Skybert

User manual

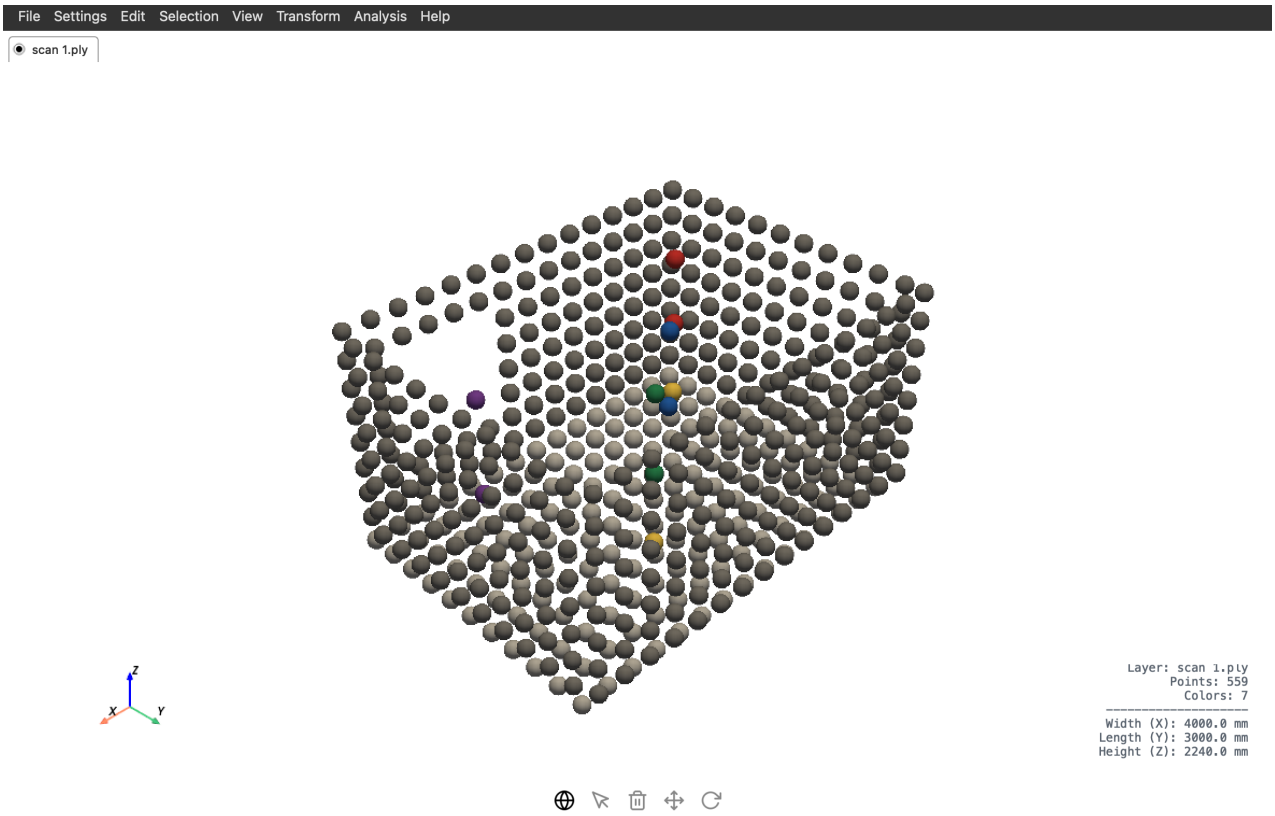
Prepare a colored point cloud for a hanging installation, then cut the ceiling plates on a laser.

Cloud2Grid

The window

Layer tabs run across the top. The cloud is in the middle. The tools along the bottom are navigate, select, remove, move, and turn. A summary of the active layer sits in the lower right. While you are navigating, the point under the cursor is described in the upper left, always in millimetres.

The cloud is stored in metres. Lengths you cut and engrave are millimetres. Open a file with File > Open. A project or one cloud replaces the scene. Skybert reads PLY, XYZ, LAS, LAZ, and E57. Save still writes PLY.

