MVPStudio — User Manual

3D Point Cloud Processing Software

Version 1.0.9 · 2026

Published by **Tersus GNSS Inc.**

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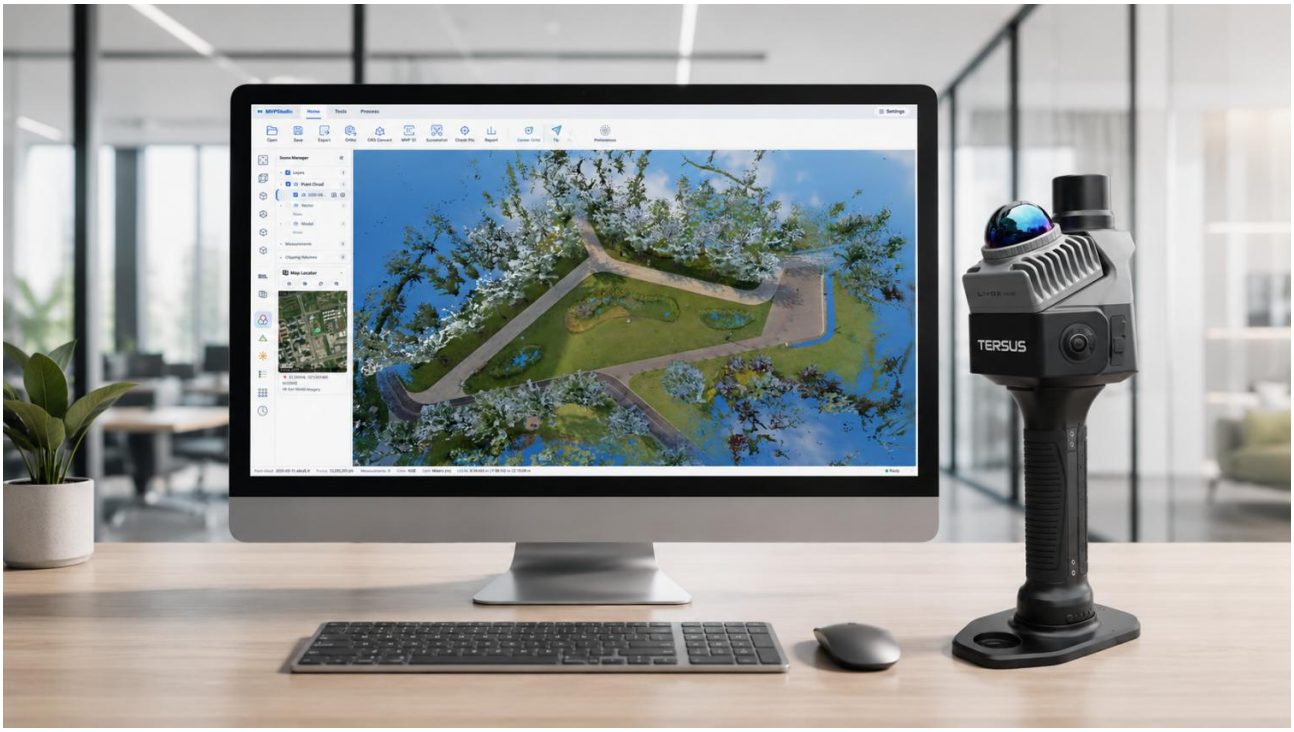


Welcome

MVPStudio is the desktop software that turns the raw scans from your **MVP S1** handheld laser scanner into finished, real-world results — a clean 3D point cloud you can measure, tidy up, draw from, and export to CAD and GIS.

Everything runs on your own Windows PC. There is no upload to the cloud and no separate tools to install: the processing engine, the coordinate-system library, and the 3D viewer are all built in.

This manual is written to get you productive quickly, even if point clouds and coordinate systems are new to you. It focuses on the two things that matter most — **processing your scan** and **placing it on a real-world coordinate system** — and keeps everything else short and practical.

About this manual

• **Who it's for.** Anyone who processes MVP S1 data: surveyors, mapping and GIS teams, engineers, and the distributors who support them. No prior experience with this software is assumed.

• **What it covers.** The software workflow — from raw scan to deliverable. It is *not* a scanner manual; for operating the MVP S1 device itself (assembly, charging, scanning in the field), see the **MVP S1 Scanner User Manual** that came with your device.

• **Version.** Screens and features describe MVPStudio **V1.0.9 RC**. Exact wording may differ slightly as the software is updated.

How to use this manual

If you are new, read these three chapters first, in order:

1. **Chapter 3 — How MVPStudio Works: The Two-Step Workflow.** The single most important idea in the software. Five minutes here saves hours later.
2. **Chapter 5 — Step 1: Solve Your Scan.**
3. **Chapter 6 — Step 2: Put Your Data on the Map (Coordinate Conversion).**

Everything after that is a reference you can dip into when you need a specific tool.

Conventions used in this manual

Style	Meaning
Bold	A button, menu item, field, or option you click or type into — for example **Add Project**.
`Home ▸ DATA ▸ CRS Convert`	A path through the ribbon: the **Home** tab, the **DATA** group, the **CRS Convert** button.

ⓘ **Note** — Useful background or a clarification.

Tip — A shortcut or a better way to do something.

⚠ **Warning** — Something that can cost you time or data if you skip it.

ⓘ **Note:** MVPStudio never deletes your original data. Throughout the software, "remove" means *hide from the current view or list* — your scan folders, point-cloud files, and converted results always stay on disk.

Contents

1. Introduction & Workflow Overview

1.1 What MVPStudio is

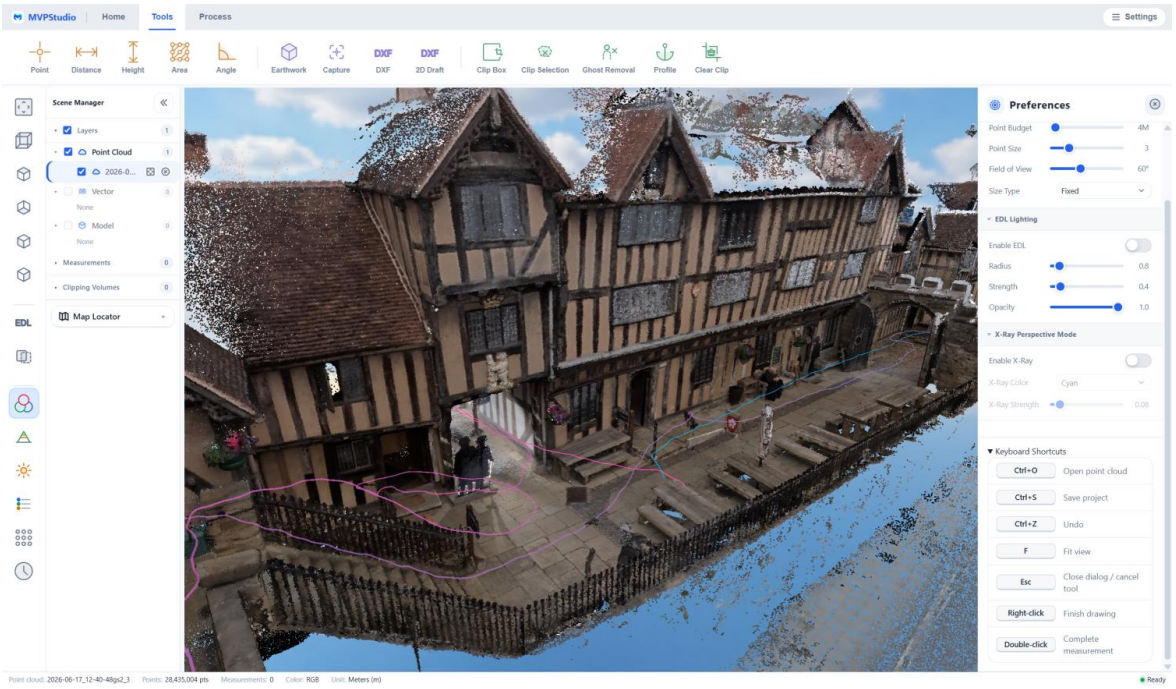
A scan is not a deliverable — MVPStudio is how you get there. Your MVP S1 captures a whole site in minutes, but what your clients pay for are the *answers* inside that scan: Is it level and correctly georeferenced? What is the distance, the height, the volume? Where do the walls, curbs, and poles land as CAD lines — and can you *prove* the accuracy? MVPStudio turns the raw scan into those finished, provable answers, in one application that runs entirely on your own Windows PC.

Point it at a raw MVP S1 scan and it reconstructs a fully colored, **level, georeferenced** point cloud — then carries you through every stage without leaving the software or juggling file formats: **view → measure → clean → extract to CAD → put on a coordinate system → deliver.** No cloud upload, no round-trips through three or four separate tools, no lost coordinates.

What makes it easy to work with:

- **Answers, not just points.** Automatic leveling and georeferencing, real-time distance / height / area / volume measurement, and real-coordinate **DXF** drafting — the deliverables clients actually ask for, drawn straight from the cloud.
- **Intelligent, assisted — never a black box.** The expertise lives in the algorithms, not on your screen. You supply the intent — one seed line, one confirmation, one cut height — and MVPStudio does the repetitive work at machine speed. It *suggests* (auto-recommended parameters, an automatic coordinate-system suggestion with a live preview); *you stay in command*, and every result is measured and reversible.
- **Accuracy you can prove.** Check your cloud against known survey points for live RMS and per-point deviation, then hand over a one-click **Accuracy Report** that documents the result.
- **Familiar from the first minute.** A clean, modern ribbon organized around real surveying tasks, with inline help — you're productive quickly, without deep training.
- **Nothing you can't take back.** Non-destructive by default: your original data is never overwritten, with unlimited undo / redo.
- **One app, in your language.** A hundred-million-point cloud streams smoothly on a normal PC, in **11 languages**, entirely on your machine — your data never leaves it.

And it isn't only for MVP S1 data: MVPStudio opens **LAS / LAZ files from any brand of scanner**, so it can be the single place your point-cloud work lives.



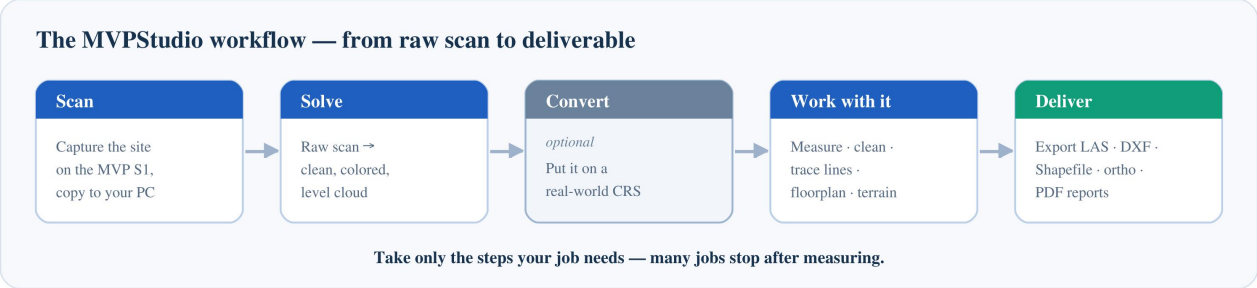
1.2 Where it fits — the MVP S1 workflow

The MVP S1 captures the world as a stream of raw sensor data (laser measurements, camera images, and motion/positioning data). That raw data is **not yet** a point cloud — it first has to be **solved**: the software fuses all the sensor streams into one consistent 3D cloud. MVPStudio has that solving engine built in (the **MVP S1 Mapper** module), so you go from raw scan to finished deliverable without leaving the software.

1.3 The end-to-end workflow at a glance

A typical session follows this path. Each step is a later chapter — and you only run the steps you actually need.

1. **Solve** the raw scan into a point cloud. *(Chapter 5)*
2. **Convert** the cloud to your required real-world coordinate system — *if and when* you need it. *(Chapter 6)*
3. **View & manage** the cloud in the 3D viewer. *(Chapter 7)*
4. **Measure** points, distances, heights, areas, volumes. *(Chapter 8)*
5. **Clean** the cloud — remove people and passing traffic, clip to your area, classify the ground. *(Chapter 9)*
6. **Draw & extract** — trace sections, draw CAD linework, extract curbs/lines/poles, build contours. *(Chapter 10)*
7. **Check & report** — verify accuracy against known points, run a data health check, generate a report. *(Chapter 11)*
8. **Export** point clouds, DXF drawings, GIS files, and images. *(Chapter 12)*



The MVPStudio workflow — from raw scan to deliverable

Note: This is a menu, not a mandatory sequence. Many people open a finished cloud (or a LAS/LAZ file from another source) just to measure it, or jump straight to extraction and export. Take only the steps your job requires.

1.4 Who it's for

MVPStudio is built for surveying, mapping, GIS, and civil-engineering work with reality-capture data. It assumes you are comfortable with the *ideas* of a point cloud, a coordinate system, and a CAD file — but it does **not** assume you have used this software before. Common tasks sit one click away on a familiar Word/Excel-style ribbon; the heavier professional tools live behind their own tabs.

Tip: Brand new? Install the software (Chapter 2), read the two-step idea (Chapter 3), then open a scan and try the measurement tools before diving into the processing chapters.

2. Before You Begin

2.1 A quick word about the MVP S1 scanner

The **MVP S1** is a one-button handheld laser scanner. You walk through a site, and it captures the space around you — laser measurements, camera images, motion, and (outdoors, with RTK) satellite positioning. When you finish, the scan is saved to the scanner's storage card.

This manual is about the **software**, so all you need to know here is: **copy the scan folder off the scanner's card onto your PC**, and MVPStudio takes it from there. For everything about operating the device — assembly, charging, how to scan well — see the separate **MVP S1 Scanner User Manual** that came with your device.

> **Tip:** Copy the *entire* scan folder, unchanged, to a local drive (ideally an SSD) before processing. Don't rename or remove files inside it — MVPStudio reads several of them.

2.2 What your PC needs

MVPStudio does real work on your computer: it reconstructs your scan into a point cloud using a built-in processing engine that runs on your **graphics card (GPU)**, and it displays clouds of hundreds of millions of points. A capable PC makes the difference between a scan that solves in minutes and one that struggles.

	Recommended
Operating system	Windows 10 / 11 (64-bit)
Processor (CPU)	Intel® Core™ i7-10700H @ 2.90 GHz (or AMD equivalent), or better
Graphics (GPU)	NVIDIA GeForce RTX 2060 (4 GB) or better, with up-to-date drivers — needed for fast scan processing
Memory (RAM)	32 GB
Storage	SSD with 64 GB+ free — scans and results grow quickly

> **Note (why a good GPU matters):** The scan-processing (solving) engine uses NVIDIA GPU acceleration. On a PC without a suitable GPU, solving still runs but is much slower, and the highest-quality mode benefits most from a good graphics card. Viewing, measuring, and exporting are lighter and run comfortably on most modern PCs.

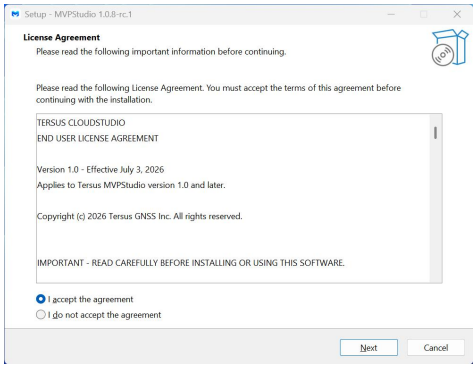
> **Note (everything is included):** You do not install anything else. The processing engine, the coordinate-system and geoid library, the 3D viewer, and all supporting components ship inside MVPStudio. No internet connection is required to run it — all processing happens locally on your machine.

2.3 Installing MVPStudio

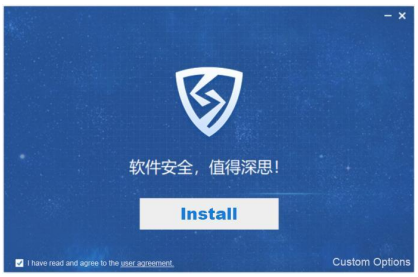
MVPStudio comes as a single Windows installer, **`MVPStudio-Setup-<version>.exe`** (for example `MVPStudio-Setup-1.0.9-rc.1.exe`). Ask your dealer or Tersus support for the latest download link.

1. Double-click the installer.
2. Read and **accept the license agreement** to continue.
3. Confirm the install location (the default installs **for the current user**, no administrator rights required) and click **Install**.

4. If any required Windows components are missing, the installer adds them automatically at this point — just follow the prompts.
5. When it finishes, leave **Launch MVPStudio** ticked and click **Finish**.



After software installation, the dongle driver installation window will appear, or you can run sense_shield_installer_pub_2.6.0.64252.exe from the software directory.



