USER GUIDE

1. LiDARMAP CONCEPT

LidarMap promote a new concept of developing applications that extract 2D and 3D information from data obtained through LiDAR technology. Specifically, stereorestitution technologies are applied to LiDAR point clouds, together with simplified procedures for rapid vectorization. *The vector data concept is based on the GIS structure and the shapefile format, which allows the addition of attributes for collecting complex and multiple informations related to the same object. Although it contains functions similar to CAD systems, it is oriented toward the GIS systems concept, featuring point, line, polygon, and GDB topologies, along with all their associated functionalities. Thanks to its highly intuitive handling and advanced navigation functions, even for very large datasets, the application can also be useful in infrastructure development project design and monitoring programs, as well as in road quality inspection and the inspection of other constructions. Mapping transport corridors or territories predominantly covered by vegetation remains one of the leading applications of such software.*

Developed primarily for extracting a wide range of geospatial information, including planimetric features and construction details, LIDARMAP provides advanced capabilities rarely found in a single software solution.

The concept of "everything within one click" is implemented through dual access to all major functions: users can activate commands either with the mouse or by pressing a corresponding keyboard shortcut. For example:

• *Insert vertex:* ***I***	• *Move vertex:* ***M***
• *Draw point:* ***P***	• ***Draw polyLine:*** ***L***
• ***Draw polygon:*** ***G***	• *Draw Arc:* ***A***
• *Draw CurVe:* ***V***	• *Draw Circle:* ***O***
• *Draw Rectangle:* ***R***	• *Draw a line profile:*
• *EXplode polygon:* ***X***	• ***Join Polygons:*** ***J***
• *Delete Vertex:* ***D***	• *Delete selected object:* ***DEL***
• *Generate polygon empty space* ***Y***	• *Cut Polygons:* ***N***
• ***Polygone Autocomplete:*** ***H***	• *Draw 3D Fences:*
• *Select any object:* ***S***	• *Select Point:*
• *Select Polyline:*	• *Select Polygon:*
• *Snap to plane:* ***1***	• *2D snapping:* ***2***
• *3D snapping:* ***3***	• *Snap to LAS points:* ***4***
• *Snap to nearby lines/vertices:* ***5***	• *Snap to Terrain:* ***T***
• *Abort command:* ***ESC***	• *Undo command:* ***Ctrl + Z***
• *Edit mode:* ***E***	• *Change 3D Fence*

What makes LIDARMAP particularly valuable is its intuitive interface and straightforward workflow. The development team has extensive experience in stereoscopic photogrammetric

restitution and even broader expertise in digital mapping. Based on this experience, many traditional CAD functions that are no longer essential for modern mapping workflows have been simplified or consolidated.
For example, drawing a curved feature does not require navigating through dozens of separate commands. Using a single curve tool, together with circle and arc functions, users can create virtually any curved line or polyline.

All major functions are displayed directly on the screen and remain accessible with a single click.

The visualization and management of LiDAR data and vector layers are equally intuitive. Users can quickly change the display mode of the point cloud between RGB, intensity, classification and other commonly used visualization modes. They can also display selected LiDAR classes, hide unnecessary classes, or show only the required vector layers.

Layer colours, LiDAR class colours and the appearance of additional vector features can be changed also quickly and easily.

LIDARMAP also includes advanced editing topological functions, such as:

- *cutting a polygon using another polygon or polyline;*
- *splitting polygons or polylines using a reference polyline;*
- *generating polygons within empty areas;*
- *generating polygons using autocomplete function on polygons and polylines*
- *merging multiple polylines into a single polyline;*
- *editing and completing complex vector geometries.*

These capabilities help users efficiently complete digital maps and extract construction elements from buildings, including walls, floors, windows, doors and other structural or architectural details.

Figure 1.1 Generating the parallelepiped working volume

Most impressive, however, is the way users can navigate and inspect tens of gigabytes of LiDAR data with instantaneous visualization.

Users can define independent three-dimensional working volumes, called fences, with a parallelepiped shape (figure 1.1). Once a fence is activated, LIDARMAP loads, displays and processes only the LiDAR points and vector data located inside that selected volume.

This spatial filtering mechanism allows users to isolate a specific building, floor, façade, corridor or construction element without loading the entire dataset into active memory.