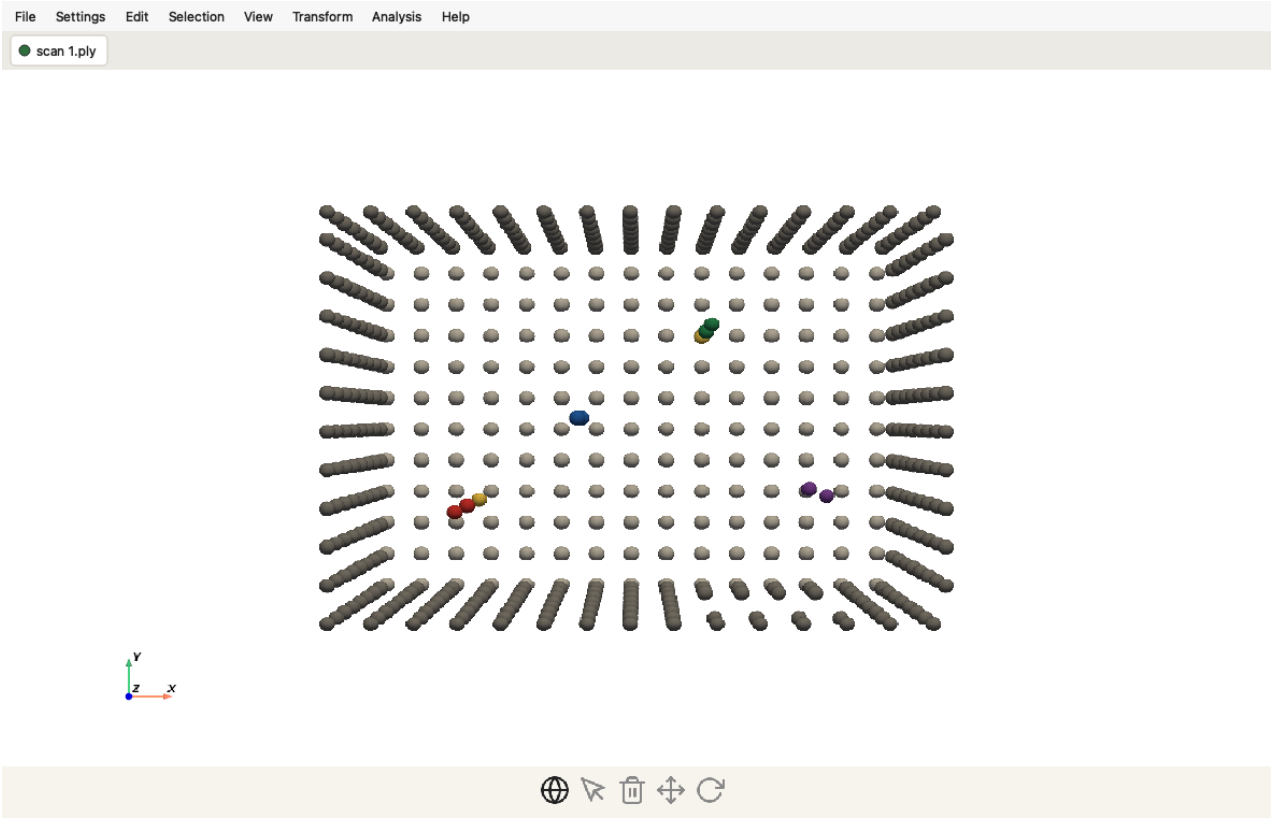


A leveled scan. Z is up, and the nearest corner sits on the origin. Colored points are the beads on each string.

A newly opened cloud is leveled so the floor lies on Z and the ceiling is up, then the nearest corner moves to the origin. A saved project is not leveled again. A cloud with more than 500,000 points is drawn as fast points. View > High Quality Glyphs draws each point as a small sphere.

Looking down

The navigate tool orbits the cloud. The scroll wheel zooms. View > Top looks down on the floor plan. View > Frame and View > Iso stand the room up, with Z upward. View > Show Ceiling Plane draws the ceiling used for string length. The ceiling margin is in millimetres and may be negative, which lets you see a cut through the top of the cloud.



Top view. This is the plan the ceiling plates are cut from. The colored stacks are strings of beads.

Select and remove

Click the select tool and drag a rectangle. Points of the active layer inside it are selected. Hold Shift to add. Hold Control, or Alt, to take points out of the selection. A tiny drag clears it.

Selection > Select by Color picks a color and a tolerance from 0 to 100. Zero is an exact match. The remove tool deletes the selection, or the point under the cursor when nothing is selected. Right-click a point for Edit Point, Remove, or Isolate String. A selection also offers Move, Rotate, Change Color, and Clear Selection. Edit > Undo puts the points back.

