslook.lng]
```

2	18:10:27	259	Open configuration [C:\lastools\qui\laslook.inil
3	18:10:27	259	Load style [laslook]
4	18:10:27	260	System language is [de]
5	18:10:27	260	Create [Settings]
6	18:10:27	260	insert dpanel [Einstellungen]
7	18:10:27	270	Create [ArgumentSelect]
8	18:10:27	270	insert dpanel [Argument Auswahl]
9	18:10:27	278	Create [LasToolList]
10	18:10:27	278	insert dpanel [LAStools]
11	18:10:27	316	Create [LasToolInfo]
12	18:10:27	318	insert dpanel [Dokumentation]
13	18:10:27	323	Create [LasToolArgumentList]
14	18:10:27	324	insert dpanel [Argumente]
15	18:10:27	332	Create [LasFiles]
16	18:10:27	334	insert dpanel [Dateien]
17	18:10:27	345	Create [LasInfoView]
18	18:10:27	347	insert dpanel [Datei Informationen]
19	18:10:27	362	Console done
20	18:10:27	363	Create [LasConsole]
21	18:10:27	363	insert dpanel [Konsole]
22	18:10:27	521	Create [LasGL3dViewPool]
23	18:10:27	524	insert dpanel [3D Ansicht]
24	18:10:27	534	Create [A4ProjJson]
25	18:10:27	893	DB connect to [C:\lastools\gui\laslook.db3]
26	18:10:27	896	layout load last [layout_current.lay]
27	18:10:27	896	<pre>dock: load file [C:\lastools\gui\layout_current.lay]</pre>
28	18:10:27	896	System language is [de]
29	18:10:27	896	all argument refresh

12. Appendix

12.1. Manual installation

If you do not have admin rights or you do not want to use the installer you can do a manual installation without admin rights.

The program is highly integrated into the mainframe and you just have to place the files in a directory of your choice.

This will allow a portable USB stick installation as well.

First download the zip file containing the files: https://downloads.rapidlasso.de/laslook_install.zip

Just unzip the files into a directory, e.g. "c:\lastools\gui".

These are the files in the zip file:

File	Description
laslook.exe	the executeable
laslook.lng	the language file
markdown.jhl	the markdown formater
lastoolsinfo.jhl	the info view formater
laslook.vsf	the style file
sqlite3.dll	the sql library
LASzip64.dll	the LAS reader/writer
libeay32.dll	open SSL connection
openssl.exe	open SSL connection

ssleay32.dllopen SSL connectionlaslook.db3the sqlite database of arguments,...lasclassification.txtthe classification texts used to be easily changed by the userlayout_current.layjson of the current/last screen layoutlayout_default.layjson of the default screen layoutrapidlasso.laza small LAZ sample

A file "laslook.ini" will be created at this location after first start to store user/application settings.

12.2. Troubleshooting

12.2.1. Not all points are shown

If not all points of a pointcloud are shown in the visualizer: You may have to click "Show all data" to ensure all data is loaded. If a display is cropped you may check your camera setting: Ensure the camera is far enough away of your pointcloud and the viewing depht is high enough:

12.2.2. Dependency "LasZip: Failed to open DLL"

If you get an error "Failed to open... LASzip64.dll":



This is most likely because the MSVC dependency is missing. Please install the Microsoft Visual C++ Redistributable package and it should work. You can download the package at "https://aka.ms/vs/17/release/vc_redist.x64.exe".

12.2.3. Database not found (SQL Error: SQL logic error)

If you receive a message like "SQL Error: SQL logic error" the database file is not found.



This may happen if the program does not find the sqlite database file. The database is written by the installer to:

C:\Users\Public\Documents\rapidlasso\laslook\laslook.db3 If the file is not there and also not at the exe location during startup the sqlite driver will create this file. However, this file will then be empty and the program will outpout the error.

So make sure the file is there an has a size of around 3 MB. In the log window of laslook you can check if the file is loaded.

13. Legals

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