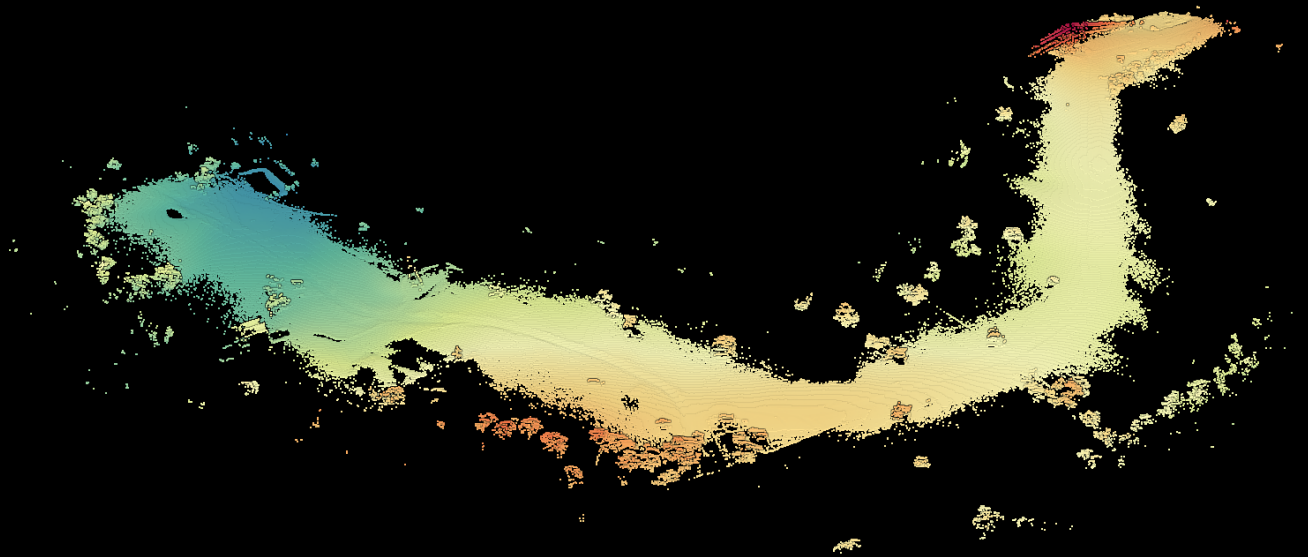


FROM DENSE SURVEY TO STRUCTURED TERRAIN

Orbis

The Grid tool.

Turn a point cloud into a regular terrain grid. Inspect the surface, focus on an area and carry the coordinates into your next workflow.



Native Orbis view of the existing Pull42 grid, coloured by elevation. Display colours aid interpretation; they do not represent change between surveys.

Structure the surface

A 1 m terrain grid makes a dense scan easier to work with.

Choose the scope

Process the whole map or define a polygon around the area of interest.

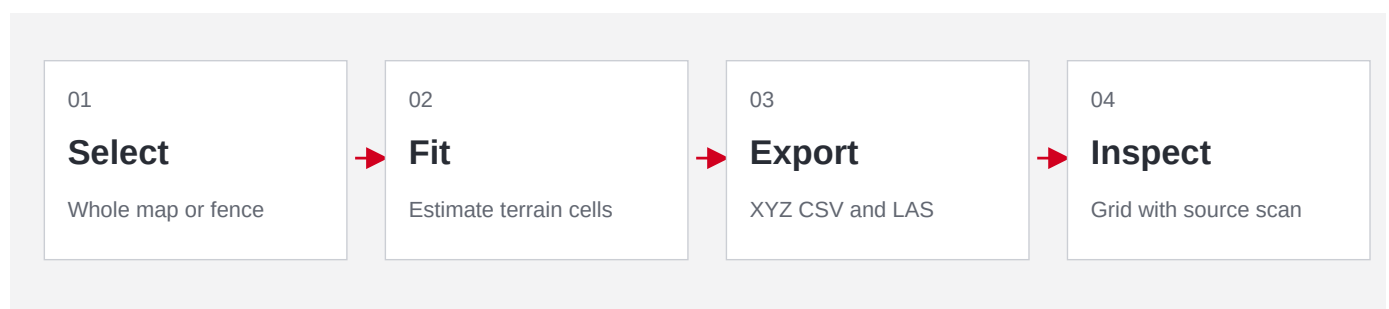
Use the coordinates

XYZ CSV and LAS outputs support inspection and downstream exchange.