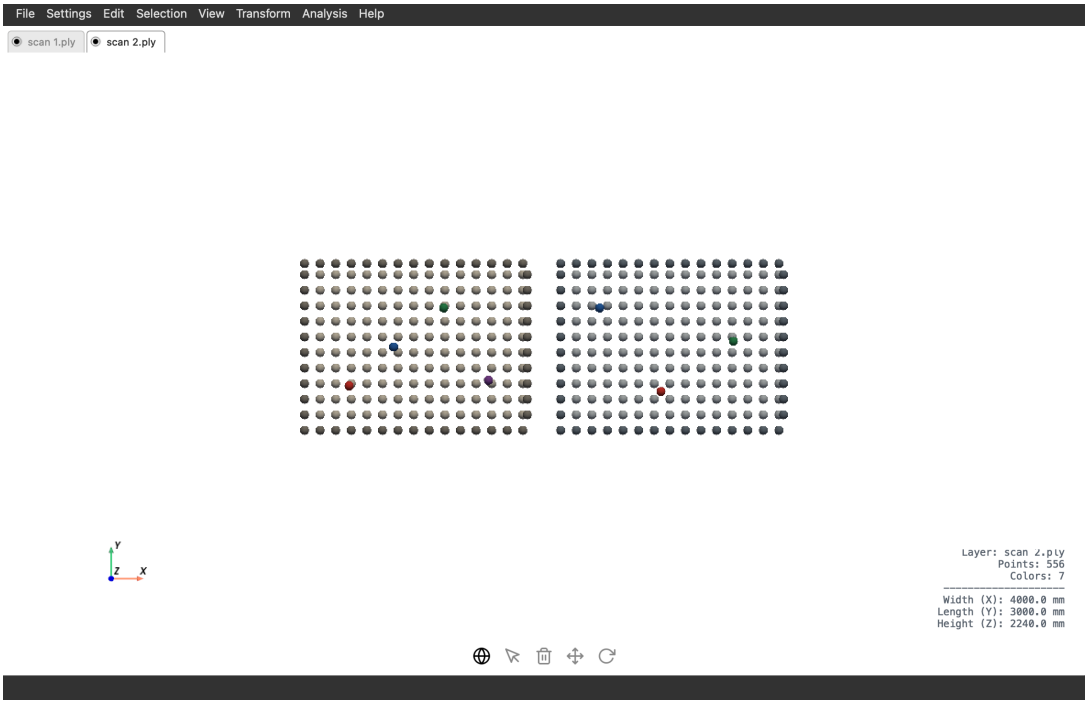
Move, turn, and scale

Move drags the active layer. Hold Shift to move it only up and down. Turn drags left and right and rotates the layer around the vertical axis. Hold Shift to tilt it. Click the navigate tool when you are done. Transform > Move by Numbers and Rotate by Numbers type the distance and the angle. Scale Cloud grows the layer from its lowest corner. Point diameter, the ceiling margin, and string thickness stay in millimetres.

Edit > Undo and Redo step through changes to the cloud. Camera moves are not undone. On a Mac the shortcuts are Command-Z and Command-Shift-Z. On Windows they are the Control-key versions.

Two scans

Put each scan on its own layer. Open the first cloud, click +, make the new layer active, and use File > Import into Active Layer for the second scan. The second scan is leveled and set down just to the right, so the rooms are not piled on the same corner.



Two scans, side by side, seen from above. Keep both layers visible while you line them up.

Transform > Register to Layer lines the active layer up with another layer. Align automatically turns the scan in the horizontal plane and slides it so the walls meet. The floor stays on the floor. Keep this alignment leaves a fit the check likes. Align anyway leaves a fit you can see is right. Put the layer back restores the cloud from before the try.

When the rooms need a hint, click Pick a pair. A click, without a drag, chooses a point. The point on the active layer is blue. The matching point on the target layer is orange. Pick three pairs, and do not put them on a straight line. Align from these points uses those hints.

Color

These commands need a cloud that has color. When a selection exists, hue, saturation, and the color curve change that selection. Otherwise they change the whole active layer.

Selection > Replace Color uses a From color, a To color, and a tolerance. Selection > Adjust Hue / Saturation takes hue in degrees and saturation and brightness as percentages. Selection > Color Curve sets shadows, midtones, and highlights from 0 to 255, and applies one curve to red, green, and blue. Transform > Reduce Colors collapses the visible layers onto a palette of 2 to 256 colors.

File > Export > Export Color Swatch PDF writes the colors in the visible layers. If there are more than 64 colors, Skybert asks before continuing.