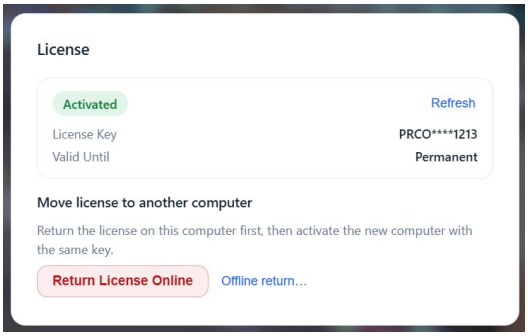
Note (for IT / managed rollouts): The installer can run per-machine and unattended (`/ALLUSERS`, `/SILENT`), and you can redirect the data folder with `/DATADIR=<path>`. These switches are only for IT deployment — a normal single-PC install needs none of them.

2.4 Activating your license

The first time you use the processing and export features, MVPStudio asks you to activate it with the **license key** provided by your dealer. Open the **License** panel and choose one of two ways:

- **Online activation (easiest).** Type in your license key and click **Activate Online**. Done.
- **Offline activation (no internet on this PC).** Click **Generate Request Code**, send that code to your dealer, and they send back an activation file/text. Paste it in and click **Activate Offline**.

Moving to a new computer? First **return** the license on the old PC (**Return License Online**, or **Generate Return Proof** and send it to your dealer for offline machines). This frees the key so you can activate it elsewhere.



Note: Viewing and importing point clouds work without activation; a valid license is required for processing, coordinate conversion, and exporting. Your dealer or Tersus representative provides the license and the activation details for your region.

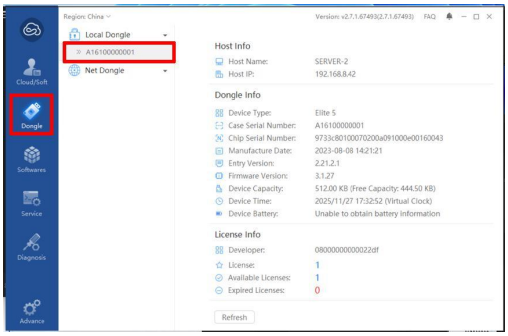
Tip: If an offline **return proof** was generated on this PC before, MVPStudio can recover it so you can re-send it to your dealer — you won't lose it.

STANDARD Free · No license code required	PROFESSIONAL Licensed · Perpetual
▪ Point cloud viewing, navigation & scene tools ▪ Import & export — LAS / LAZ ▪ Coordinate / CRS conversion ▪ Measurement — point, distance, height, area, angle ▪ Volume — cut / fill / net ▪ Ortho image ▪ Check points (precision check) ▪ Profile / section view ▪ Ghost removal (cleanup) ▪ Point capture · clip & region tools ▪ Report center · 3DGS viewer · scanner panel	***Everything in Standard, plus:*** ▪ DXF drawing & export (R12 / AC1009) ▪ Section trace — 2D vectorization ▪ Structure lines extraction ▪ Wall line auto-extract ▪ Pole auto-extraction ▪ Shapefile export (GIS / MLS) ▪ Terrain — ground / DTM / contours ▪ Line trace — curb / wall / marking / edge ▪ Floorplan Studio — wall lines ▪ Point cloud registration

Raw-data solve (MVP S1) is enabled by the process dongle and sits outside the scope of this software license.

Note: Processing the raw data for MVP S1 requires using the blue hardware dongle found inside the MVP S1 case to activate the processing license.

Insert the dongle into your computer, open the **Virbox user tool**, and check the **[Hardware Key]** – Local Dongle list to view license information. This license covers only the part involving the processing of MVP S1 raw data.



2.5 Updating and uninstalling

• **Update:** when a newer build is available, run the newer **`MVPStudio-Setup`** installer over your existing install.

• **Uninstall:** the standard Windows way — **Settings ▸ Apps ▸ Installed apps ▸ MVPStudio ▸ Uninstall**. Temporary caches are cleared; **your data is kept by default** (point clouds, scan projects, and converted results are never removed by an uninstall).

2.6 Where your data is stored

MVPStudio keeps the program separate from your working data, so the app can live in a protected folder while your data stays freely writable.

- **Default data folder:** `%LocalAppData%\MVPStudio\data` (for example `C:\Users\<you>\AppData\Local\MVPStudio\data`).
- It holds your imported and processed results, the streaming display cache, and logs.
- Your administrator can point this to another drive at install time (`/DATADIR=<path>`), useful if your system drive is small.

> **Tip:** If you ever need to report a problem, the logs in `…\MVPStudio\data\desktop-logs` are the first thing support will ask for.

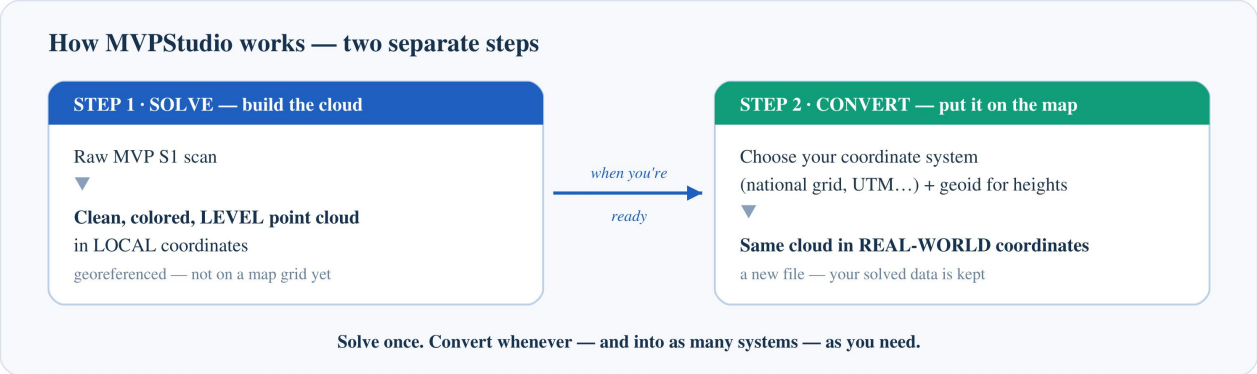
3. How MVPStudio Works: The Two-Step Workflow

If you read only one chapter, read this one. It explains the single idea that makes MVPStudio easy to work with — and clears up the question we hear most often from people used to other survey software.

3.1 The big idea: build first, place second

MVPStudio turns your raw scan into a deliverable in **two separate steps**:

1. **Solve — build the 3D model.** MVPStudio reconstructs your scan into a clean, colored, upright point cloud. *(Chapter 5)*
2. **Coordinate Convert — place it on the map.** When you're ready, MVPStudio expresses that cloud in the real-world coordinate system your project requires. *(Chapter 6)*



How MVPStudio works — two separate steps

The key point: **Step 1 is about getting the geometry right. Step 2 is about which coordinate system you deliver in. They are kept apart on purpose.**

3.2 Step 1 in a nutshell — Solve

Solving takes the raw sensor data and reconstructs the scene into one consistent point cloud. It colors the cloud from the camera photos and, crucially, sets it **level** — the ground is flat and "up" is up, so it looks right and is easy to measure.

At the end of solving, your cloud sits in a **local coordinate frame**: coordinates are small, sensible numbers measured from a point near your scan, not giant numbers on a national grid. If you turned on **RTK**, MVPStudio has already used your field satellite corrections to anchor the scan accurately to its true position on Earth — that information is stored with the cloud. But the cloud is **not yet expressed on a map grid or projection**. That comes next, only if you need it.

3.3 Step 2 in a nutshell — Coordinate Convert

When your deliverable must be in a specific real-world coordinate system — a national or local grid, a UTM zone, with true (above-sea-level) heights — you run **Coordinate Convert**. You tell MVPStudio the target coordinate system, optionally attach a geoid model for correct heights, and it writes a **new** point cloud in those real-world coordinates. Your solved cloud is untouched; the converted result is a separate file you can hand off, export to CAD/GIS, or open in the viewer.

3.4 Why two steps? (And a note for anyone switching from other software)

You may have used survey software where, the moment you enabled RTK for processing, you were also **forced to choose a coordinate system right then** — the two decisions were bundled into one. MVPStudio deliberately keeps them apart, and here is why that's better for you:

- **You don't have to decide up front.** Often you don't know (or don't yet care about) the exact delivery coordinate system when you sit down to process. Now you don't have to. Solve first; choose the coordinate system later, with the finished cloud in front of you.
- **One solve, any coordinate system.** Solving is the heavy, time-consuming computation — you do it once. Converting is quick. Need to deliver the same site to two clients in two different grids? Just convert again from your solved project. No re-processing.
- **Mistakes are cheap, not costly.** Picked the wrong system, or the project's required datum changed? You don't lose your work — you simply convert again. In a bundled workflow, the wrong choice at processing time could mean redoing everything.
- **Your source data stays pristine.** Every conversion is a *new* output file. The solved cloud — your source of truth — is never overwritten. That's cleaner and safer for quality control and traceability.

ⓘ **It's the same accuracy, just organized differently.** Splitting the steps does **not** reduce accuracy. Turning on **RTK** during Step 1 still anchors your scan to its true real-world position using your field corrections — exactly as you'd expect. All Step 2 does is *express* that already-anchored data in the particular grid and height system you choose. Nothing is approximated by keeping the steps apart.

💡 **In one sentence:** *RTK (in Step 1) decides how accurately your scan is anchored to the Earth. The coordinate system (in Step 2) decides how those coordinates are written down. They're different questions, so MVPStudio lets you answer them separately.*

3.5 Do I always need Step 2?

No. Reach for Step 2 **only** when your deliverable must be in a specific real-world coordinate system. Many jobs never need it:

Your goal	Do you need Step 2 (Convert)?
Measure distances, heights, areas, or volumes on the cloud	**No** — relative measurements are correct in the local (solved) cloud.
Clean the cloud, extract lines, draw a floor plan, inspect the site	**No** — these work directly on the solved cloud.
Deliver a point cloud, DXF, or Shapefile in a **national/local grid or UTM**, with true heights	**Yes** — convert first, then export.
Tie the data to survey **control points** on a specific datum	**Yes** — use control points in Step 1 for accuracy, and convert to the required system in Step 2.

⚠ **Warning:** If you need real-world map coordinates in your export, run **Coordinate Convert first**, then export the converted result. A plain export writes coordinates *as they are stored* — for a solved-but-not-converted cloud, that means local coordinates, not your national grid.

3.6 Putting it together

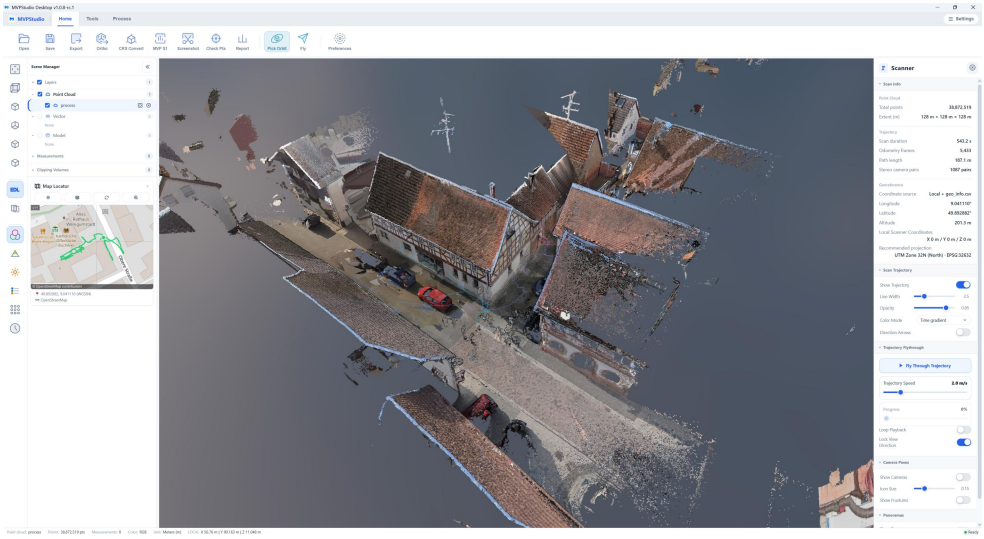
A complete, coordinate-referenced job looks like this:

1. Copy the raw scan to your PC.
2. **Solve** it (Chapter 5) — with **RTK** on, and optionally **control points**, for the best absolute accuracy. You get a clean, level, colored cloud.
3. Look at it, measure it, clean it — all in local coordinates (Chapters 7–11).
4. When you're ready to deliver, **Coordinate Convert** (Chapter 6) into the required system, with a geoid for heights.
5. **Export** the converted cloud to LAS/LAZ, DXF, Shapefile, or a report (Chapter 12).

If your job only needs measurements or a local model, stop after step 3 — you're already done.

4. A Tour of the Interface

This short chapter points out the parts of the MVPStudio window so you can find the tools in later chapters. Don't worry about learning it all — you'll pick it up as you go.



4.1 The main areas

- **Ribbon** (top) — a Word/Excel-style tabbed toolbar with three tabs, **Home**, **Tools**, and **Process**. This is your main way to work.
- **Left quickbar** (narrow strip on the left) — quick buttons for the view, display effects, and color modes.
- **Scene Manager** (left panel) — the list of everything loaded: point clouds and other layers, with a checkbox to show or hide each.
- **3D viewport** (center) — the interactive 3D view of your data, where you navigate and pick points.
- **Right panel** (right) — shows the controls for whatever tool you're currently using.
- **Status bar** (bottom) — live information about the scene and, when your data is georeferenced, the real-world coordinate under your cursor.

4.2 The ribbon at a glance

Home — open, save, and export data, plus the two core steps and view basics.

Group	Buttons
Data	**Open**, **Save**, **Export**, **Ortho**, **CRS Convert**, **MVP S1**, **Screenshot**, **Check Pts**, **Report**
Navigate	**Orbit** (default), **Fly**
View	**Preferences**

Tools — things you do *on* the cloud: measure, annotate, clip.

Group	Buttons
Measure	**Point**, **Distance**, **Height**, **Area**, **Angle**
Annotate	**Volume**, **Capture**, **DXF**
Clip & Region	**Clip Box**, **Clip Selection**, **Ghost Removal**, **Profile**, **Clear Clip**

Process — the heavier processing steps.

Group	Buttons
Process	**Terrain** (ground/DTM/contours), **Line Trace**, **Wall Lines**, **Register**, **Scanner**

> **Tip:** Every button has a tooltip — hover to see what it does.

4.3 Moving around in 3D

• **Orbit** (default) — drag to rotate around the point under your cursor; the mouse wheel zooms toward the cursor.

• **Fly** — move through the scene freely, first-person style.

• On the left quickbar's **View** group: **Fit** (`F`) snaps back to a full view of your data; **Perspective/Orthographic** switches the projection; **Top / Bottom / Left / Right** jump to preset viewpoints.

4.4 Color, display, and the status bar

• The left quickbar's **Color** group switches how the cloud is colored — the everyday modes are **RGB** (true photo color), **Elevation** (by height), **Intensity** (laser reflectivity), and **Classification**; a couple of advanced modes (**LOD** and **GPS-time**) are available too.

• The **Display** group toggles **EDL** (a shading effect that sharpens depth and detail) and **X-Ray** (see-through mode).

• Finer display settings live in **Preferences** (`Home ▸ VIEW ▸ Preferences`) — covered in Chapter 7.

• The **status bar** shows the active point cloud, point count, measurement count, current color mode, and your **display unit**. A small notice, *"Testing version · verify results independently,"* reminds you this is a release-candidate build — always check critical results against known values.