01 / FEATURES AND BENEFITS

A regular surface. A practical handoff.

The Grid tool converts irregularly distributed survey returns into fitted terrain points at regular XY locations.



Supported workflow: generation produces CSV and LAS; browser viewing uses the converted LAS derivative.

Reduce the data burden

A regular grid gives you a compact surface representation to inspect and exchange. Each accepted cell contributes one XYZ point, rather than carrying every captured return into the next task.

Make sampling consistent

The current spacing is 1 m in plan. Regular positions make terrain levels easier to organise in a table or load into software that accepts gridded point coordinates.

Focus the work

Use a whole-map run for broad coverage or a closed fence to select a specific patch, access area or working zone before fitting.

Keep the scan as evidence

Load the grid with its original scan to compare the fitted terrain with the measured environment. Hide either layer to inspect what each contributes.

Continue in familiar formats

CSV provides numerical XYZ rows. LAS carries the same grid as spatial point data. A fenced run also preserves its selected input points in a separate PLY.

Understand the output

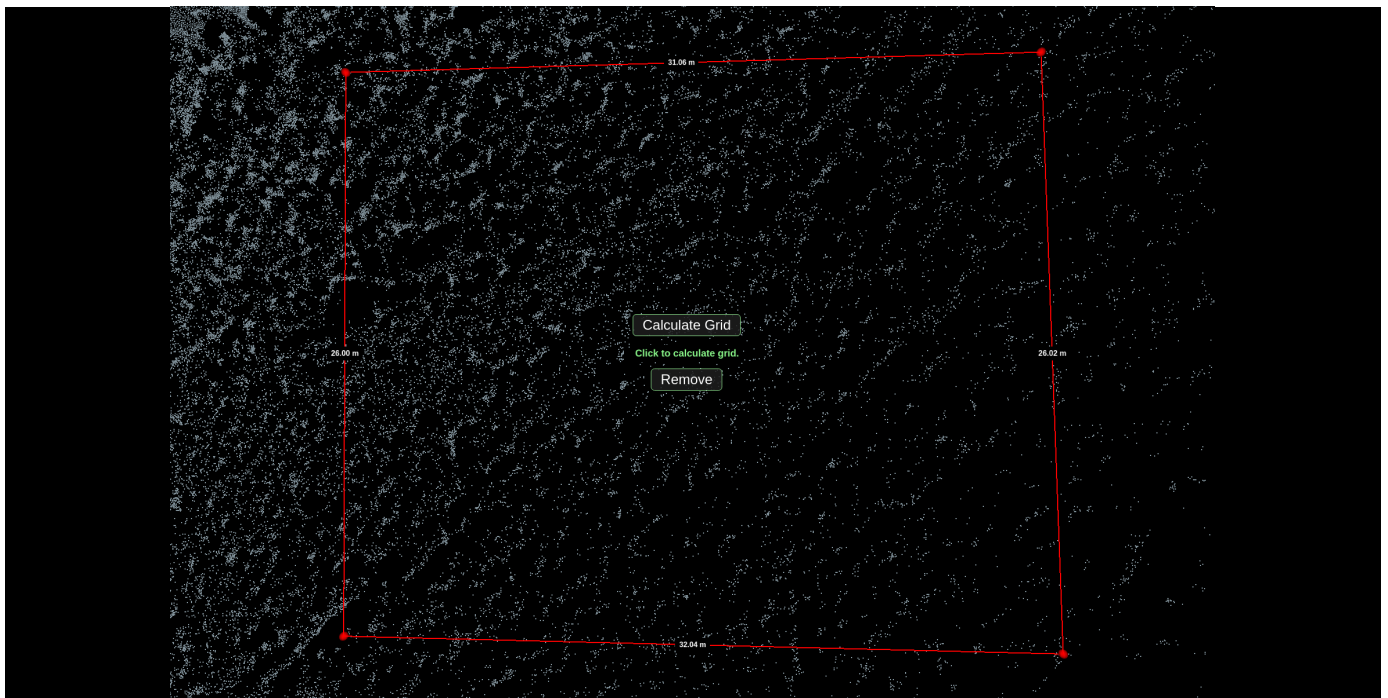
The active tool creates a single terrain surface. It does not itself calculate survey-to-survey differences, cut/fill volumes, contours or a finished design model.