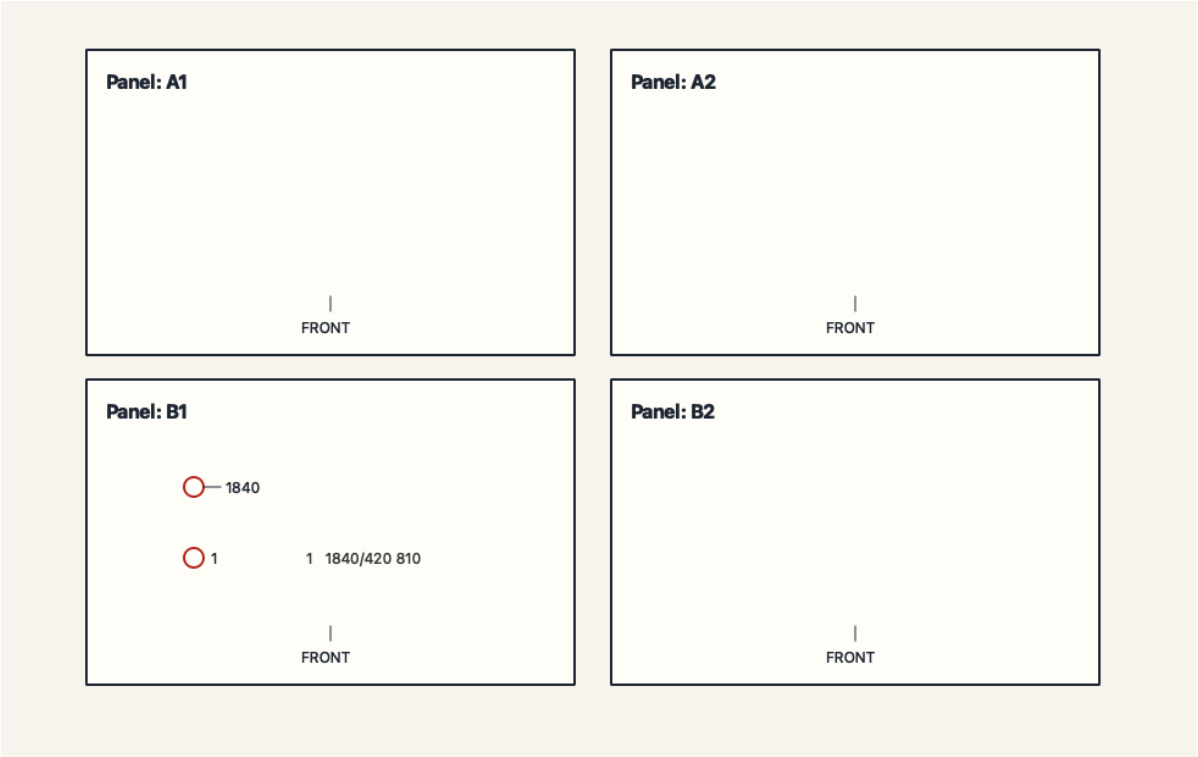
Strings

A string is the set of points that hang from one ceiling hole. Its length is millimetres from the ceiling down to the lowest point. The ceiling includes the ceiling margin.

Analysis > Generate String Report lists each string: its number, its plan position in millimetres, how many points it has, and its length. Open a row to see each bead depth. Click a row to highlight those points. Strings with ten or more points are red in the list. Close the window to clear the highlight. File > Export > Export String Report as PDF writes the same lengths. The report stays in millimetres.

Laser plates

File > Export > Export for Laser Cutter asks how to split the ceiling. X Divisions and Y Divisions each start at 1 and can go up to 100. Hole Diameter is in millimetres and starts at 3.00 mm. Skybert then asks for a folder. Each sheet is an SVG named like Export_A1.svg. The letter is the row and the number is the column. The folder also contains Mounting_Map.svg and export_report.txt.



Row A is the far edge. The last row is the front. FRONT is engraved on the near side of every sheet. Install the sheets with FRONT toward the front of the room.

Each hole is engraved with the cut length in millimetres, then the bead depths that are not already the end of the thread. A single bead at the end is just the length, for example 1840. Beads higher up follow a slash, for example 1840/420 810: cut the thread to 1840 mm and attach beads at 420 mm and 810 mm down from the ceiling.

If that line does not fit beside the hole, the hole is marked with a local number such as 1, and the same line is set down in open space on that sheet, with the same number: 1 1840/420 810. When several of these lines fit together, they stay as one list. Otherwise each one is wrapped to the sheet and set down in its own open spot. The number on the hole and the number in that free area are the only link. Local numbers start again on each sheet.

Saving and settings

File > Save overwrites the PLY the active layer was opened from. If the scene was not opened from a PLY, Save asks for a path. File > Save Active Layer As PLY writes a new PLY and names the layer after that file. File > Save Project As writes a .ddot project and a folder of one PLY per layer. Open that project later with File > Open. Skybert does not save XYZ, LAS, LAZ, or E57.

Settings > Display Units switches the info box and the move and scale distances among millimetres, centimetres, metres, and inches. Laser export, the string report, point diameter, and the ceiling margin stay in millimetres. The numbers next to the cursor stay in millimetres as well.

Settings > Settings gathers the display unit, the point diameter, the default maximum points for the next file, and the ceiling margin. Transform > Resolve Conflicts merges points closer than a distance you type. Transform > Resolve String Conflicts finds points that share nearly the same plan position, so two strings are not cut through one hole.

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