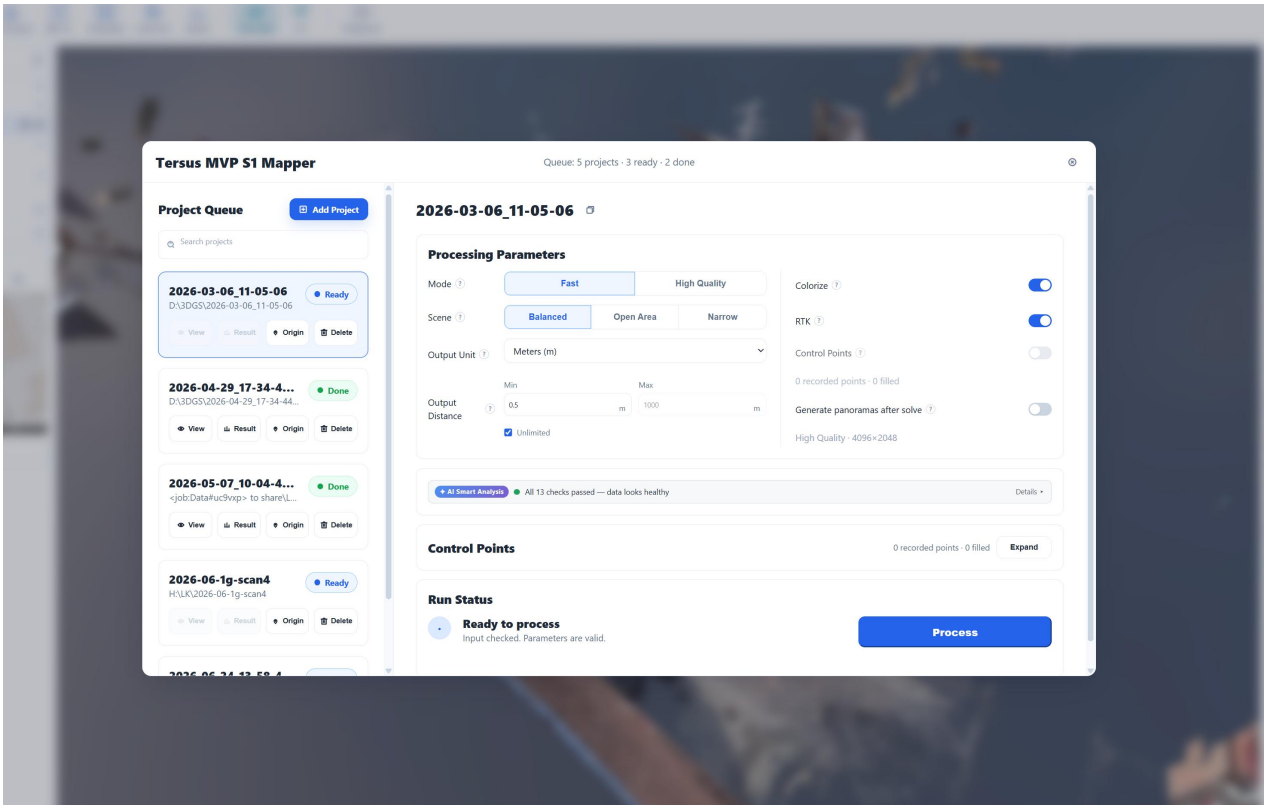
5. Step 1 — Solve Your Scan

Solving is where every MVP S1 job begins: it turns the raw data your scanner recorded into a clean, colored, level point cloud you can work with. It all runs on your PC — nothing is uploaded.

Remember the two-step idea from Chapter 3: **solving builds the cloud; it does not ask you to pick a coordinate system.** You choose processing options here; the coordinate system comes later (Chapter 6).

5.1 Open the solver workspace

On the ribbon, click `Home ▸ DATA ▸ MVP S1` (tooltip **MVP S1 Raw Data Solve**). A full-screen workspace opens, titled **Tersus MVP S1 Mapper**.



It has two sides:

- **Left — your projects.** A list of the scans you've added, each with a status (**Ready**, **Queued**, **Running**, **Done**, **Failed**, …) and an **Add Project** button.
- **Right — the selected project.** Its processing options, an automatic **Data Health Check**, a **Control Points** section, and the run/result area.

> **Tip:** You can close this window and keep working in the 3D viewer while a scan solves in the background. The ribbon **MVP S1** button shows progress while a job runs.

5.2 Add your raw scan

1. Click **Add Project**.
2. In the folder picker, select the **raw scan folder** you copied off the scanner (the original folder from the device's card).
3. The scan appears in the list as **Ready**, with its options loaded on the right. Rename it if you like.
4. Add more scans to line several up — they process one after another.

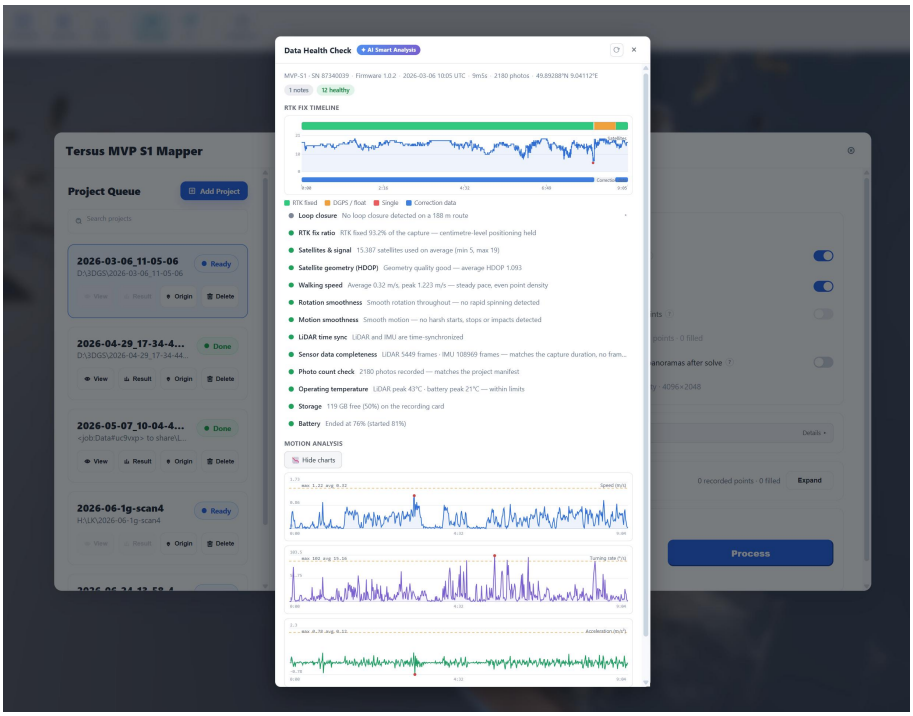
> ⚠ **Warning:** Choose the **original raw scan folder** — not an already-processed or converted point cloud. If you point the solver at finished output, it declines with *"Select the original MVP S1 raw scan folder…"*. This protects you from accidentally re-processing finished data.

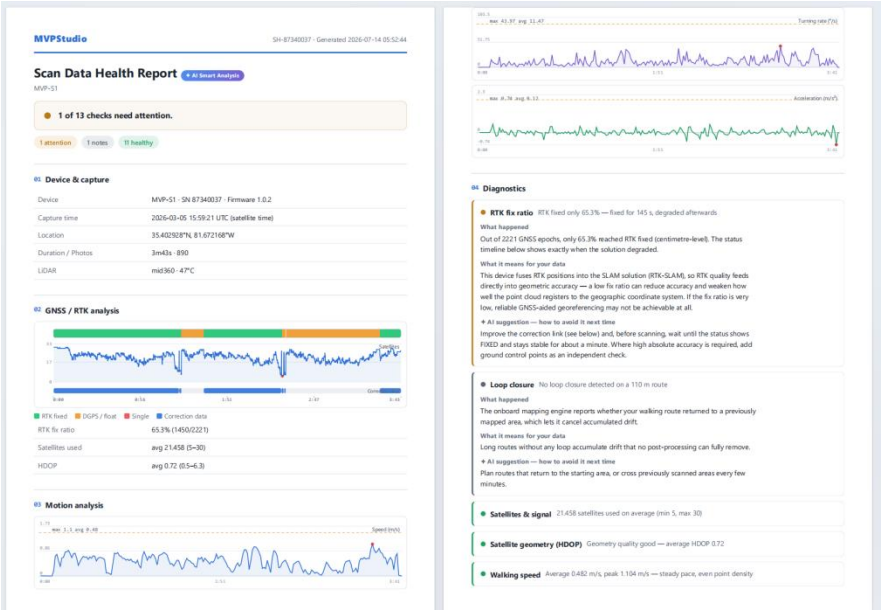
> ⓘ **Note:** You don't pick an output location — MVPStudio saves each result in a managed folder next to the scan, so results stay with the data they came from.

5.3 Check the data (Data Health Check)

When you add a scan, MVPStudio automatically runs a **Data Health Check** and shows the result on the project's card. In plain language it tells you whether the capture is good — satellite coverage, when the RTK signal was strong or weak, and how steadily you moved. Green means good to go; warnings are explained with what they mean for your data.

You can glance at this and process straight away. For the full report and how to read it, see Chapter 11.





5.4 Choose your processing options

Select the project and set its options on the right. Each option has a **?** you can hover for help. The defaults are sensible — for many scans you can simply leave them and process.

Option	Choices (default in bold)	What it does
Mode	**Fast** · High Quality	*Fast* processes quicker for field checks; *High Quality* runs the full optimization for final deliverables (and benefits from a good GPU).
Scene	**Balanced** · Open Area · Narrow	Match your environment: *Balanced* for general use, *Open Area* for wide feature-poor spaces, *Narrow* for indoor/confined areas.
Output Unit	**Meters** · Feet · US survey feet	The unit of the resulting coordinates. This is only a *unit* — **not** a coordinate system.
Output Distance	Min **0.5 m**, Max **Unlimited**	Keep only points within this distance from the scanner, to trim far-away noise.
Colorize	**On** · Off	Color the cloud from the camera photos. Off gives a faster, grayscale (intensity) cloud.
RTK	On · Off	Anchor the result to its true real-world position using the RTK fixed solutions recorded during the scan. Automatically unavailable if the scan has no RTK fix.
Control Points	On · Off	Tie the solve to your surveyed control points for higher absolute accuracy (see §5.5). Unavailable if the scan recorded none.
Generate panoramas after solve	On · **Off**	Also create 360° panoramas when solving finishes (see §5.8).

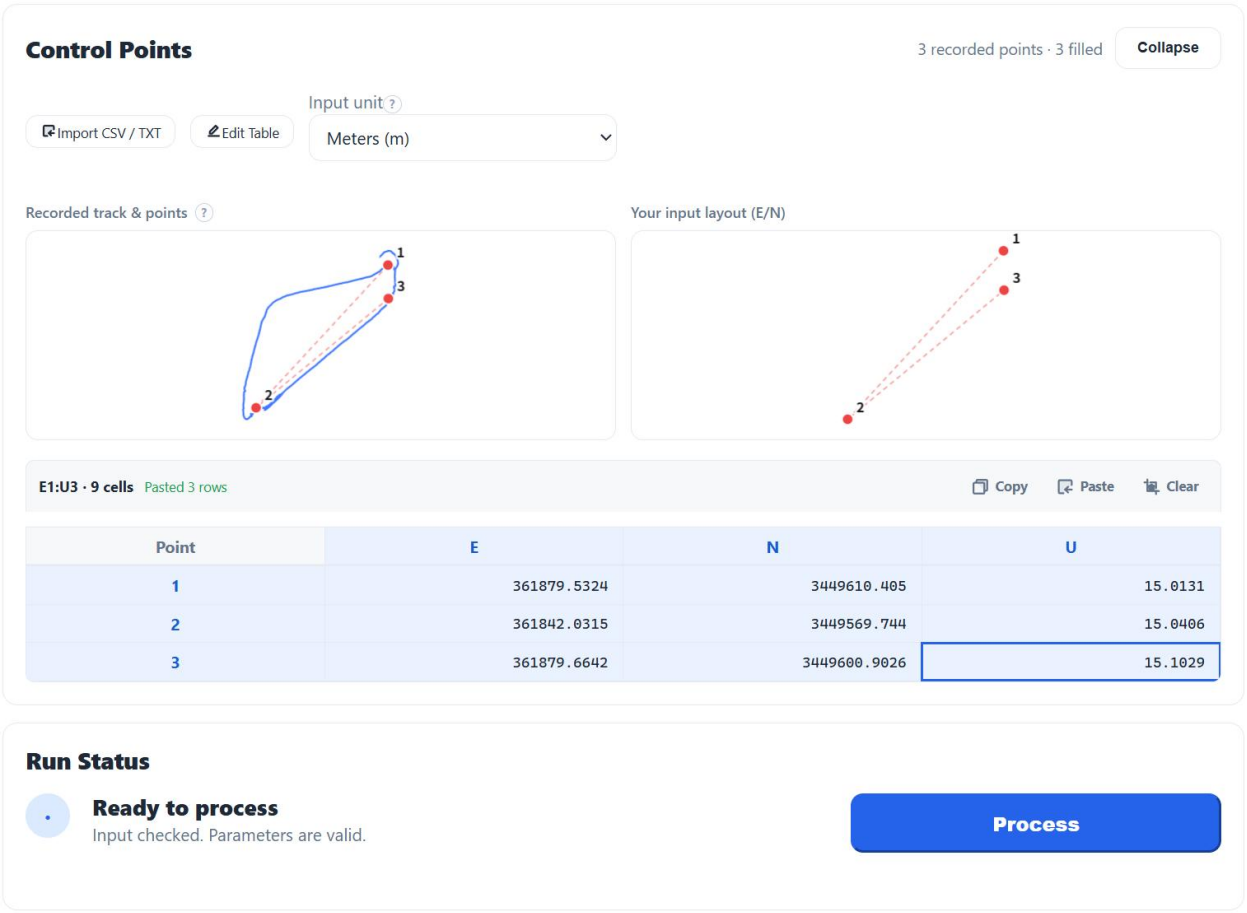
Note (RTK): Turning **RTK** on uses the satellite corrections captured in the field to place your scan accurately on Earth. It does **not** ask you to choose a national grid or projection — that stays a separate, later choice (Chapter 6). If a scan has no usable RTK fix, the option is switched off automatically.

Note: Once a project starts processing, its options lock. To try different settings, add the scan again as a new project.

5.5 Control points (optional)

If you surveyed **control points** and the scanner recorded markers for them during the scan, you can feed your known coordinates in for higher absolute accuracy.

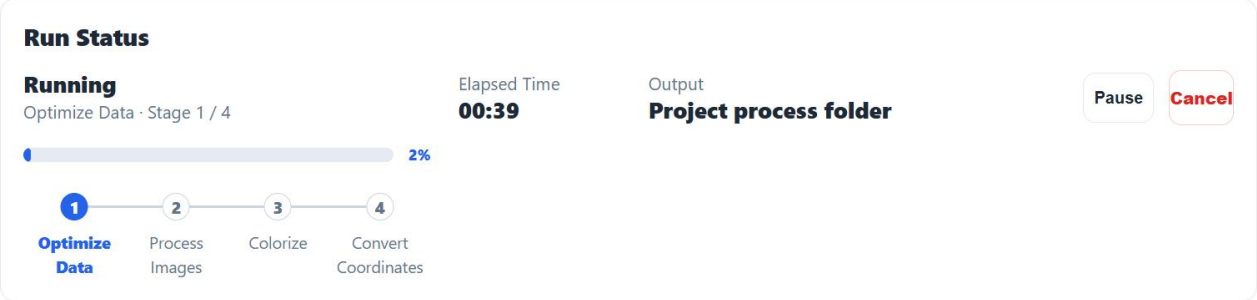
1. Turn on **Control Points**.
2. For each recorded point, enter its surveyed **E / N / U** (East, North, Up). You can **type** them, **paste** from Excel, or **Import** a CSV/TXT file. An **input unit** setting lets you enter feet or US-survey-feet if that's how your control is recorded.
3. MVPStudio shows a side-by-side preview — the recorded marker layout versus the coordinates you entered — and warns you if something looks off (for example, points in the wrong order, or East/North swapped) **before** you waste a solve.



Tip: Provide at least three well-spread control points for a reliable fit.

5.6 Run the solve

1. Click **Process**. If several projects are queued, they run one at a time.
2. The run area shows a **progress bar**, the **current stage** (of 4), and **elapsed time**. The stages are **Optimize Data → Process Images → Colorize → Convert Coordinates**.
3. When the engine finishes, MVPStudio wraps up automatically — the progress bar completes and the card then shows **Result ready**.
4. While running you can **Pause/Resume** or **Cancel**. A cancelled or failed project keeps a **Retry** button.



If a solve fails: you'll see a short **error code** and a plain-language reason (for example a missing graphics driver, not enough disk space, or invalid input). Fix the cause and use **Retry**, or add the scan again as a new project.

5.7 Why your cloud comes out level (and local)

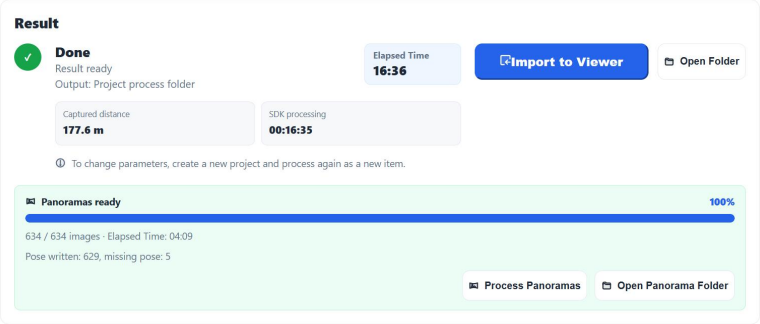
You don't have to do anything for this — MVPStudio handles it automatically as it finishes a solve — but it's worth understanding.

A georeferenced scan is first computed in an Earth-centered frame, where the axes point at the center of the planet. Shown raw, such a cloud would appear **tilted** (by roughly your latitude) and its coordinates would be millions of meters. MVPStudio automatically re-anchors the cloud to a **local, ground-level frame** at your scan site, so the ground is flat, "up" is up, and coordinates are small and easy to measure. The original georeferencing is preserved behind the scenes, so you can still convert to any real-world system later.