The interface and pipeline use the internal name **GridDiff**. The reviewed active implementation performs terrain gridding; a basemap difference is not part of that calculation.

02 / CHOOSE THE AREA

Whole recording or a deliberate boundary.

Match the scope of the grid to the surface you need to inspect or export.



Native Calculate Grid and Remove controls on Pull42. This boundary is an unsaved demonstration; the existing whole-recording grid was not calculated from it.

Use the whole map

A grid run without a fence uses the selected source map's available points. Pull42's published example is a whole-map result.

Draw a closed polygon

Use the Grid measurement tool to place boundary vertices in the viewer. At least three distinct, non-collinear vertices are required. Keep edges from crossing and inspect the boundary in plan.

Calculate the selected area

Zoom in to reveal **Calculate Grid**, then submit the fence. The engine selects points by their position inside the polygon in X/Y before fitting terrain cells.

Revise or remove the fence

Vertex handles and edge lengths help review the footprint. The contextual Remove control asks for a second click to confirm. Finish a calculation before changing its boundary.

The fence defines a plan footprint, not a top/bottom clipping volume. Grid has no volumetrics base-surface selector.

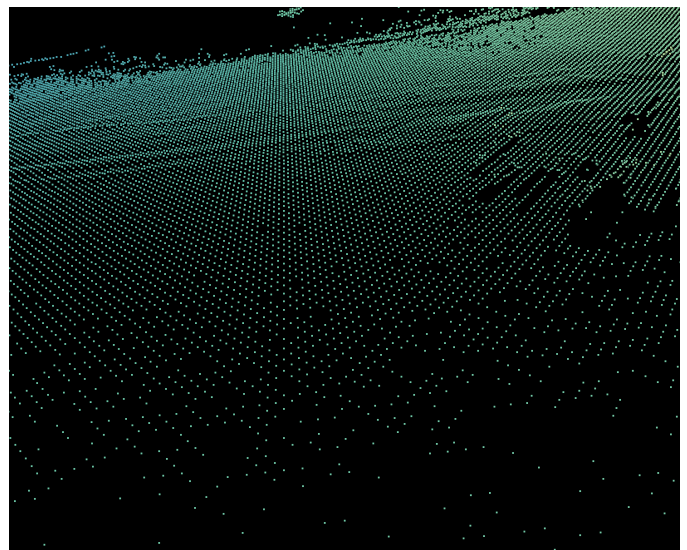
03 / LOOK CLOSER

The scan contains detail. The grid provides structure.

Two views of the same Pull42 location show how the fitted result differs from the original survey.



Source scan: original survey returns, styled grey.



Grid: regularly spaced points, coloured by elevation.

Read the underlying terrain

The source scan contains local surface texture, vegetation and other captured objects. Its point distribution reflects where the sensor could observe the environment.

The grid estimates a terrain level at each fitted location. It offers a more regular representation for broad surface interpretation and numerical use.

Retain the original evidence

The grid is a derived product. Keep the source recording so that unusual levels, boundaries and holes can be checked against the measured returns.

Inspect the 1 m spacing

At close range, individual grid points are visible. Each screen symbol represents a coordinate, not a solid 1 m square or a mesh face.

Recognise the trade-off

Regular sampling and terrain fitting reduce detail. Small features, abrupt edges and multiple surfaces can be simplified or represented imperfectly.

A 1 m interval describes spacing. It does not specify vertical accuracy, plan accuracy or the smallest feature that can be assessed reliably.

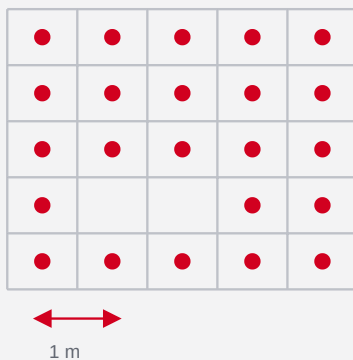
The screenshots use the same camera position. Point size and colour differ deliberately to make the source returns and regular output easy to distinguish.

04 / INSIDE THE ENGINE

Fit the local terrain. Build the grid.

The calculation uses local plane estimation and neighbouring tiles to derive the surface elevations.

Regular XY locations • fitted elevations



One result per fitted tile

Local scan points support a terrain fit.

Neighbour smoothing adjusts the result.

Missing cells remain missing

No fitted cell means no XYZ output row.

Schematic • grid spacing is not a claim of accuracy.