As a result, memory consumption is significantly reduced, visualization remains responsive, and editing operations can be performed faster, even when the complete project contains tens or hundreds of gigabytes of LiDAR data.

Multiple fences can be created and managed independently, enabling large datasets to be divided into smaller, well-defined working areas. Users can therefore move efficiently from one area of interest to another while preserving access to the complete project and avoiding unnecessary processing of data outside the active workspace.

2. STARTING WITH LIDARMAP

2.1 Installation

Installation begins by running the installer application received from the software provider.

Follow the instructions and select the installation location as shown in Figure 2.1. At this step, the application displays the required disk space and the available space. If the available space is sufficient, you can continue and complete the installation. Before installing a new version, make sure to uninstall the previous version.

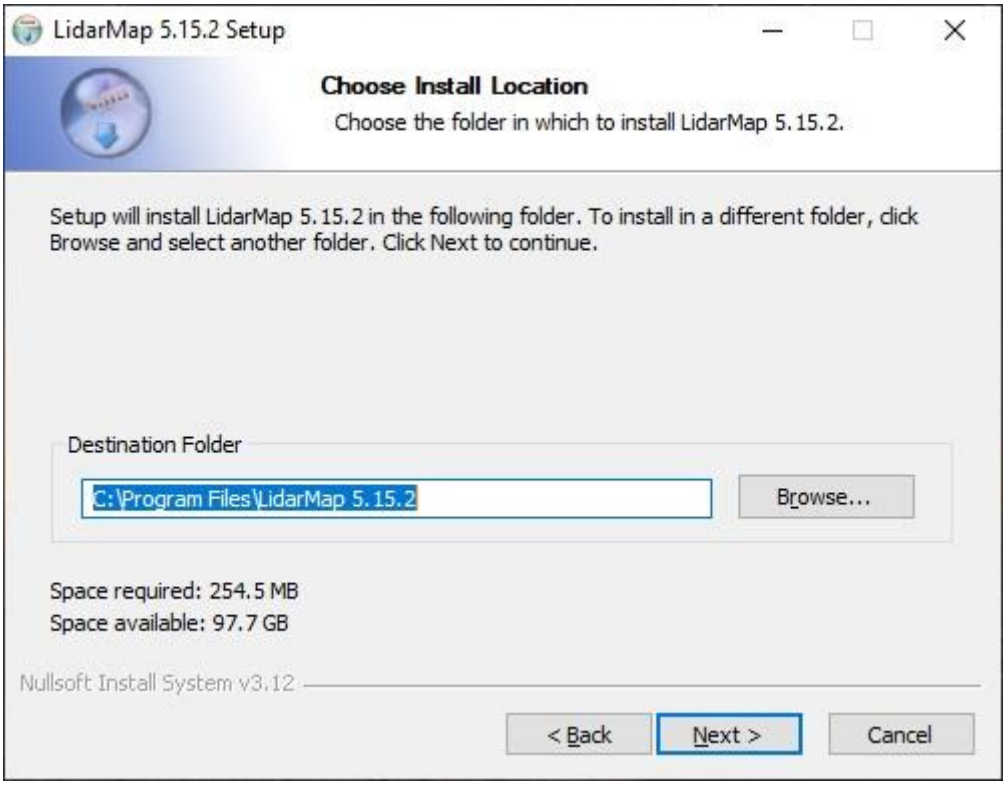


Figure 2.1 Application installation

2.2 Registering as a LidarMap user

After installation and when the application is launched for the first time, the window shown in Figure 2.2 appears. If you are not already registered from an earlier version, click the Register button.