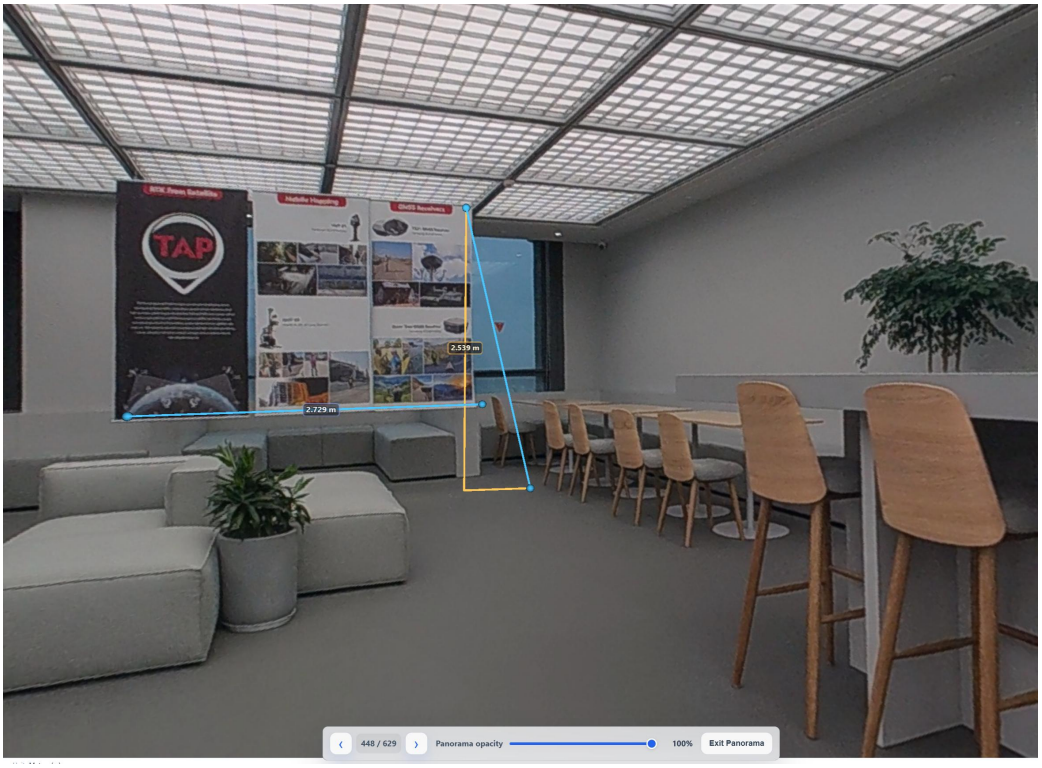
Note: MVPStudio verifies this leveling before letting you open the result. If it can't confirm the cloud is level, it stops you and asks you to reprocess — it will never silently show you a tilted survey.

5.8 360° panoramas (optional)

If your scan has photos, MVPStudio can stitch them into **360° panoramas** placed along your path, so you can look around the scene photographically from inside the point cloud. Turn on **Generate panoramas after solve** before processing, or run **Process Panoramas** later from a finished project.



Panoramas are optional and don't change the point cloud — generate them only when you want photographic context. Once they exist, you open them (and can even measure on them) from the viewer — see §7.7.



5.9 Open the result

When solving finishes, click **Import to Viewer**. MVPStudio prepares the cloud for smooth display and opens it in the 3D viewport. (It has usually pre-prepared the cloud in the background, so this is quick.) Use **Open Folder** to see the result files in Windows.

What you get:

- A **colored point cloud** (if Colorize was on), already level and ready to measure.
- The scanner **path** and **camera positions**, and any **panoramas** you generated.
- Preserved georeferencing, so you can convert to a real-world coordinate system whenever you need (Chapter 6).

The cloud now appears in the **Scene Manager** (Chapter 7), ready for measuring, cleaning, extraction, and export.

6. Step 2 — Put Your Data on the Map (Coordinate Conversion)

This is Step 2 from Chapter 3. Your solved cloud is clean, level, and in **local** coordinates (small numbers near your scan). **Coordinate Convert** expresses that same cloud in a **real-world coordinate system** — a national or local grid, a UTM zone — with correct heights, and writes it out as a new point cloud you can deliver.

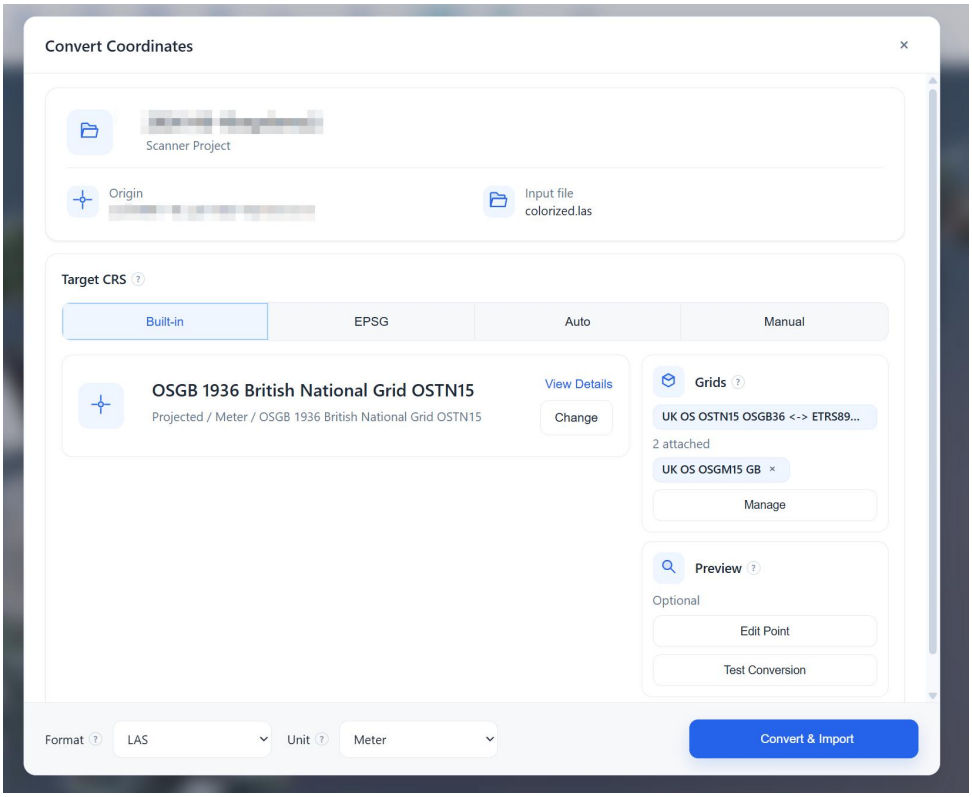
> **Remember:** Solving and converting are separate on purpose. You can convert whenever you're ready, and re-run from your original solved project to produce a different coordinate system — without ever re-solving.

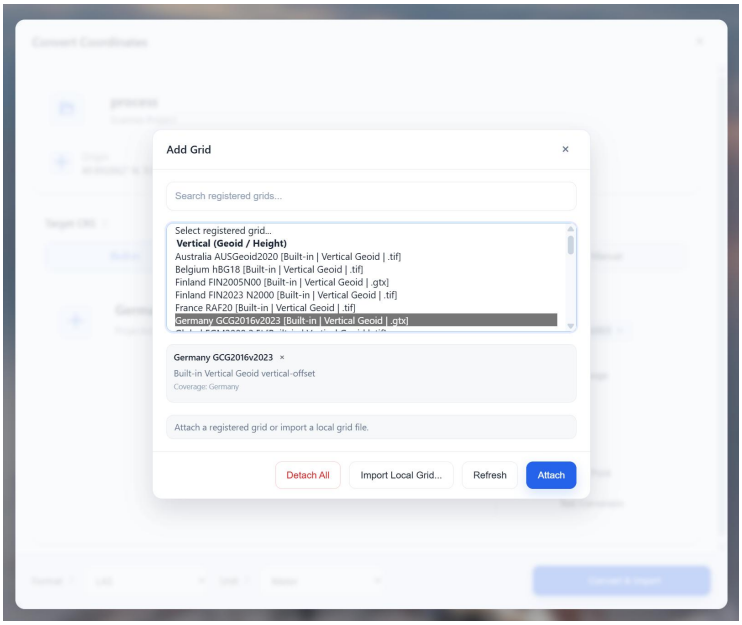
6.1 When you need this step

Convert when your deliverable must be in a specific real-world coordinate system (for example, to hand a point cloud, DXF, or Shapefile to a client on a national grid, or to tie your data to survey control on a known datum). If you only need to measure, clean, or model the cloud in local coordinates, you can skip this step entirely (see §3.5).

6.2 Open Coordinate Convert

Load the solved project you want to convert, then click `Home ▸ DATA ▸ CRS Convert`. The **Convert Coordinates** window opens.





The window is read top to bottom:

- **Project card** — shows the loaded project, its **Origin** (its real-world location, from the georeferencing preserved during solving), and the input file. A green status means it's ready to convert. If it says *Missing origin* or *No global coordinate source*, the cloud has no real-world reference and can't be converted (it wasn't solved with RTK/a global source).
- **Target CRS** — where you choose the coordinate system to convert *into* (§6.3).
- **Grids** — where you attach a geoid model for correct heights (§6.4).
- **Preview / Test Conversion** — check a known point before committing (§6.5).
- **Footer** — the output **Format** (LAS/LAZ), **Unit** (Meter/Foot/US survey foot), and the **Convert & Import** button.

6.3 Choose your target coordinate system

In the **Target CRS** area, pick the system you want using whichever of the four tabs suits you. (The target must be a *projected* system — one with easting/northing in meters or feet — not plain longitude/latitude.)

Tab	Use it when…	What you do
Built-in	You want a standard published system by name	Type a name or code into the search box and pick from the built-in library (over a thousand systems worldwide).
EPSG	You know the EPSG code	Type the code (for example `EPSG:32633`) and click **Search**.
Auto	You just want a plain UTM zone for the area	Click **Use Auto CRS** — MVPStudio picks the WGS84/UTM zone from your project's location.
Manual	You need a custom or local system	Fill in the projection and parameters yourself, and optionally save it to your library for reuse.

The system you pick appears in a summary card. If it shows an **Unsupported** badge, the built-in engine can't run that exact system — choose another.

⚠ **Warning (about Auto): Auto** only ever produces a generic **WGS84 / UTM** zone. It will **not** match a national or local survey grid (such as a 3°/6° Gauss-Krüger zone or a State Plane zone) and won't line up with your control points. For anything tied to control or a national grid, choose the exact system under **Built-in** or **EPSG** — not Auto.

ⓘ **Note (Manual tab):** The Manual builder defines a projection at the ellipsoid level. It does not apply a full national datum-shift, so for precise national realizations prefer **Built-in** or **EPSG** (which can carry the proper correction grids). The optional *Local Adjustment* fields (offset / rotation / scale) apply a simple planar fit — useful for matching a local control network, not a substitute for a datum transform.

6.4 Heights and geoids

Straight out of solving, the heights (Z) in your cloud are **ellipsoidal heights** — measured from a mathematical model of the Earth. These are *not* the above-sea-level elevations a surveyor levels to. To get true (orthometric) heights, attach a **geoid model**:

1. In the **Grids** row, click **Add Grid**.
2. Pick a built-in geoid for your region, or **Import Local Grid…** to add your own.
3. Convert as usual — MVPStudio applies the geoid so your output heights are true elevations.

Most plain projected systems need no grid at all; you add a geoid only when you need correct heights. For **Korean** coordinate systems, MVPStudio attaches the national **KNGeoid2026** geoid automatically.

Built-in geoid models

MVPStudio bundles ready-to-use geoid models for many regions, so most projects need no downloads — just pick the one for your area under **Add Grid**.

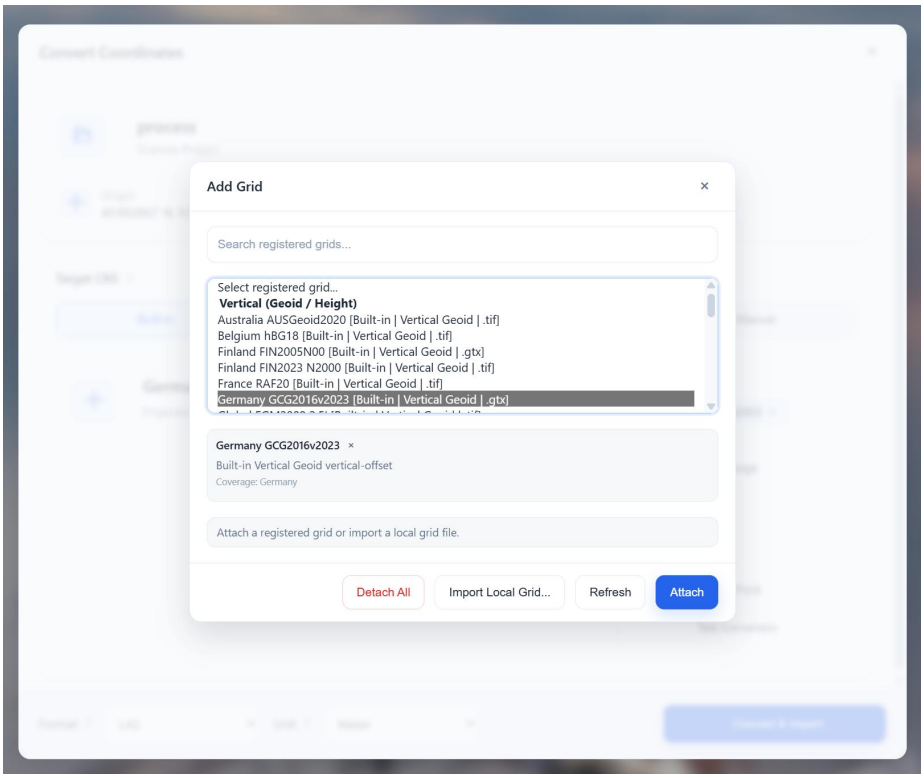
Region	Built-in geoid model(s)
Global	EGM2008, EGM96
USA	GEOID18 (CONUS); GEOID12B (Alaska / Hawaii / Puerto Rico & Virgin Islands)
United Kingdom	OSGM15 (GB)
France	RAF20
Germany	GCG2016 (2023)
Belgium	hBG18
Spain (Canary Islands)	REDNAP Canarias (EGM2008)
Finland	FIN2023 (N2000)
Sweden	SWEN17 (RH2000)
Norway	HREF2018B (NN2000)
Romania	Stereo70 geoid
Serbia	SRG2024
Australia	AUSGeoid2020
Japan	JPGEO2024
South Korea	KNGeoid2026 *(auto-attached for Korean systems)*
South Africa	SAGEOID2010

MVPStudio also bundles **horizontal datum grids** for the UK (OSTN15), Belgium (BD72 ↔ ETRS89), Germany, Romania, and the USA (NADCON5 families) — applied automatically where a coordinate system needs them.

ⓘ **Note:** This is the **current** built-in set, and we keep expanding it. If you need a geoid or grid for your region, ask your dealer or Tersus support — and you can always **Import Local Grid…** to add your own (**GTX**, **GSB**, or **TIFF** files;

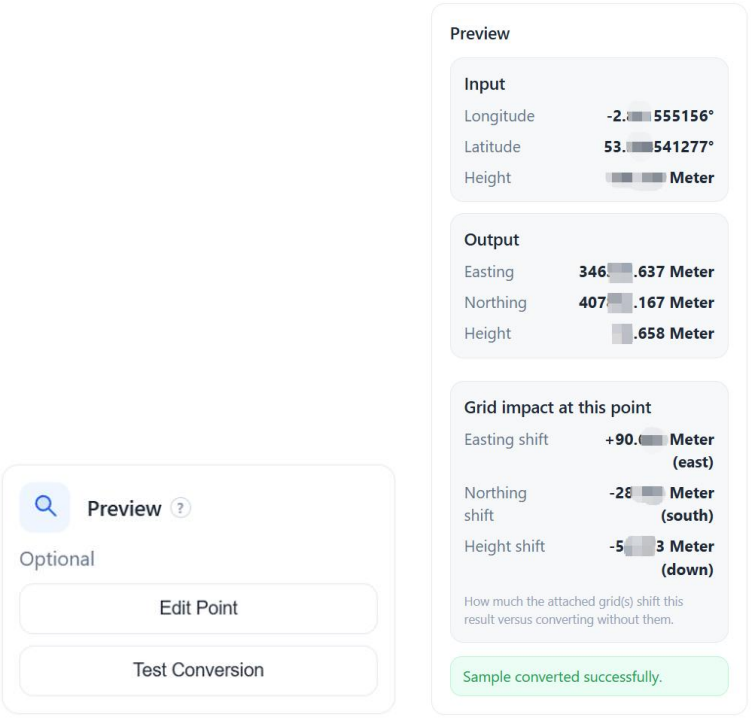
Trimble **GGF** and ASCII **GRD** files are converted automatically).

⚠ **Warning:** If you attach a geoid but part of your cloud falls **outside** the geoid's coverage area, MVPStudio will **not** quietly mix corrected and uncorrected heights — the full conversion stops with a clear message. Choose a geoid that covers your whole survey area.



