Search

LAS LiDAR Binary File Description

The ASPRS LiDAR LAS binary file format stores 3D point data. LiDAR stands for Light Detection and Ranging data. This data is generally created by software which combines GPS, IMU, and laser pulse range data to produce X, Y, and Z point data.

Click Home | New Map | Specialty | Point Cloud to create a point cloud map with one or more LAS or LAZ files. Click File | Open or Data | Edit | Merge and select the LAS or LAZ file to view the LAS/LAZ data in the worksheet window.

Surfer imports compressed (LAZ) and uncompressed (LAS) LiDAR Binary files.

File Format

The format contains binary data consisting of a header block, variable length records, and point data. All data is in little-endian format. The header block consists of a public block followed by variable length records. The public block contains generic data such as point numbers and coordinate bounds. The variable length records contain variable types of data including projection information, metadata, and user application data.

Currently, **Surfer** imports 1.0, 1.1, 1.2, 1.3, and 1.4 format LAS files.

Classification Number

The following table lists the LiDAR classification numbers and their colors in the default classification colormap for a point cloud layer.

Classification Number	Meaning	Point Cloud Classification Colormap Default Color
0	Created, never classified	Black
1	Unclassified	20% Black
2	Ground	Dark Brown
3	Low Vegetation	Forest Green
4	Medium Vegetation	Dull Green

5	High Vegetation	Spring Green
6	Building	Banana Yellow
7	Low Point (noise)	Light Orange
8	Model Key (Mass) point	Blue Purple
9	Water	Blue
10	Railroad	Purple
11	Road Surface	70% Black
12	Overlap	10% Black
13	Wire - Guard (Shield)	Yellow
14	Wire - Conductor (Phase)	Pale Yellow
15	Transmission Tower	Moon Green
16	Wire - Structure Connector (e.g. Insulator)	Magenta
17	Bridge Deck	Powder Blue
18	High Noise	Red
19-39	Reserved	20% Black
40	Bathymetric Point	Twilight Blue
41	Water Surface	Deep Blue
42	Derived Water Surface	Blue Purple
43	Submerged Oject	Pale Purple
44	IHO S57 Object	Light Violet
45	No Bottom Found Bathymetric Point	Deep Navy Blue
46-255	Reserved	20% Black

Return Number

One emitted laser pulse can return to the LiDAR sensor as a single or as many returns. The returns are reflected from objects on or above the ground surface. The first return will be associated with the highest feature, whatever it may be. Intermediate returns may be associated with features such as vegetation. The last return may be associated with the ground but may also be associated with other objects, such as a thick branch. Filtering LAS files by return number can be useful for creating DEMs (digital elevation models), canopy or building height models, or other models.

Export Automation Options

Surfer does not currently export LiDAR LAS data via automation.

References:

LAS Specification v1.4 - R13. American Society for Photogrammetry & Remote Sensing. 15 July 2013. http://www.asprs.org/

See Also

File Format Chart
Grid Data
Import Points Dialog
Import - Worksheet
LiDAR Export Dialog Options
LiDAR Import Automation Options
LiDAR Import Filtering Dialog