Conceptual grid illustration. The source implementation fixes the terrain tile size at 1 m; ordinary Grid controls do not expose a spacing slider.

1. Read and position the map

The engine reads the PLY and applies the appropriate coordinate transform when metrics are supplied. A spatial index supports repeated local point queries.

2. Select points for each tile

For a fenced run, the input is first restricted to the polygon. At each terrain cell, the engine gathers local returns and requires enough points to attempt a fit.

3. Search for a supported plane

A Hough-based terrain estimator searches for local plane support. Its ground-following, feature and wider-search phases adjust the range of candidate slopes and elevations.

4. Smooth neighbouring tiles

Accepted tiles are smoothed using available neighbours. This produces fitted terrain samples, not raw point averages copied directly from the scan.

5. Retain accepted locations

Cells that cannot support an accepted fit do not contribute output points. The process does not create a complete rectangular raster by filling every hole.

6. Validate the coordinates

Before export, every fitted XYZ must be finite and representable in the LAS coordinate range. An invalid fitted result fails rather than publishing unusable coordinates.

05 / COORDINATES

Carry the surface in the right frame.

A useful grid must align with the source scan, the boundary and the downstream project.

Keep the scan, fence and grid in the same frame

Local source map

Scan coordinates

Apply the correct fit/GPS metrics.

Transform

Site-coordinate terrain grid

CSV: full XYZ coordinates

LAS: header offset + scaled coordinates

Already in the required coordinate frame? Generate without an extra transform.

Schematic • verify coordinate reference and units separately; decimal precision is not survey accuracy.

The native engine supports whole-map and fenced runs, with or without appropriate metrics.

Support local and site coordinates

Wildcat fit metrics or Atlas GPS metrics can place a local source map in the project frame. A source already in the desired frame can be processed without an additional transform.

Use a consistent fence

Draw the fence in the viewer's coordinate frame and confirm that the source map and its metrics correspond. A fence outside the available map cannot produce a useful grid.

Preserve large coordinates

The CSV retains full XYZ values. LAS uses a nearby header offset and scaled local integers, keeping large site coordinates within its storage range.

Confirm units and reference

The implementation uses metre-based terrain spacing. Record the horizontal reference, vertical reference and units alongside exported files; do not infer them solely from the number format.

Avoid applying a transform twice

An already-positioned map should not receive the same correction again. Check an identifiable location in the source, grid and destination project.

Keep precision in perspective

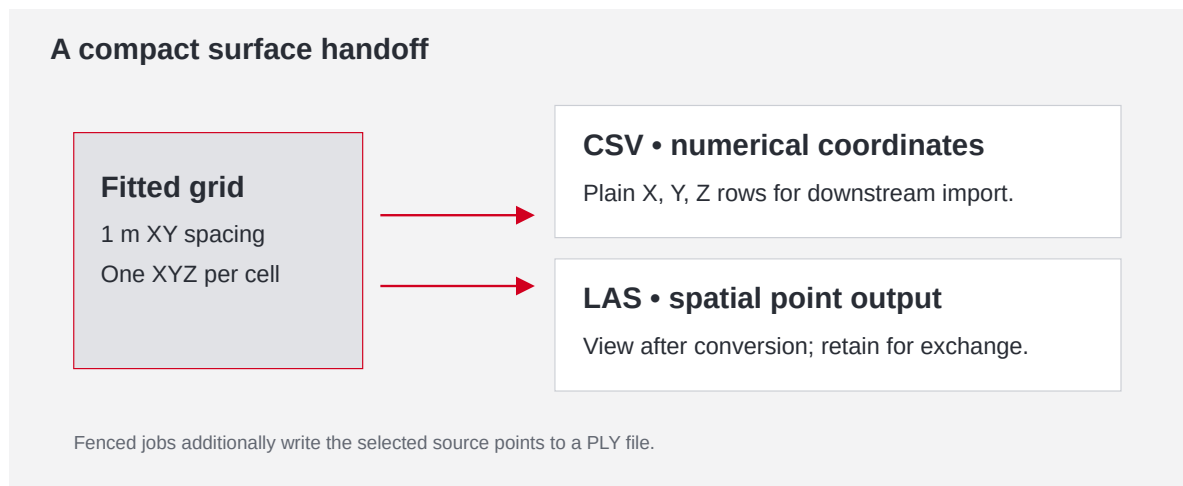
Close agreement between CSV and LAS checks export consistency. It does not establish the survey's accuracy or validate the terrain estimator against independent control.