6.5 Preview before you commit (optional)

Before converting the whole cloud, click **Preview** / **Test Conversion**. MVPStudio transforms a few sample points and shows the result, so you can sanity-check. You can also type a **known point** (longitude/latitude/height) and confirm it lands where you expect. The preview flags helpful warnings — such as points outside a geoid's coverage, or a lower-accuracy datum shift — so you catch issues before running the full job.



6.6 Convert and get your result

Set the **Format** (LAS or LAZ) and **Unit** in the footer, then click **Convert & Import**. MVPStudio transforms the cloud, prepares it for display, and opens the converted result in the viewer. Click **Open Result** (or find it in Windows) to get the files.

The converted result is written to a **new folder** next to your scan, `converted-coordinate-project`, containing:

- the **converted point cloud** (LAS/LAZ) in your chosen real-world coordinates — your deliverable;
- a **`crs_manifest.json`** certificate recording exactly which coordinate system and grids were used (handy for QA and traceability).

Your original solved cloud is never touched.

> ⚠ **Warning (keeping more than one system):** Each time you convert, MVPStudio **replaces** the previous converted output in that folder. If you need to keep two different coordinate systems side by side, copy/rename the `converted-coordinate-project` folder before running the next conversion.

> ⓘ **Note:** You can't convert a cloud that's already been converted (it would corrupt the coordinates) — MVPStudio disables it and marks the project **Already converted**. To produce a different system, reopen the **original** solved project and convert again.

6.7 Common questions

- **"My exported cloud is in weird small coordinates."** You exported a solved-but-not-converted cloud, which is in local coordinates. Run **Coordinate Convert** first, then export the converted result (see §3.5).
- **"Do I choose a coordinate system when I process / turn on RTK?"** No. RTK (Step 1) anchors your scan accurately to the real world; the coordinate system is chosen here, in Step 2. See Chapter 3.

• **"My heights look wrong / too high."** They're probably ellipsoidal heights. Attach a **geoid model** for your region (§6.4) to get true elevations.

• **"The result doesn't match my control points."** You likely used **Auto** (generic UTM). Pick the exact national/local system under **Built-in** or **EPSG** instead.

• **"Conversion is disabled."** Either the project has no real-world origin (it wasn't solved with RTK/a global source), or it's already a converted result — start from the original solved project.

> **Tip:** Conversion writes a second full copy of the cloud, so make sure you have disk space. If space is tight, choose **LAZ** (compressed) as the output format.

7. Viewing & Managing Your Data

This chapter covers opening clouds, organizing them, changing how they look, and saving your work as a project.

7.1 Opening data

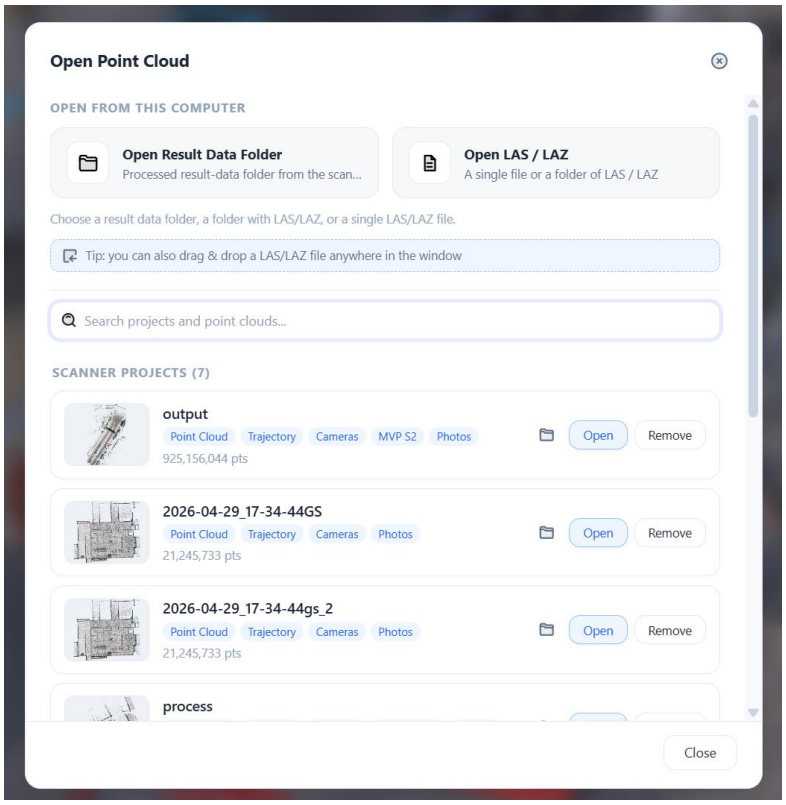
Click `Home ▸ DATA ▸ Open` (or press `Ctrl+O`) to open the **Open Point Cloud** window. Under **Open From This Computer** you have two choices:

- **Open Result Data Folder** — a processed result folder from the scanner.
- **Open LAS / LAZ** — a single LAS/LAZ file, or a folder of them.

You can also **drag and drop** a LAS/LAZ file anywhere onto the window.

The same window lists data you've used before, so you can reopen it in one click:

- **Scanner Projects** — your solved scans (with badges showing what each contains: point cloud, trajectory, cameras, coordinates, photos).
- **Saved Projects** — projects you've saved (see §7.5).
- **Point Clouds** — clouds you've imported before.



Note: In these lists, **Remove** only hides an item from the list — it never deletes the underlying files. A search box appears once a list gets long.

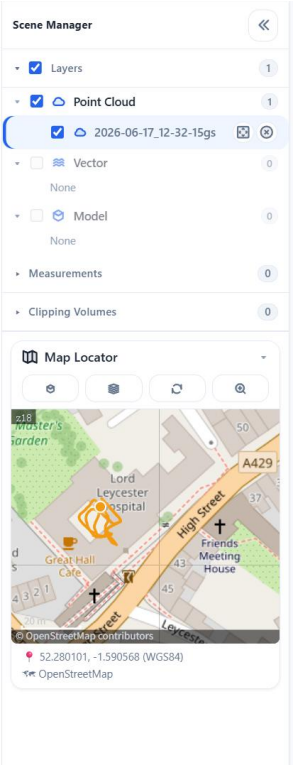
Note: When you open a large cloud, MVPStudio automatically prepares it for smooth streaming (you'll see a short progress dialog). This lets the viewer handle clouds of hundreds of millions of points on a normal PC.

7.2 The Scene Manager

The **Scene Manager** on the left lists everything in your scene, grouped into **Point Cloud**, **Vector** (lines, contours, check points), and **Model** (surfaces, meshes) categories.

- **Show / hide** any layer — or a whole category — with its checkbox.
- **Click** a point cloud to make it the **active** one; tools then act on it.
- **Hover** a layer for quick actions: **Fit view** (frame it) and **Close (×)** (remove it from the scene).
- **Right-click** a point cloud for **Open Point Cloud Folder**.

Below the layers you'll also find your **Measurements**, **Clipping Volumes**, and a **Map Locator** minimap (shown when your data is georeferenced).



7.3 Changing how the cloud looks

- **Color modes** (left quickbar, **Color** group): **RGB**, **Elevation**, **Intensity**, **Classification** (plus advanced **LOD** and **GPS-time** modes).
- **Preferences** (`Home ▸ VIEW ▸ Preferences`, right panel) — the fuller set of display controls:
  - **Background** — sky, gradient, or solid presets.
  - **Rendering** — render quality, point budget, **point size**, field of view, projection, point shape.
  - **EDL** — depth-shading strength and radius.
  - **X-Ray** — see-through mode and color.
  - **Gradient Style** — 15 color ramps for elevation/intensity, plus an **Elevation Range** to set the min/max heights the colors span.

When you color by **Elevation**, a color-scale **legend** appears over the viewport.

7.4 Navigating

See §4.3 — orbit/fly, **Fit** (`F`), perspective/orthographic, and the preset views on the left quickbar.

7.5 Saving and reopening a project

A **project** saves your working state — camera view, measurements, drawn lines, clip regions, check points, and so on — so you can pick up exactly where you left off.

- **Save:** `Home ▸ DATA ▸ Save` (or `Ctrl+S`). The **Save Project** dialog shows a summary of what's being saved and where.
- **Reopen:** open the **Open Point Cloud** window and pick from **Saved Projects**.

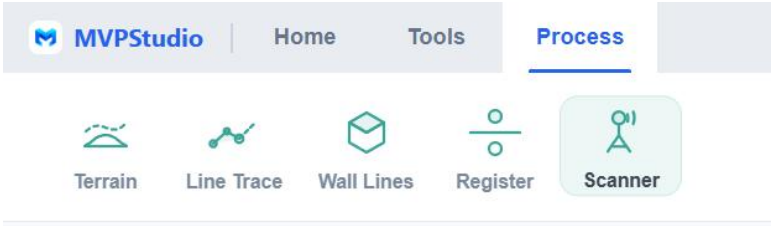
> ⓘ **Note:** A saved project is a lightweight file that *references* your point-cloud data — it doesn't copy the cloud. Keep your source data in place; if you move or delete it, the project may not fully reopen.

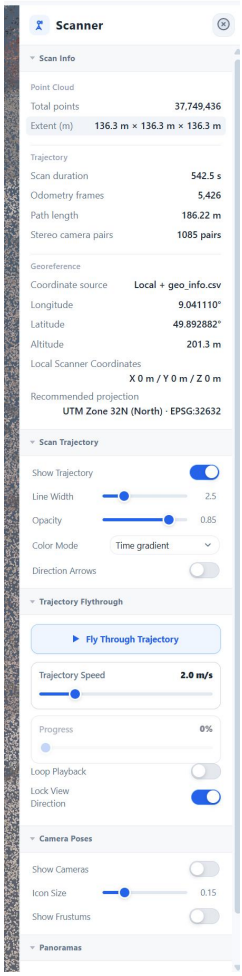
7.6 Explore the scanner project — scan info, trajectory & flythrough

When you open a **solved scan** (a *scanner project*, not an ordinary LAS/LAZ file), MVPStudio gives you extra tools for exploring *how* it was captured — a summary of the scan, the path you walked, and a first-person flythrough of that path.

Where: the **Scanner** button on the **Process** tab — `Process ▸ Scanner`.

> ⓘ **Note (this is the part people miss):** These tools live on the **Process** tab, not Home, and they only appear for a **solved scanner project** — not for a plain LAS/LAZ you imported. Open your solved scan first, then click `Process ▸ Scanner`.





Scan Info — what's in this scan

The **Scan Info** block summarizes the capture at a glance: whether **RTK positioning** and **color** were on, the **scene type**, the **total points** and extent, the **scan duration** and **path length**, the number of **camera pairs**, and the **georeference** (coordinate source, and the origin's longitude / latitude / altitude).

Scan Trajectory — see the path you walked

The **Scan Trajectory** section draws the path the scanner travelled through the scene.

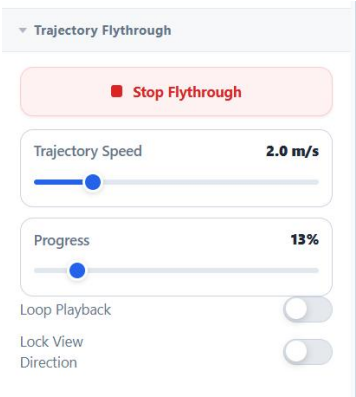
- **Show Trajectory** turns the path line on and off (on by default); **Line Width** and **Opacity** adjust its look.
- **Color Mode** colors the path by **Time**, **Speed**, **Positioning quality**, or a **Solid color**.
  - **Positioning quality** is the one to know: it colors the path by how strong your satellite (RTK) signal was — **green** = solid fix, **amber** = weaker (float / DGPS), **red** = single-point, **grey** = no fix. A **Fix timeline** strip appears; click it to jump the camera to that moment, and hover the path to read the exact status, satellite count, and HDOP.
- **Direction Arrows** adds arrowheads showing which way you walked.

> **Tip:** Coloring the path by **Positioning quality** is the quickest way to spot where a scan may be less accurate — the same insight the Data Health Check gives you (Chapter 11).

Trajectory Flythrough — re-walk the scan in first person

The **Trajectory Flythrough** section flies the camera along your path, first-person, so you can re-walk the whole site.

1. Click **Fly Through Trajectory** (▶). The view drops into first person and cruises along the path. *(The button stays greyed out until a scanner trajectory is loaded.)*
2. While it runs:
   - Drag **Progress** to jump to any point on the path.
   - Change **Trajectory Speed** live (shown in m/s).
   - **Loop Playback** repeats from the start; **Lock View Direction** (on by default) keeps the view aimed forward along the path — turn it off to look around freely as you glide.
3. Press **Esc** or click **Stop Flythrough** to end; your previous view is restored.



Camera & panorama markers

The **Camera Poses** and **Panoramas** sections are where you switch on the scanner's photo positions — including the **360° panoramas** covered next.

7.7 Panoramas & photos — walk the site in 360° (and measure on it)

Your scan carries the photos the scanner took along the way. MVPStudio can place them in the scene as **360° panoramas** you can step inside — and, because the point cloud sits right behind the photo, you can even **measure on the panorama**.

> ⓘ **First, turn the markers on — this is the step customers miss.** Panorama markers are **hidden by default**. Open `Process ▸ Scanner`, and under **Panoramas** tick **Show Panorama Markers** (an **Available** count shows how many the scan has). Blue, globe-shaped markers then appear along the trajectory.

Step inside a 360° panorama

Single-click a blue globe marker to enter the 360° view. The photo wraps around you as a sphere, draped over the point cloud.

- **Look around** — left-drag inside the view.
- **Move along the path** — **‹ Previous** / **Next ›** step to the neighbouring capture points; a counter shows **N / total**.
- **Panorama opacity** — the slider (default 85%) blends the photo against the cloud. Drag it down to see the point cloud through the photo, or up to 100% for the full picture.
- **Exit** — click **Exit Panorama** (or un-tick **Show Panorama Markers**).

> **Tip:** A marker only opens on a clean **single-click** with a clear line of sight — if you *drag* (to look around) or the marker is hidden behind a wall, nothing happens. (Double-click is for the flat 2D photo view below, not the 360°.)

Measure and draw on the panorama

While a panorama is open, the normal **measurement tools still work** — pick **Point**, **Distance**, **Height**, **Area**, or **Angle** from the **Tools** tab and click on the photo. Each click lands on the real point cloud behind the image, so you get **true real-world results** — a coordinate, a length in metres — exactly as if you'd measured in the 3D scene. You can draw **DXF** linework on the panorama the same way.

> **Note:** Measuring "on the photo" is really measuring the point cloud behind it, so the accuracy is the point cloud's accuracy at that spot. Lower the **opacity** if the photo hides the geometry you want to click, and pick on well-scanned surfaces.

The flat photo view (2D)

If you'd rather flip through the raw photos, tick **Show Cameras** (in the **Camera Poses** section) and **double-click** a camera marker. A simple photo viewer opens with **‹ Previous / Next ›**, a **Switch L/R** button for the two camera sides, and an info line (position, orientation, camera side, timestamp). This view is for looking only — to measure, use the 360° panorama above.

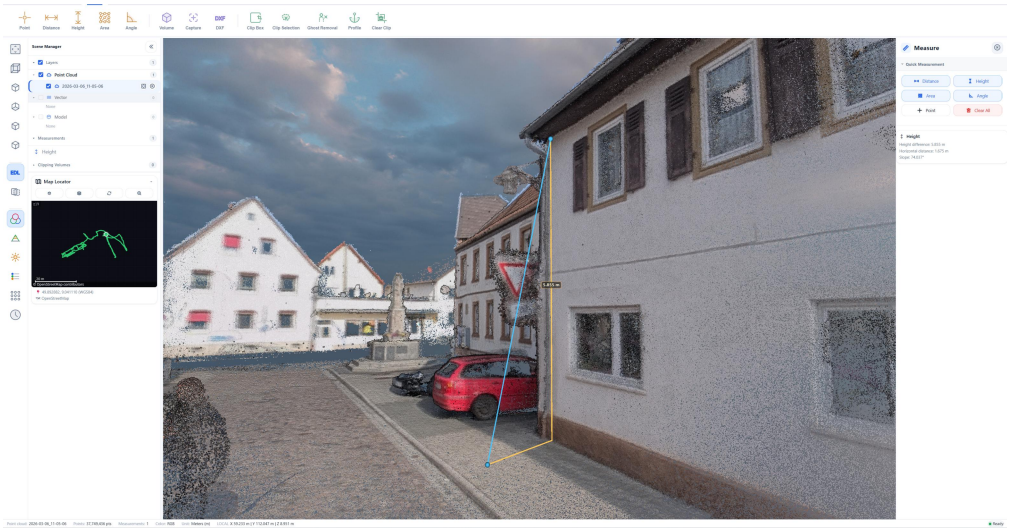
8. Measuring & Inspecting

MVPStudio measures directly on the point cloud, in real-world units. Measurement tools live on the **Tools** tab. Results appear as cards in the right panel and as rows under **Measurements** in the Scene Manager; press `Ctrl+Z` to undo.