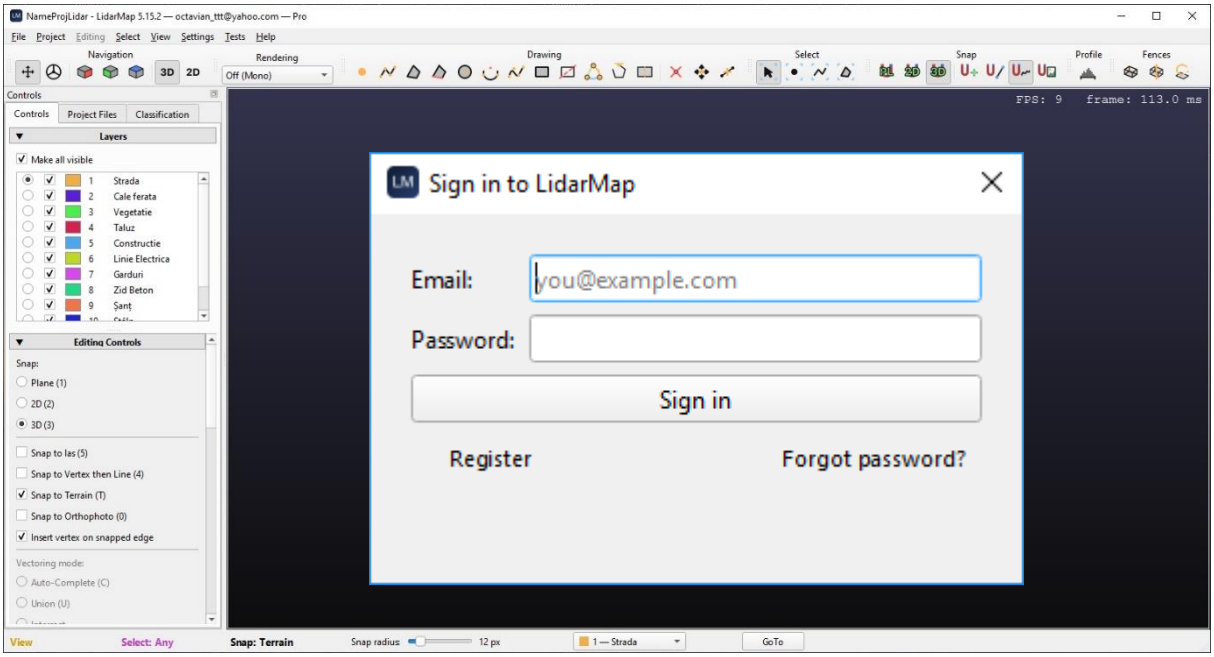


Figure 2.2 User registration

After starting the registration process, the interface shown in Figure 2.3 is displayed. Enter a password, confirm it, and create the user account by clicking Create account

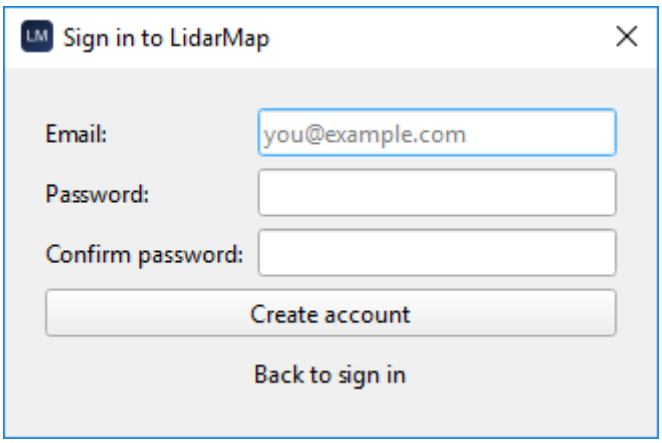


Figure 2.3 Creating a user account

2.3 Starting the application

After registering as a user and signing in, the LidarMap interface shown in Figure 2.4 opens. You can start working using three options from the File menu:

1. New Project – create a new project
2. Open Project – open an existing project
3. Recent Projects – select an existing project from a list of previously opened projects

You can also log out if you want to switch users by selecting the Log Out (user email) option shown in Figure 2.4.