The processing pipeline chooses its prioritised PLY source. Viewer visibility alone does not identify the file used for a calculation.

06 / DELIVERABLES

Coordinates you can inspect and exchange.

The native result is a point-based terrain grid with two principal output formats.



Output filenames derive from the source-map name. Browser viewing requires the LAS to be converted into the viewer's streaming format.

Output	What it contains / how to use it
_grid.csv	Comma-separated X, Y, Z rows without a column-header row. Import as coordinates into a spreadsheet or compatible spatial software.
_grid.las	The fitted grid points in LAS. Retain for point-cloud exchange or conversion for viewer display.
_fence_points.ply	Fenced runs only: the selected source points, useful for tracing the inputs to that area.

Use a lightweight derivative

The grid can provide a manageable input to terrain interpretation or external surface-building workflows. Check the receiving application's coordinate and format requirements.

Keep scope with the files

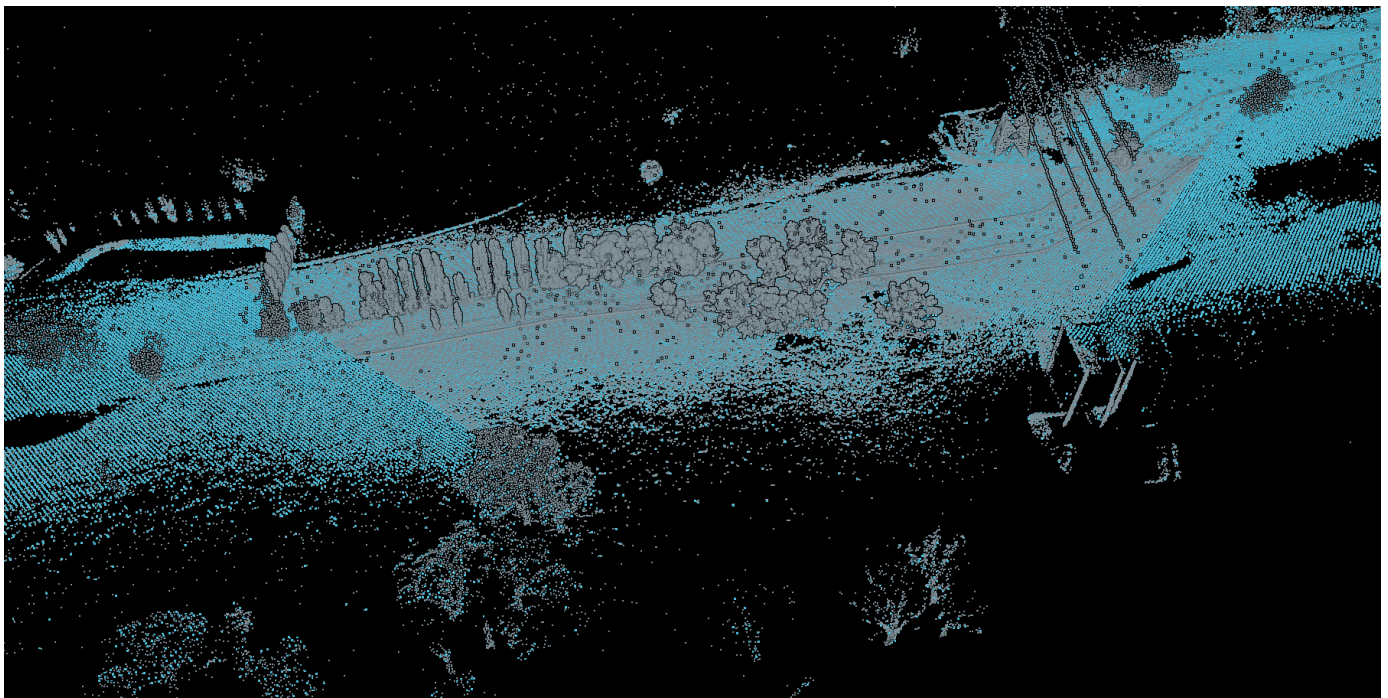
Archive the recording, source identity, boundary and coordinate reference with each export. Subsequent runs use the same output names, so copy results you need to retain.

CSV/LAS contain the grid coordinates. The current export does not include per-cell confidence, breaklines, triangle connectivity or a survey-difference field.

