

LIDARMAP: A NEW STEREO-BASED APPROACH FOR FAST 3D FEATURE EXTRACTION FROM LiDAR DATA

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 Rectangle: R
• EXplode polygon X	• Draw polyGon: G
• Delete Vertex D	• Delete selected object DEL
• Draw polygon from polylines: Y	• Cut Polygons: N
• Select any object: S	• Edit mode: E
• Snap to plane: 1	• 2D snapping: 2
• 3D snapping: 3	• Snap to LAS points: 4
• Snap to nearby lines / vertices: 5	• Polygone Autocomplete: H

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;
- 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.



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. 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.

LidarMAP general concept

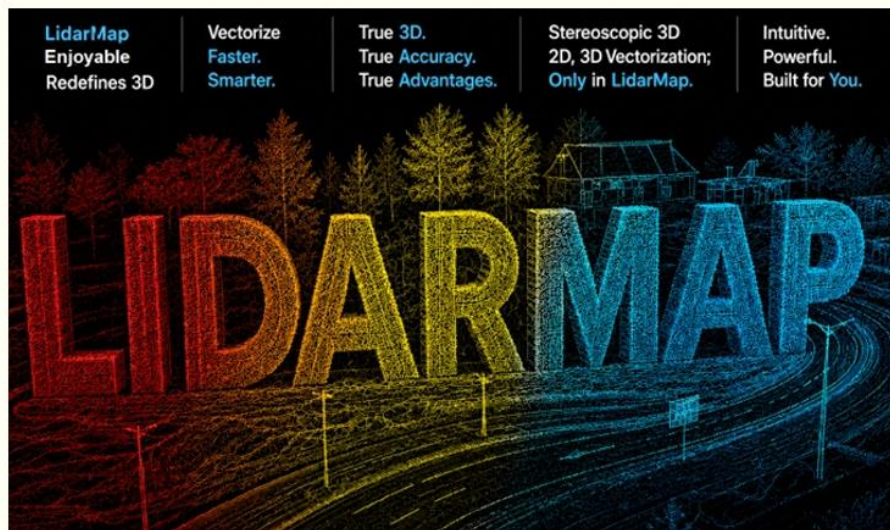
Goals:

**SIMPLE,
INTUITIVE**

**FASTER,
SMARTER,**

**POWERFUL
ENJOYABLE**

3D Mapping software using LiDAR points cloud data



**SIMPLE,
INTUITIVE**

All the functions at maximum one click distance

All controls / buttons are always visible on the screen

Some functions are automatically activated when needed

7 Navigation
modes

3 of them always
available:

Move in

Drive in

Follow me

One click

Insert Vertex

No click

Move Vertex

One click

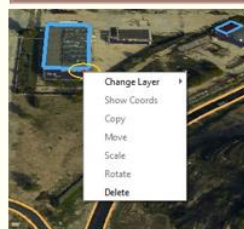
Copy object

No click

Move Object

No click

Rotate Object



Scale Object

No click



Built For You

By introducing stereoscopic restitution directly into LiDAR data processing and vectorization workflows, **LIDARMAP can increase productivity by approximately 30%–40% (tested by our operators)**. This improvement results from more accurate point identification, fewer interpretation errors and a significant reduction in the time required for quality control and error checking.

LidarMAP stereo concept



LidarMAP new concept



To our knowledge, LIDARMAP is among the first professional LiDAR mapping solutions to use executable workflow recording specifically for preserving and transferring stereoscopic working procedures.

Executable Stereoscopic Training

LIDARMAP introduces an innovative training concept based on the recording and replay of complete stereoscopic working sessions.

Unlike conventional screen recording, which captures only a flat sequence of images and therefore loses the original depth perception, LIDARMAP records the actual workflow performed inside the three-dimensional environment.

The system captures the commands executed by the operator, the time intervals between actions, mouse and keyboard input, object selections, editing operations, snapping modes and the complete position, orientation and zoom level of the stereoscopic viewpoint.

During playback, LIDARMAP does not display a prerecorded video. Instead, it re-executes the recorded operations directly on the original LiDAR and vector data, reconstructing the working session inside the application as though an experienced operator were once again using the computer.

Because the scene is rendered again in real time, the learner preserves full stereoscopic depth perception and can observe precisely how objects and points are identified, selected, measured and edited in three-dimensional space.

The recorded session therefore becomes an executable 3D tutorial rather than a passive video demonstration.

The proposed functionality transforms expert knowledge into a reusable and reproducible stereoscopic workflow.

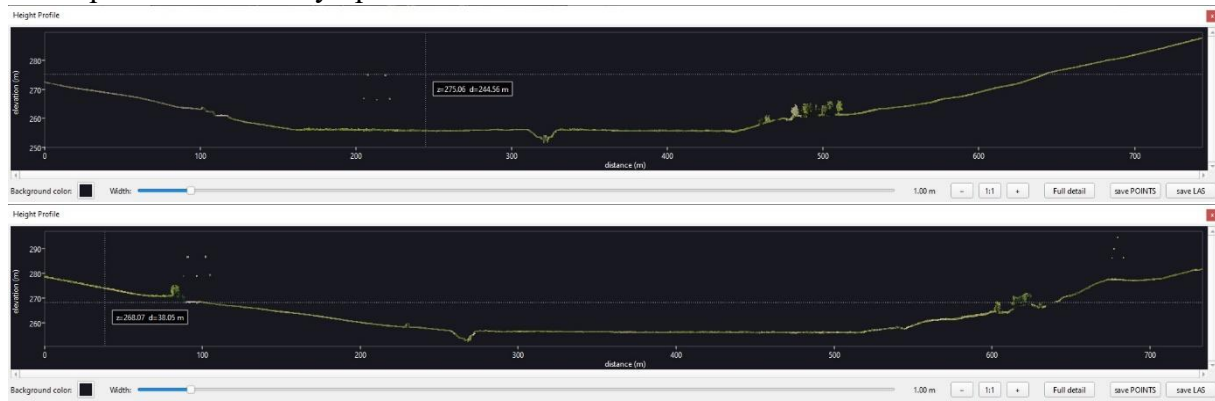
An experienced operator can record a complete mapping, vectorization or building-element extraction procedure, including not only the commands that were used, but also the spatial viewpoint from which each decision was made.

A trainee can subsequently replay the procedure in the original LiDAR environment and observe the same geometries with full stereoscopic depth perception. This is particularly important in operations where the correct identification of points, edges, planes and construction elements depends on three-dimensional perception.

The technology creates a new form of interactive technical instruction situated between a video tutorial, a software macro and an immersive simulation. Unlike a conventional macro, it preserves the temporal and visual logic of the expert's workflow. Unlike video, it preserves the native three-dimensional and stereoscopic environment.

Images with the LidarMap products

Cross profiles defined by operator



Digital Maps from Aerial lidar data