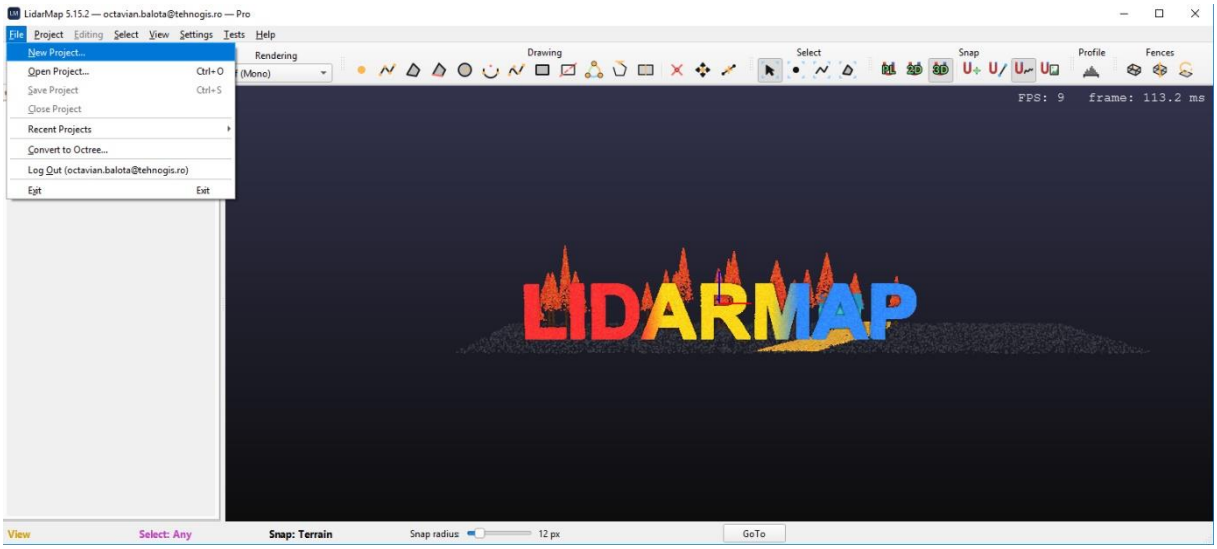


Figure 2.4 Creating a new project

When you select New Project, the interface shown in Figure 2.5 opens. Here you choose a **representative name** for your project, a **working directory**—usually the folder containing the LiDAR data you want to use—and a CSV text file describing the desired layer structure for the new project.

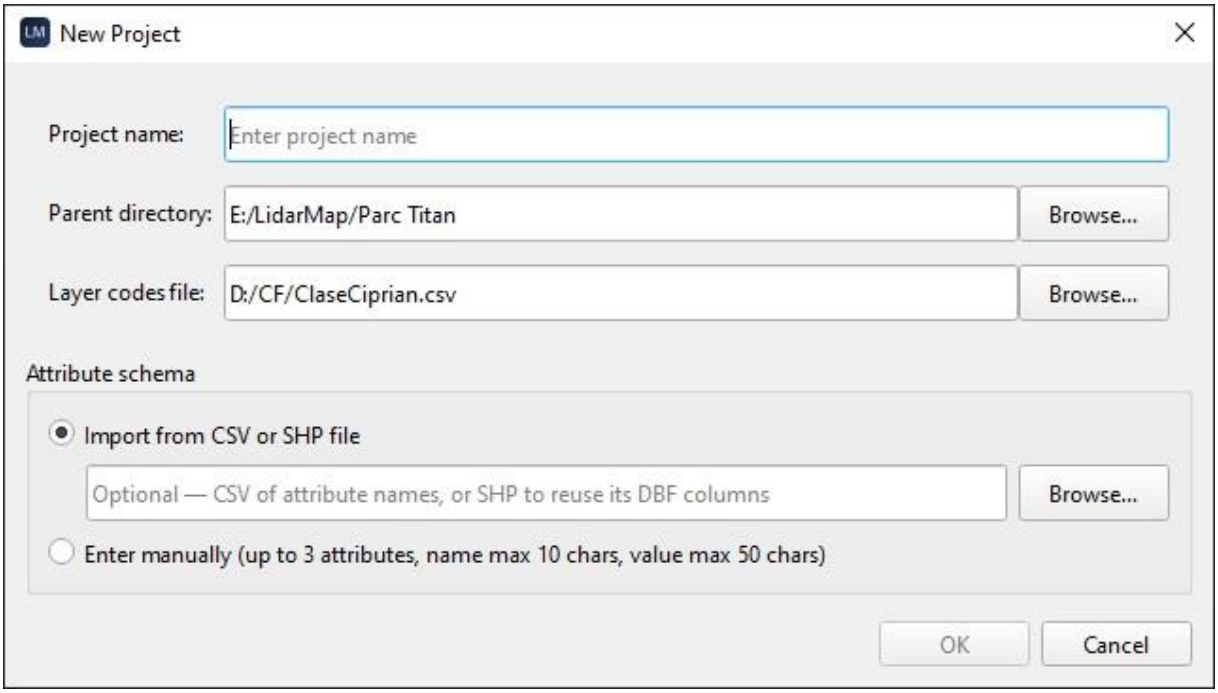


Figure 2.5 Setting the working information for a new project

LidarMap can also extract the attribute schema from an existing model shapefile. In this case, select the corresponding shapefile using the option: Import from CSV or SHP file

Although LidarMap adds three attributes to the layer structure by default, you can define three custom attributes by selecting the option:

Enter manually (up to 3 attributes, name max 10 chars, value max 50 chars)

In this case, three new fields appear in the interface shown in Figure 2.5, allowing you to define the three additional attributes (Figure 2.6).