07 / INSPECT IN ORBIS

Keep the grid in its survey context.

Overlay the result on the original recording, then switch layers to inspect the fitted surface.



Pull42: grid points styled cyan over the grey source scan. The colours are display choices, not a classification or difference result.

Compare locations

Use a plan view to assess the footprint and an oblique view to see how elevations follow the terrain. Examine transitions, isolated points and areas near structures.

Control the display

The converted grid is a separate point-cloud layer. Visibility, point size and elevation colouring can help separate it from the denser source data.

Understand the colour ramp

The elevation-coloured screenshots use a display range of approximately 435–563 m. They show height variation within one result, not change since another survey.

Reopen the correct output

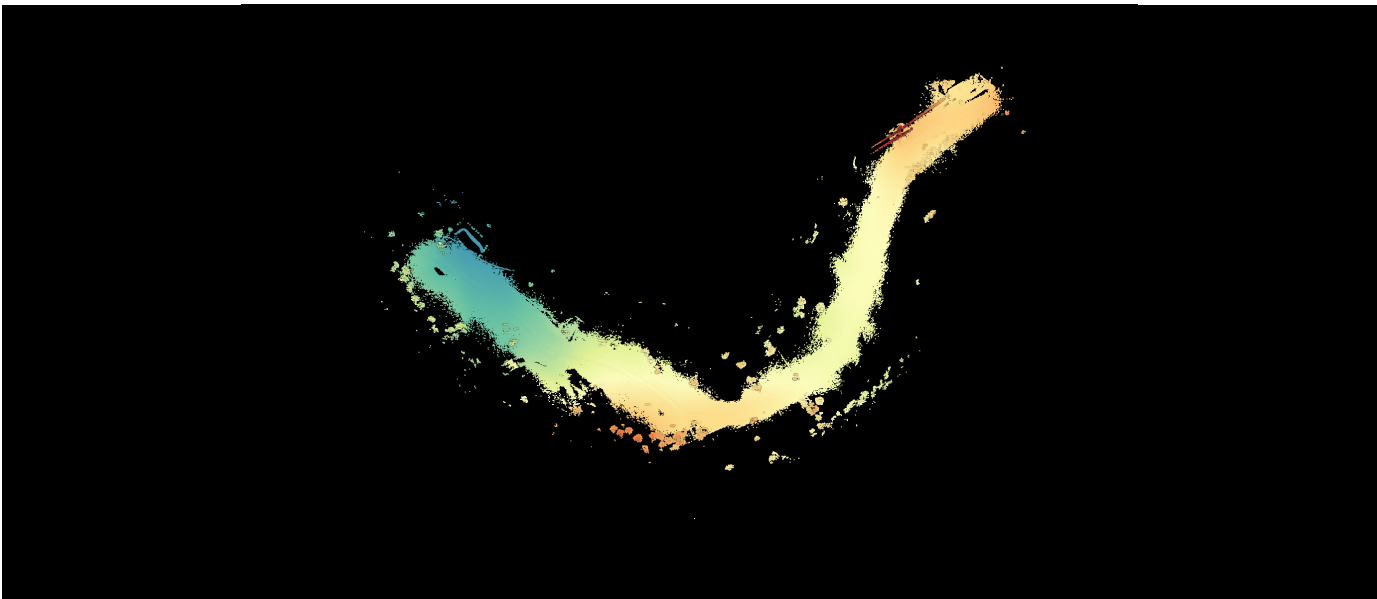
After regeneration and conversion, ensure the viewer has loaded the current grid. Confirm its count and position against the intended exported files.

The grid simplifies the captured environment. It is not a guarantee that vegetation, structures or all non-ground surfaces have been removed.

08 / PULL42 EXAMPLE

230,386 terrain points. One published example.

The supplied recording demonstrates the Grid tool on a large, uneven surveyed area.



Existing grid from 2026_07_28_01_59_58Z_Pull42. Native plan-oriented viewer capture; source scan hidden.

Verified output property	Pull42 result
Grid points / unique XY locations	230,386 / 230,386
Terrain spacing	1 m in plan
X coordinate range	626,480–627,647 m
Y coordinate range	6,124,812–6,126,534 m
Fitted Z range	434.951–562.921 m

Check the published data

The downloaded XYZ CSV contains finite values and 230,386 unique XY locations. The live viewer metadata reports the same point count.