> **Note:** Measurements are correct in the cloud's current coordinates. Relative results (distances, heights, areas, volumes) are the same whether or not you've converted to a national coordinate system — so you can measure a solved cloud straight away.

8.1 The measurement tools

Tool	What it measures	How
Point	The coordinate of a single point	Click one point; the readout shows its coordinates.
Distance	Length along a path	Click points in turn; **right-click to finish**. Shows total length and segments.
Height	Vertical difference between two points	Click two points. Shows height difference, horizontal distance, and slope.
Area	A flat area	Click the boundary; **double-click to finish**. Warns if the boundary crosses itself.
Angle	The angle at a corner	Click three points.



> **Tip:** Press `Esc` to cancel a measurement in progress.

8.2 Volume (cut / fill)

Turn a stockpile or an earthwork into a billable number in minutes. Volume measures **cut, fill, and net volume** over an area you draw, grades how trustworthy the result is, and can produce a **Volume & Billing report** for the client.

Where: `Tools ▸ ANNOTATE ▸ Volume` (the **Volume** pane on the right).

How to use it

1. Click **New**, then **click points on the cloud surface** to trace a boundary around your pile or area (at least 3 points). **Undo** fixes a vertex.
2. Click **Finish** (or right-click / press Enter). MVPStudio computes the volume and shows a result card.
3. To change the area later, use **Redraw** — your previous result stays until the new boundary is finished.

> **Tip:** Click **directly on the point cloud** when tracing the boundary, and keep the polygon tight to real data. Vertices dropped on empty space are marked "inferred" and lower the result's grade.

Pick the measurement type (Scenario)

- **Stockpile** (default) — a pile measured against a base fitted from your boundary; for sand / gravel / aggregate mounds.
- **Plane Cut/Fill** — compare the surface against a fixed elevation (a design or grading level). Set the **Reference height** (type it, or **Pick** it on a benchmark). Net is then the signed cut/fill balance.
- **Ground-Fitted** — fit a terrain base under the area, for excavations and pits on uneven ground.

Key settings (sensible defaults — change only if needed)

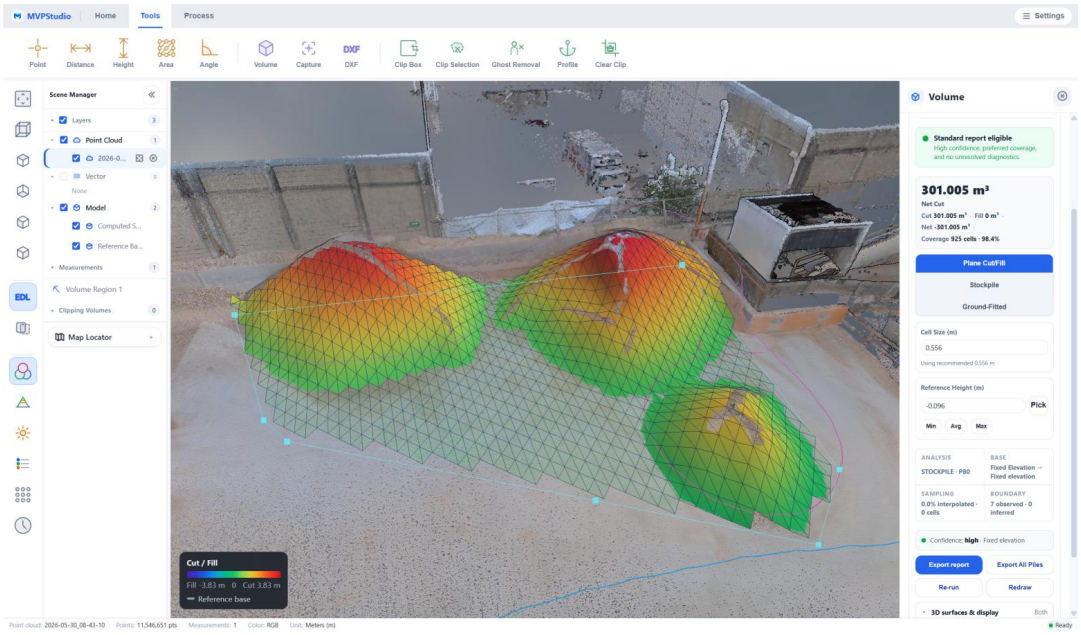
Setting	Default	What it does
Cell size	Recommended (auto)	The grid resolution. Click **Apply** to use the recommendation — finer isn't more accurate, just slower.
Surface mode / Aggregation	Stockpile · P80	How the top surface is measured. **P80** suits a normal pile top; **Median / Low** for noisy tops.
Remove vegetation / tall objects	Off	Turn on to lift grass, trees, or poles off a pile before measuring (raise **Max object size** for wide tree crowns).

Read the result

The card shows the headline volume plus **Cut · Fill · Net · Coverage**, a **confidence** rating, and a **delivery grade**:

- **Ready** — high confidence and good coverage: fine for a formal report.
- **Review / Draft** — lower coverage or warnings: tighten the boundary around visible data, rescan gaps, or adjust the base, then **Re-run**. (Draft reports come out watermarked.)

You can also generate **contours** from the surface (export to DXF) and export the surface mesh.



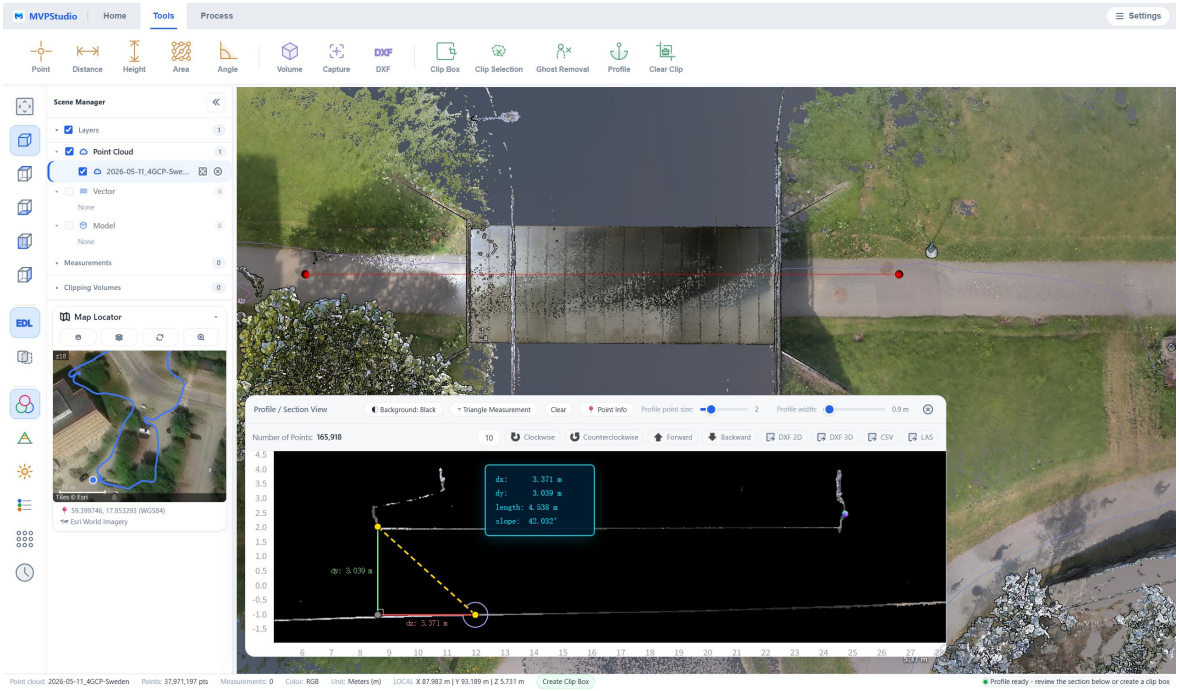
Billing report

For an invoice-ready document, open `Home ▸ DATA ▸ Report ▸ Volume & Billing Report` (Chapter 11): enter a **unit price**, **currency**, and **billing basis** (Cut / Fill / Net), and MVPStudio produces a per-area table with amounts and a total.

> **Note:** Volume results and their 3D surfaces are cached for about three days; after that, re-run the region to regenerate the report.

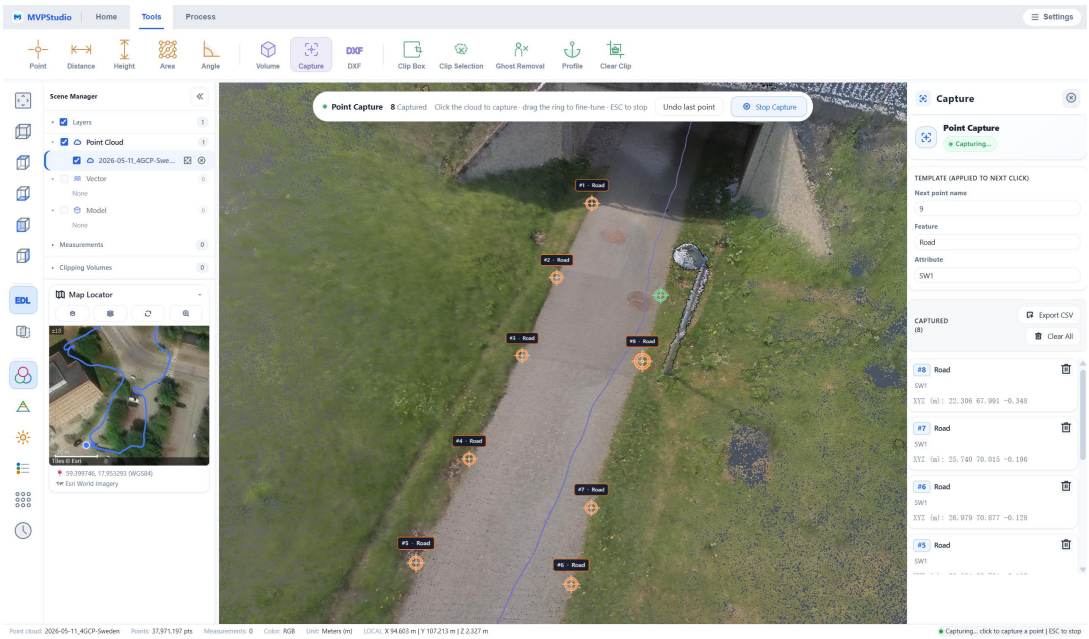
8.3 Cross-sections (Profile)

`Tools ▸ CLIP & REGION ▸ Profile` pulls a **cross-section slab** through the cloud, so you can inspect a slice of the site edge-on. To trace a section into CAD linework, use **Section Trace** in the DXF panel (Chapter 10).



8.4 Point Capture

`Tools ▸ ANNOTATE ▸ Capture` lets you collect and **name individual survey points** on the cloud — with automatic sequential naming (like RTK point collection) and per-point notes. Export the collected points to **CSV** for use elsewhere.

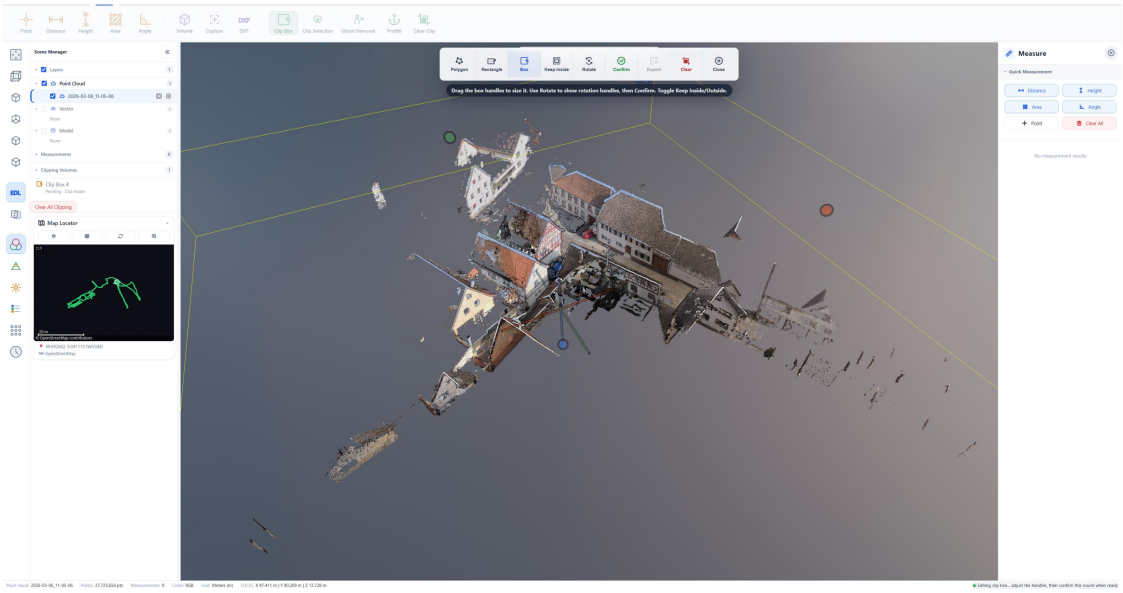


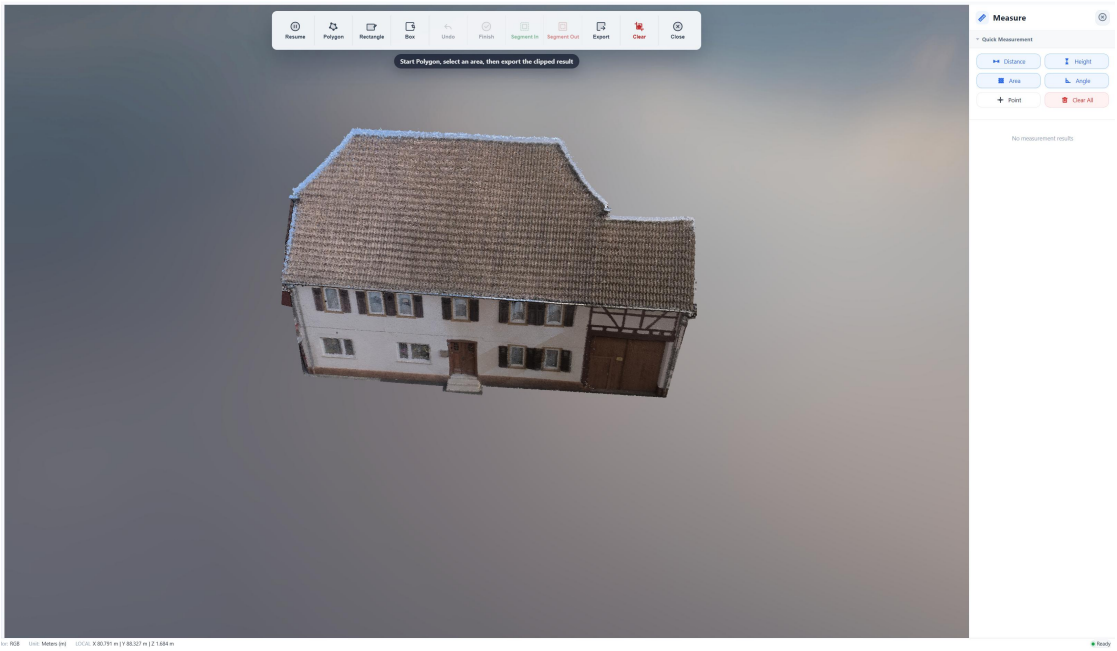
9. Cleaning & Preparing the Cloud

Field scans always capture a few things you don't want — passers-by, traffic, stray points, and areas outside your interest. These tools tidy the cloud before you measure, extract, or export. They all work non-destructively: your original files are never changed.

9.1 Clip to a region

- **Clip Box** (`Tools ▸ CLIP & REGION ▸ Clip Box`) — drops an adjustable 3D box; only what's inside is shown. Drag its faces to size it. Good for focusing on one building or area.
- **Clip Selection** (`Tools ▸ CLIP & REGION ▸ Clip Selection`) — draw a freehand/polygon region and keep or remove the points inside it.
- **Clear Clip** — removes all clipping and returns to the full cloud.