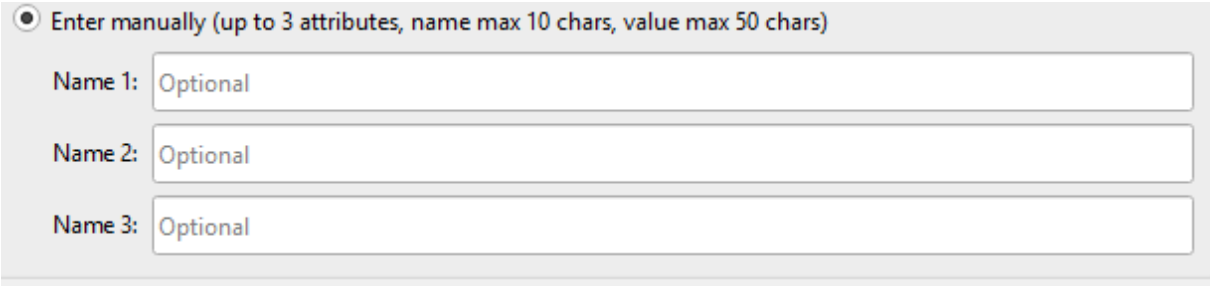


Figure 2.6 Defining additional custom attributes

To continue working on an existing project, the fastest method is to find it in the Recent Projects list (Figure 2.7) and select the desired project.