Use the example honestly

These are properties of the existing Pull42 result. They are not a product size limit, a guaranteed accuracy or a benchmark for other recordings.

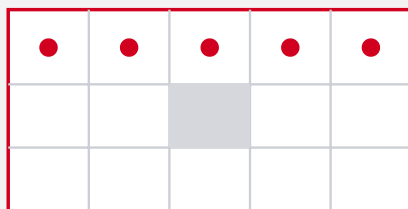
Reviewed 14 September 2026. No new production grid was calculated for the brochure. The accompanying review includes the deployment validation history and fresh regression-test results.

09 / QUALITY AND REPEATABILITY

Review the fitted surface. Retain the result context.

A useful terrain grid combines suitable source coverage with a checked fit and a reproducible export.

Inspect support, edges and isolated cells



Schematic • no per-cell confidence layer is exported by this Grid workflow.

A hole is not a zero elevation

An unsupported fit leaves no output cell.

An edge cell has a footprint

A fenced input does not imply every output cell centre sits strictly inside the polygon.

A fitted point set can contain gaps and edge effects. These should be reviewed against the original scan.

Inspect missing and unusual cells

Low point support or poor plane fits can leave holes. An isolated high or low sample may reflect captured clutter or a surface transition. Check the source before using it in downstream work.

Review polygon edges

The fence crops input points, while the output represents fitted tiles. Near an edge, a tile centre can sit outside the exact polygon even though its supporting input was selected inside it.

Keep a consistent comparison

Changing the source, boundary or coordinate transform can change the fit. Retain those inputs whenever comparing regenerated grids.

Protect completed exports

The native engine builds outputs in a temporary directory, validates them and then publishes the set. Failed generation preserves earlier successful files; ordinary publication failures roll back replacements.

Verify completion

Check processing status and the actual output files. The native engine logs failure details; a saved viewer completion label alone is not proof that the latest output succeeded.

Archive important runs

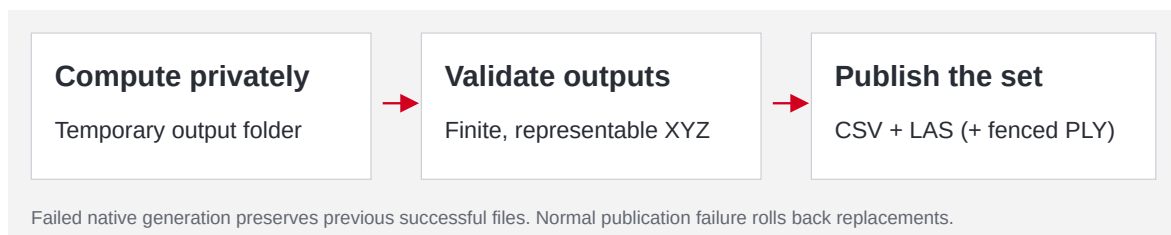
Output names are reused. Save a separate copy with the source, date and boundary if you need a durable record of a particular grid.

Current regression verification: **30 Grid tests passed**, including actual Potree conversion. These tests check software behaviour and file consistency, not independent survey accuracy.

10 / PUT IT TO WORK

From terrain review to the next project step.

Use a checked grid wherever a regular terrain-point representation is a useful starting point.



The generation process checks the native output set before replacement. Retain source and boundary information with your archive.

Terrain and access review

See broad terrain form, level changes and working-area context without carrying the full scan into every discussion.

Spatial data exchange

Provide a regular XYZ set to colleagues using compatible point-cloud, CAD or GIS workflows. Any surface meshing or contour generation happens in the receiving workflow.

Focused area studies

Use a deliberate fence to prepare terrain points for a selected zone, while retaining its cropped source points for inspection.

Prepare a demonstration

Bring a representative processed recording, its coordinate reference and the area you want to work on. Compare the source, generate the grid and inspect the exports together.

Choose the appropriate tool

Grid creates a regular terrain point set. Orbis volumetrics measures against a base; clash detection checks a vehicle envelope. Those calculations are separate capabilities.

Record the intended use

Agree on the required surface detail and checks before treating a 1 m grid as a suitable input to a design or assessment.

Explore the Orbis Grid tool

Discuss your recording and terrain workflow with AutoMap.

sales@automap.io · 0438 753 678

automap.io/contact

Source reviewed 14 September 2026. Native Pull42 screenshots; unsaved boundary demonstration. Implementation review and capture provenance accompany the editable master.