9.2 Remove people and moving objects (Ghost Removal)

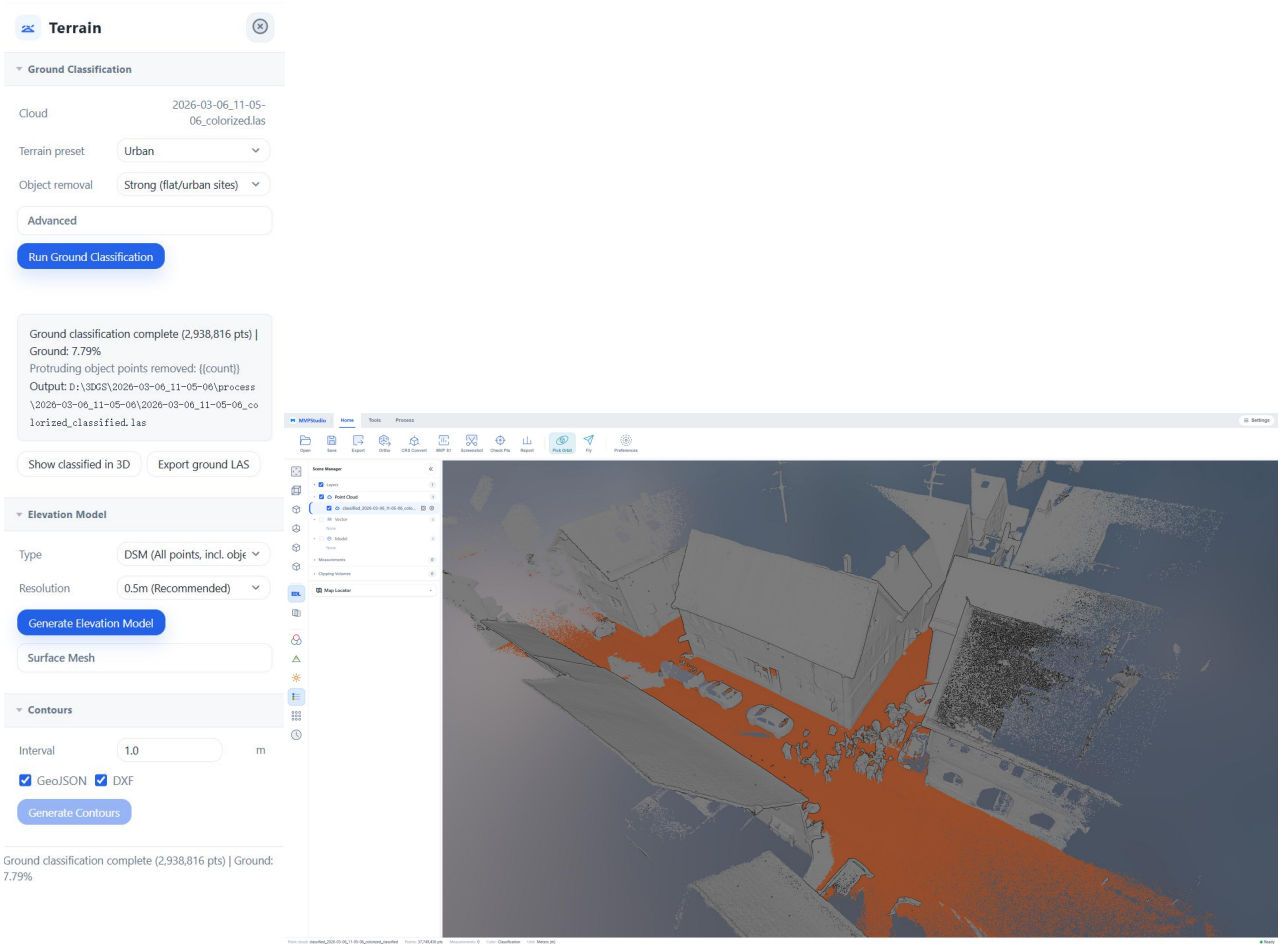
`Tools ▸ CLIP & REGION ▸ Ghost Removal` finds and removes the "ghosts" a mobile scan picks up — **people, small vehicles, floating noise, and stray points**.

1. Draw a region around the area to clean.
2. Choose what to target and a **sensitivity** (Loose / Standard / Strict). A live preview shows what will be removed.
3. Apply. MVPStudio saves a **new, cleaned** point cloud and opens it — your original stays intact.

9.3 Classify the ground

`Process ▸ Terrain` opens the **Terrain** panel, where **Ground Classification** separates ground points from everything else (buildings, vegetation, objects).

1. Pick a **terrain preset** that matches your site (Auto / Flat / Rolling / Mountain / Urban).
2. Choose an **object-removal** strength.
3. Run it. You can view the classified ground in 3D and **export a ground-only point cloud** — the starting point for terrain models and contours (Chapter 10).



10. Drawing & Extraction — CAD & GIS Deliverables

This is where a point cloud becomes a drawing: linework, floor plans, contours, and feature points you can hand to CAD and GIS software. MVPStudio's CAD output is written as **DXF R12 with real coordinates**, the format survey and CAD tools (including 3D-Win) read reliably.

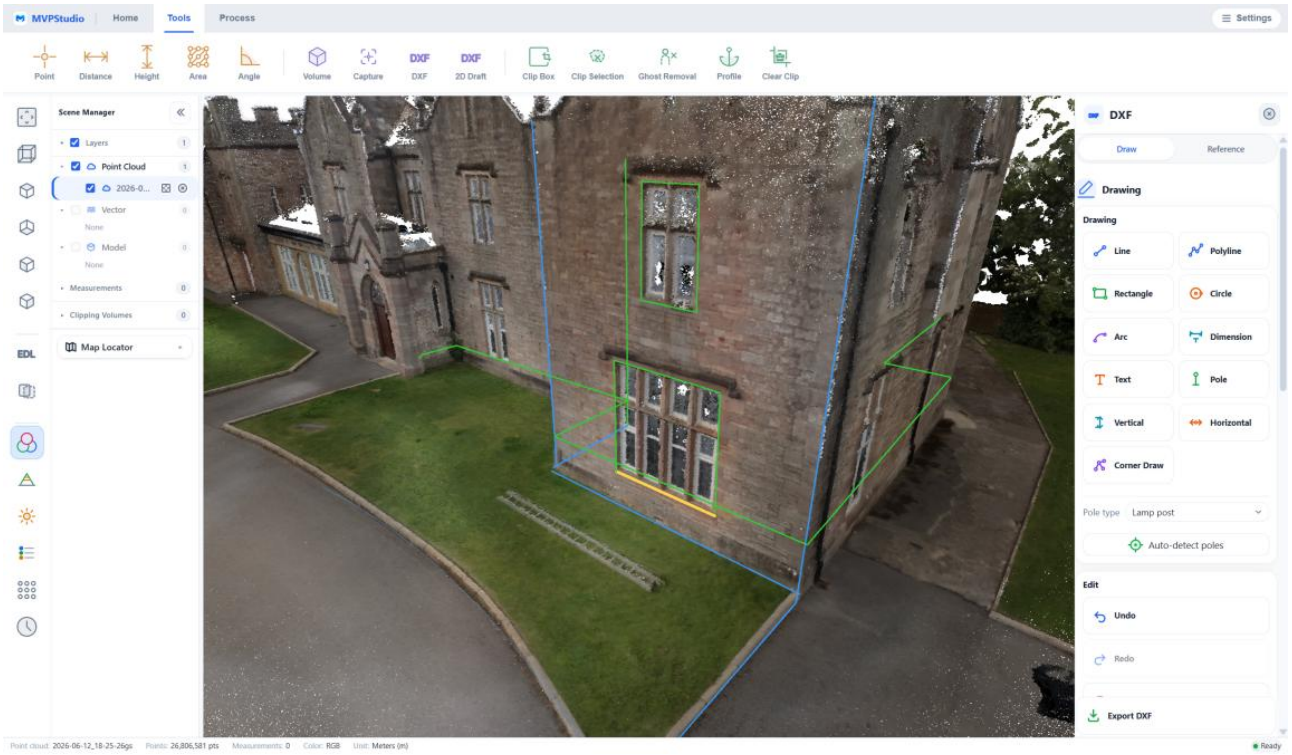
> ⚠ **Warning:** DXF and Shapefile exports carry the cloud's **current** coordinates. If you need them in a national/real-world coordinate system, run **Coordinate Convert** (Chapter 6) *before* you draw and export.

10.1 The DXF drawing panel

`Tools ▸ ANNOTATE ▸ DXF` opens a full 2D drafting workspace over your cloud. You get the drawing tools you'd expect:

- **Line** (free, or locked vertical/horizontal), **Polyline**, **Rectangle**, **Circle**, **Arc**
- **Offset** (parallel copy at a set distance), **Corner Draw**
- **Dimension** (linear) and **Text** labels
- **Pole** (see §10.5)

Everything sits on **layers** you can name, color, and show/hide, with full **undo/redo** (`Ctrl+Z` / `Ctrl+Y`) and point **snapping**. When you're done, **export to DXF R12** (or **Shapefile** for GIS).



> 💡 **Tip:** A **Smart Generate** section helps you draw lines semi-automatically — Section Trace, structure lines, and the Wall Lines and Line Trace tools below all feed into the same drawing.

10.2 Trace a clean section (Section Trace)

To draw an accurate cross-section, first pull a slice with **Profile** (§8.3), then use **Section Trace**: it locks a **flat 2D sheet** on the section plane so every line you trace stays perfectly straight and in-plane. The traced lines export straight to DXF.

10.3 Trace lines semi-automatically (Line Trace)

Line Trace turns hours of vertex-by-vertex drawing into a guided sweep. You show it a feature with a short seed line; it recognizes the feature and extends the line along it automatically while the view follows — and you stay in control of where it goes. It's built for the long, repetitive linework in road and mobile-mapping surveys: **curbs, wall bases, road markings, and material edges.**

Where: `Process ▸ Line Trace`.

What it can trace

Under **Advanced parameters ▸ Target override**:

- **Auto detect from guide** (default) — decides from your seed line whether you're tracing a curb or a marking.
- **Curb / wall base** — follows a vertical height step (a curb flowline or the base of a wall).
- **Road marking / material boundary** — follows a painted stripe or a change in surface material (it recolors the cloud by intensity so you and the algorithm see the same thing).

How to use it

1. Click **Guide & Trace**.
2. **Draw a short seed line:** click two points directly on the feature, a couple of metres apart, pointing the way you want the line to grow.
3. The line **extends automatically**, following the feature as the view advances (**Follow camera** is on by default). A banner shows the live length and a **confidence gauge**.
4. **Press Space to stop.** It also pauses by itself when it loses the feature, and tells you why (weak feature, sharp turn, a gap…).
5. At a pause, choose **Continue**, **Guide & continue** (draw two points to bridge a gap or go around an obstruction), **Undo** (`Ctrl+Z` or right-click), **Finish**, or **Discard** (`Esc`). If the line returns to its own start, it closes the loop automatically.
6. **Finish** adds it to the list as a smoothed line with its length and vertex count.

The one knob you'll actually touch — confidence

While tracing, the banner shows a **Detection vs Threshold** gauge. When live detection (the fill) drops below the **Threshold** handle, tracing pauses. Drag the handle (or use the arrow keys):

- **Lower** it to push through faint or worn features (shadowed curbs, worn paint, sparse passes).
- **Raise** it in busy scenes so it only accepts strong evidence and won't wander onto the wrong edge.

Everything else can stay at its defaults; the **Advanced parameters** section holds fine controls (step size, search width, curb min/max step height, a dashed-line mode for broken centre lines, marking contrast) for tricky cases.

Output

Traced lines become an orange overlay in the scene and **export to DXF R12** (real coordinates, on a `CURB` layer) with **Export DXF** — ready for AutoCAD and 3D-Win. They're saved with your project and restored when you reopen it.

Tips

- **A clean seed is everything** — put both seed points exactly on the feature.
- **Don't fight gaps** — at a pause, use **Guide & continue** to bridge across parked cars, driveways, or overhead-wire shadows; for a sharp corner, put the first bridge point right on the corner (hand-drawn corners are kept exactly).
- **Dashed centre lines** — set the target to Road marking and turn on **Dashed line (skip gaps)** so each dash becomes its own segment.

Where it shines: road curbs and kerb lines, lane and road markings, indoor wall bases, and material boundaries (asphalt ↔ concrete) — the backbone linework of road and MLS deliverables.

10.4 Extract wall lines (Wall Lines / Floorplan Studio — Beta)

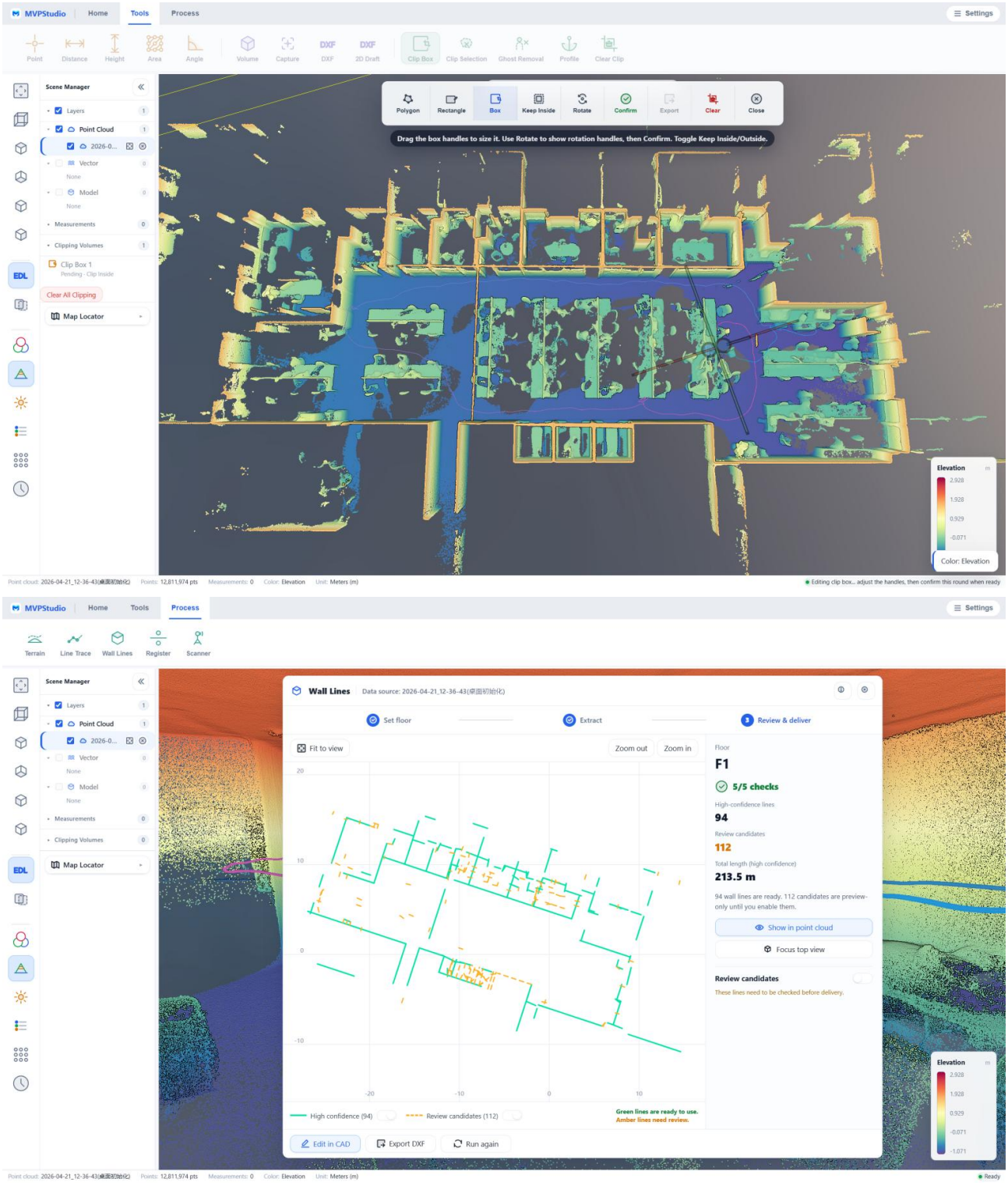
`Process ▸ Wall Lines` opens **Floorplan Studio**, which extracts building **wall lines** for a CAD floor plan.