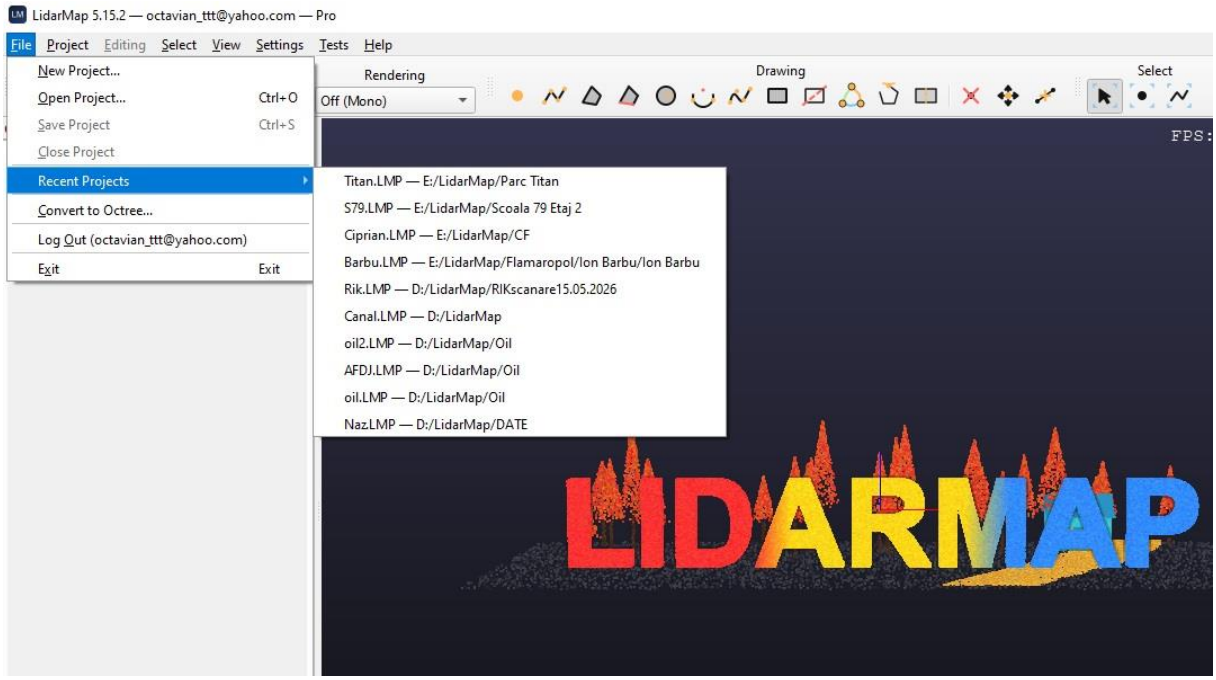


Figure 2.7 Selecting an existing project

If you create a new project, its name—for example, NameProjLidar—is displayed in the application title bar. Vector information extracted from the LiDAR data is automatically stored in a geographic database named NameProjLidar GDB (Geographical Data Base). You can then select the LiDAR data file associated with the project from the Project Files control panel. The first time a LiDAR data file is selected, it is automatically converted into an Octree structure, allowing the LiDAR data to be handled much more quickly and efficiently.

After conversion, the data is displayed using a selected mode, for example by classification as shown in Figure 2.8. For efficient use of the application, RGB visualization is recommended and can be set from

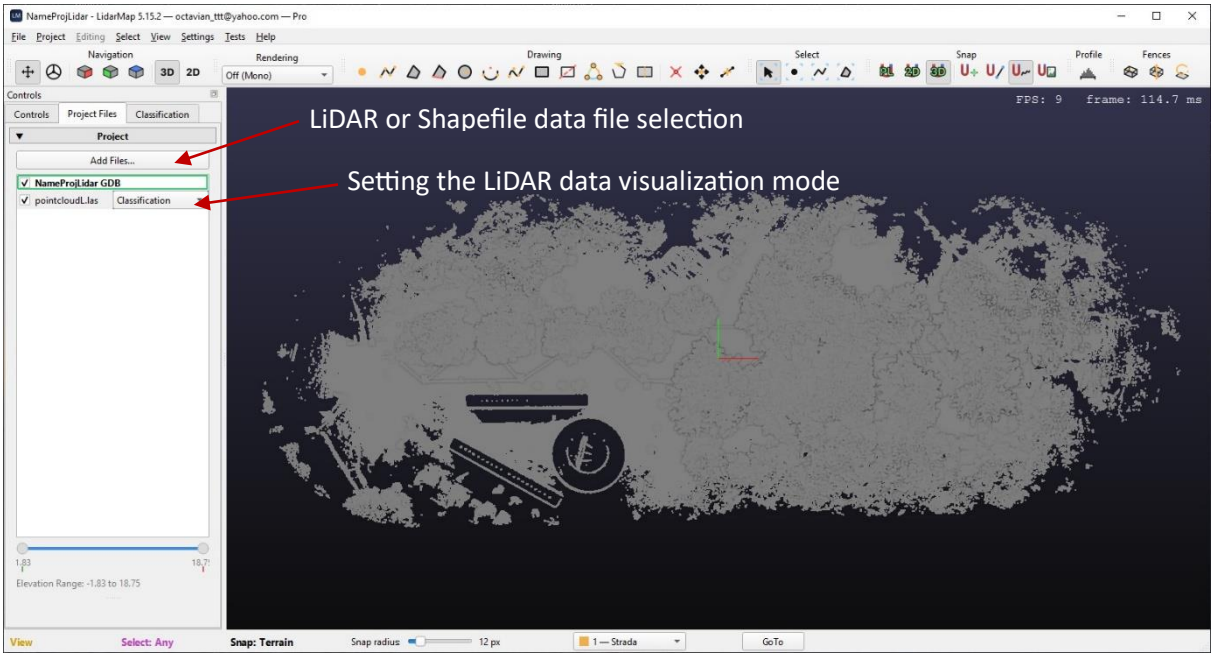


Figure 2.8 Selecting a LiDAR data file and display mode

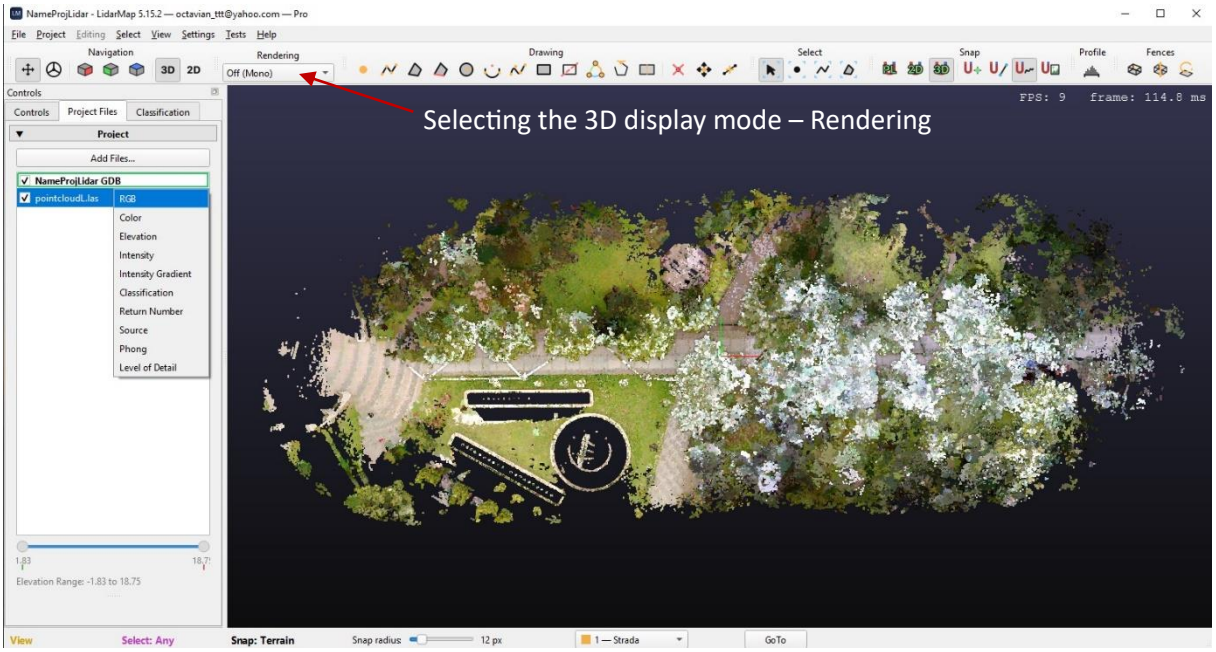


Figure 2.9 Selecting RGB display and 3D rendering mode

For efficient and fast vectorization, stereoscopic 3D display is recommended. The most commonly used modes are Crystal Eyes and Interlaced, which require dedicated 3D monitors.

The Rendering type required for 3D visualization can be selected from the menu toolbar (Figure 2.9) or from the Controls tab, where additional parameters can be configured. It is recommended to keep the default values (Figure 2.10).

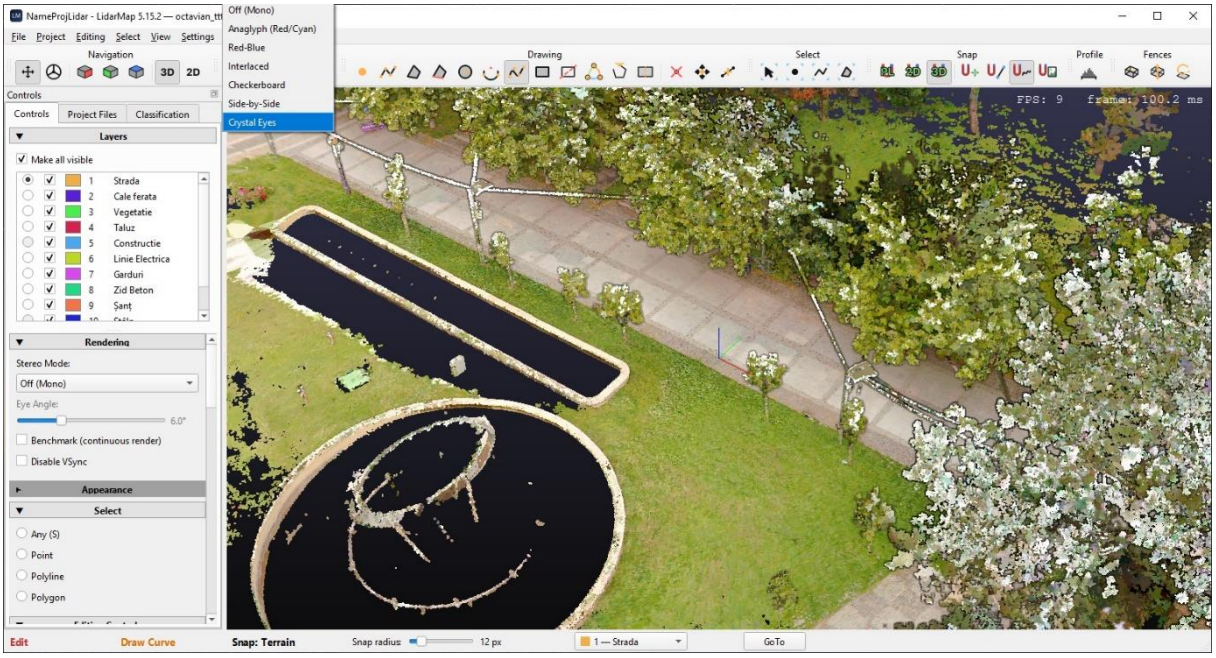
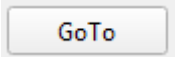


Figure 2.10 Selecting the 3D display mode and corresponding parameters

IMPORTANT: While working in LidarMap, the status bar at the bottom of the application continuously displays useful information, including:

- Working mode: Edit or View
- In Edit mode, the active editing function is displayed (Draw Curve, Draw Polygon, etc.)
- The active Snap types are displayed (LAS Points, Vertex/Line, Terrain)
- The active working layer is displayed (and can also be changed from here)
- The ground coordinates of the cursor position are displayed
- Direct access to a point in coordinates is available through the button 

The final step in preparing the application for vectorization is to select the visible classes and their colours when the LiDAR data file is classified. This is done from the Classification tab (Figure 2.11).

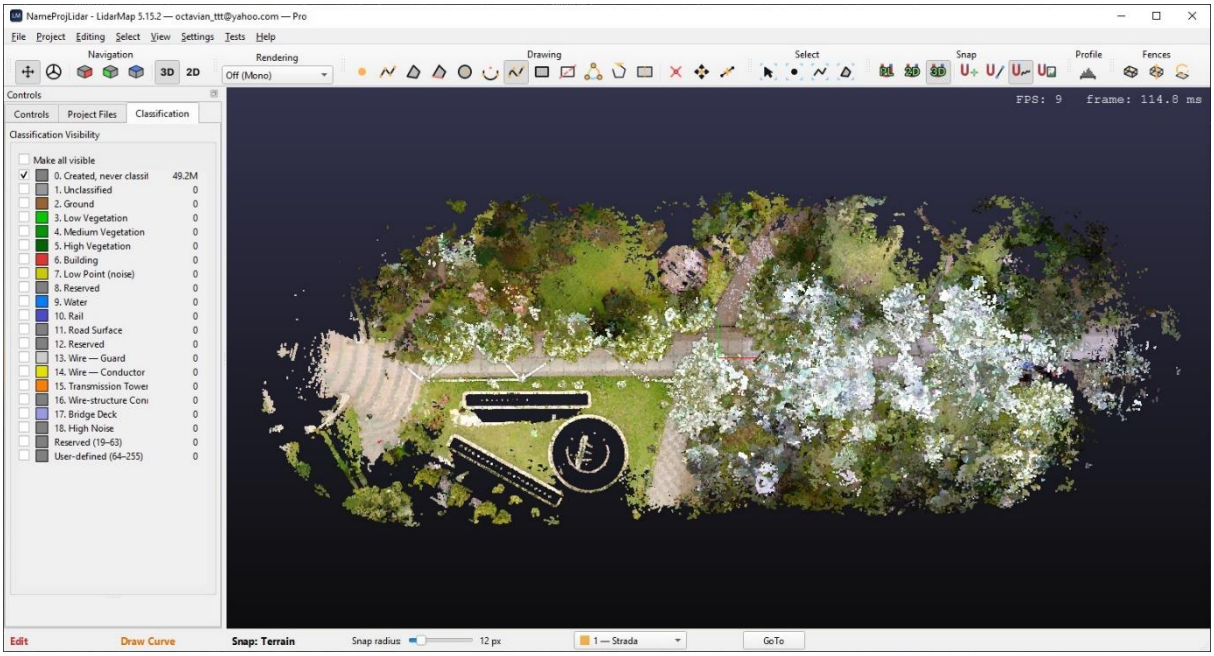


Figure 2.11 Selecting LAS file classes for display