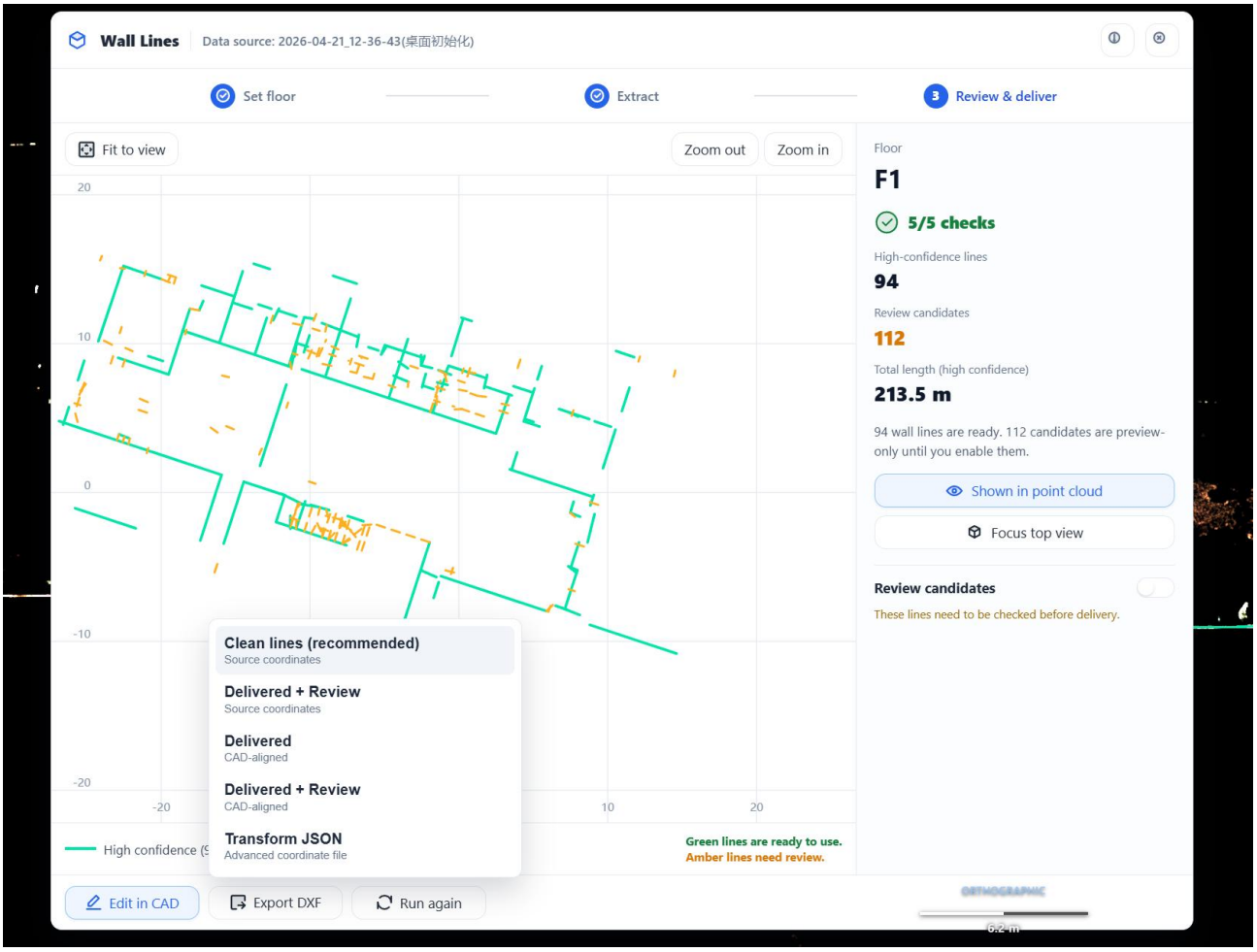
1. Pick a building scan (in meters). Optionally add a **Clip Box** to exclude outdoor clutter.
2. Let it **analyze the floors** (or set the floor/ceiling heights yourself).
3. **Extract wall lines.** You get editable, high-confidence wall lines plus separate "review" lines to check.
4. In **Review** mode, click each wall or opening to **Accept / Reject / Modify**, set thickness, or tag openings as **Door / Window / Passage**.

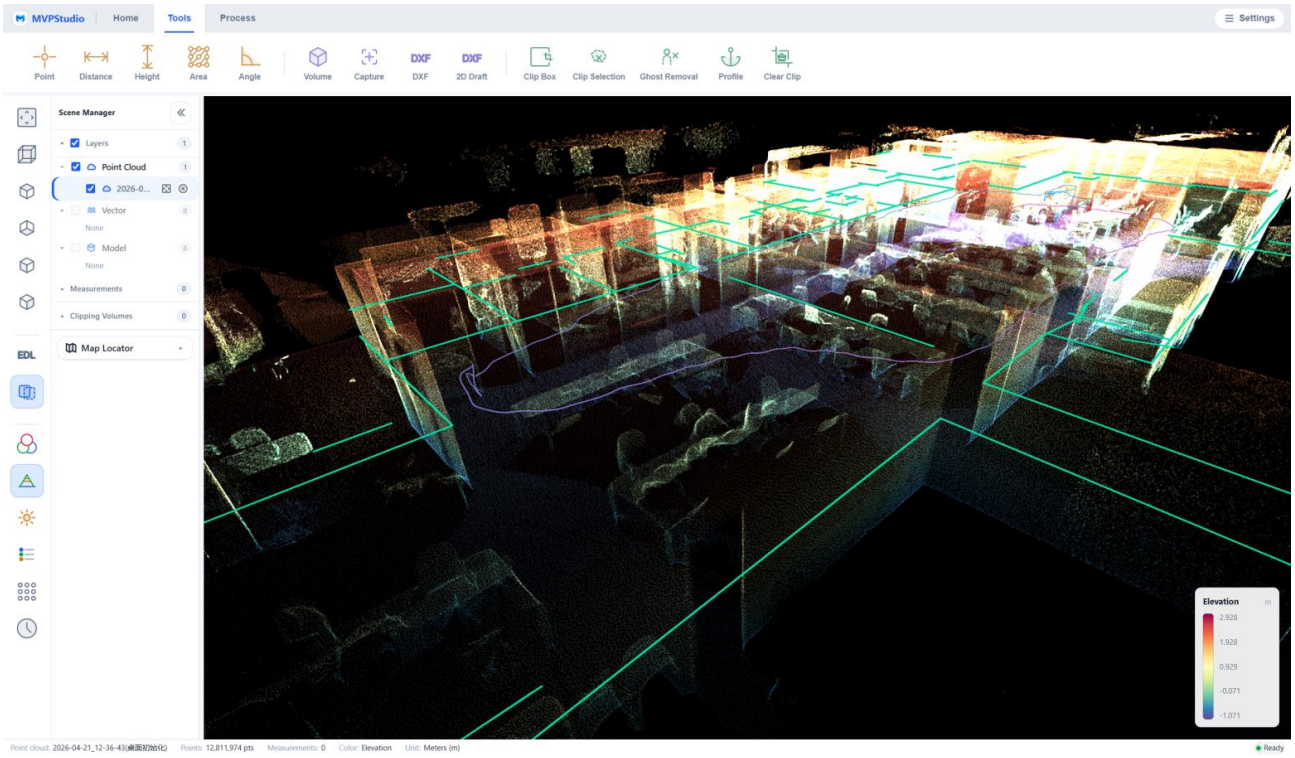
Send the result to the DXF panel or export as CAD.

> **Note (Beta):** Floorplan Studio is a Beta feature and works on meter-unit clouds. It produces **wall lines** — not a

closed, fully-roomed floor plan — so review the output before delivery.




Wall Lines
Data source: 2026-04-21_12-36-43(桌面初始化)
Set floor
Extract
3 Review & deliver
Fit to view
Zoom out
Zoom in
Floor
F1
5/5 checks
High-confidence lines
94
Review candidates
112
Total length (high confidence)
213.5 m
94 wall lines are ready. 112 candidates are preview-only until you enable them.
Shown in point cloud
Focus top view
Review candidates
These lines need to be checked before delivery.
Clean lines (recommended)
Source coordinates
Delivered + Review
Source coordinates
Delivered
CAD-aligned
Delivered + Review
CAD-aligned
Transform JSON
Advanced coordinate file
Green lines are ready to use.
Amber lines need review.
Edit in CAD
Export DXF
Run again


MVPStudio
Home
Tools
Process
Settings
Point
Distance
Height
Area
Angle
Volume
Capture
DXF
2D Draft
Clip Box
Clip Selection
Ghost Removal
Profile
Clear Clip
Scene Manager
Layers
Point Cloud
Vector
Model
Measurements
Clipping Volumes
Map Locator
EDL
Elevation

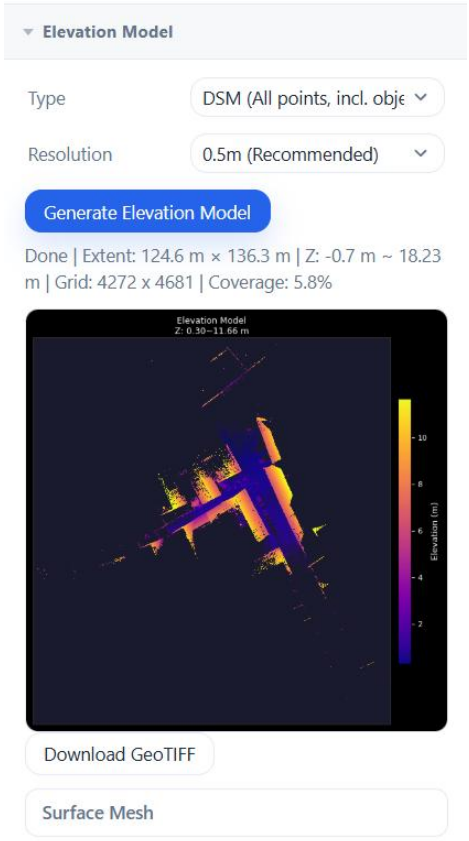
10.5 Poles

In the DXF panel, the **Pole** tool measures upright poles (lamp posts, sign posts, utility poles): click the base, and MVPStudio reads the **height automatically** from the cloud and drops a labeled pole into your drawing. A batch option can extract many poles at once.

10.6 Terrain models and contours

Back in the **Terrain** panel (`Process ▸ Terrain`), after classifying the ground you can build:

- an **Elevation Model (DTM)** — a bare-earth surface at a resolution you choose; and
- **Contours** at your chosen interval, which **export to DXF**.



10.7 GIS export (Shapefile & GeoJSON)

Vector linework and poles in the **DXF** drawing panel can be exported as a **Shapefile** (`.shp/.shx/.dbf/.prj`, delivered as a zip) for GIS software, in addition to DXF; the Shapefile carries its coordinate system when the project is georeferenced.

11. Quality Check & Reporting

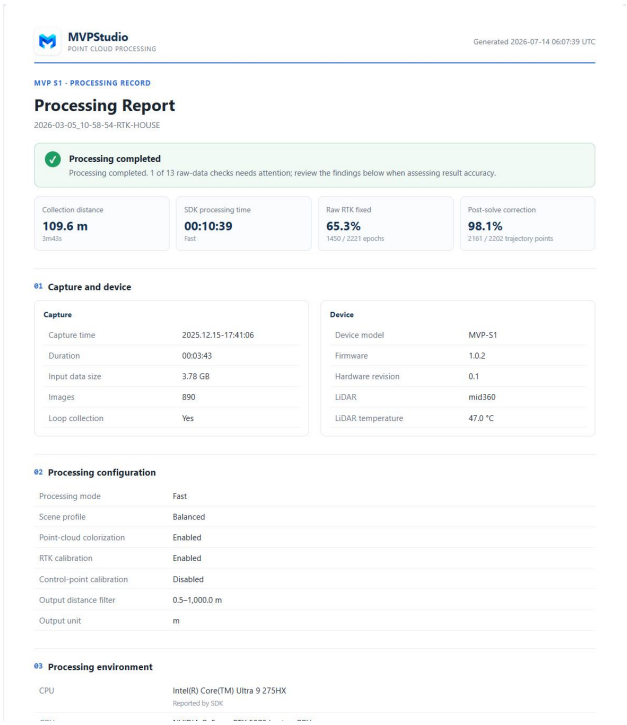
These tools help you trust your data and prove its quality to clients — a health check on the raw scan, an accuracy check against known points, alignment of overlapping scans, and one-click client reports.

11.1 Data Health Check (on your scan)

Every time you add a scan in the solver (Chapter 5), MVPStudio runs an automatic **Data Health Check** and explains, in plain language, whether the capture is good. It looks at:

- **Satellites and signal** — how many satellites and how good the geometry was.
- **RTK quality over time** — a timeline showing exactly when your positioning was strong or weak during the walk.
- **Motion** — whether you moved smoothly, or too fast/jerky in places.

Findings are grouped as **critical / attention / notes / healthy**, each with *what happened*, *what it means for your data*, and a suggested action. You can export a **one-click report** (a self-contained HTML file) into the project folder to keep with the job or send to a colleague.



> **Tip:** Run this before you leave the site. If it flags weak coverage in an area, you can re-scan while you're still there.

11.2 Prove your accuracy (Check Points)

Don't just claim accuracy — certify it. If you have **known survey control points**, Check Points measures how closely your cloud matches them and turns the result into a report your client can file. The flow is three steps: **Import → Verify → Report.**

Where: `Home ▸ DATA ▸ Check Pts`.

1. Import your control points

Load a **CSV or TXT** file of known points. MVPStudio auto-detects the delimiter and columns; check the preview and confirm the mapping:

Column	Required	Notes
Point name	optional	Auto-named P1, P2, … if absent.
X (Easting)	**required**	
Y (Northing)	**required**	Survey files are often N,E — check the preview so E/N aren't swapped.
Z (Elevation)	**required**	
Code	optional	A free note / attribute.

The points appear as labelled markers in the scene. If they land far from the cloud, MVPStudio warns you (usually a swapped E/N or the wrong coordinate system).

2. Verify — mark each point on the cloud

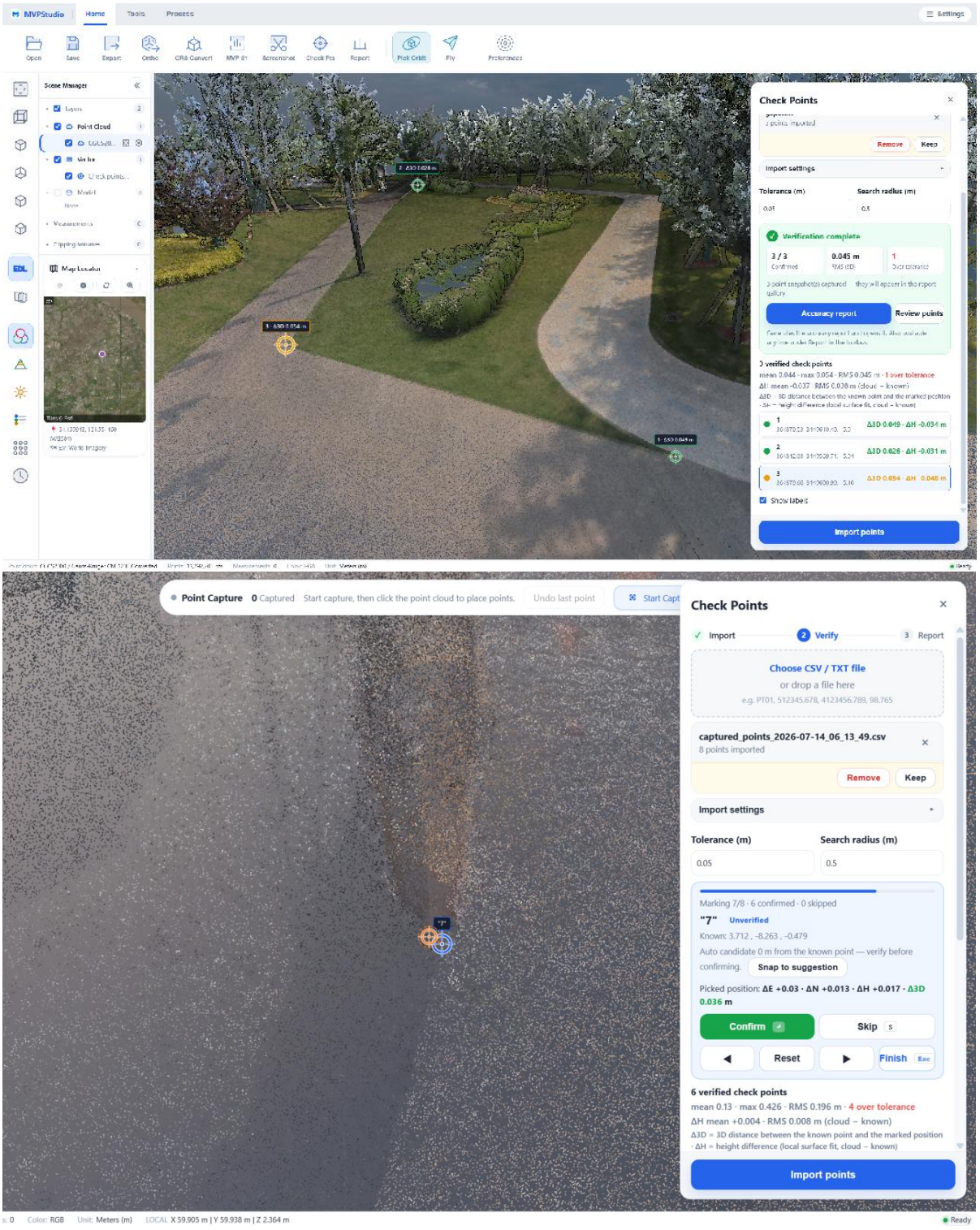
Click **Start marking**. For each point, MVPStudio flies the camera to it and pre-places a best-guess crosshair. **Mark the true position** by clicking the cloud (or drag the orange handle for a fine nudge). As you aim, a live readout shows **ΔE / ΔN / ΔH / Δ3D**, colored green / amber / red against your tolerance, so you see pass or fail before committing. Press **Enter** to confirm (a snapshot is saved for the report and it jumps to the next point), or **S** to skip a point that wasn't scanned.

Two settings, both with sensible defaults:

Setting	Default	What it does
Tolerance	0.05 m (5 cm)	Sets the pass/fail color and the "over tolerance" count. It doesn't change the measured deviation.
Search radius	0.5 m	How far to look for the nearest cloud point; increase it for sparse clouds.

3. Report

When you're done, MVPStudio shows the headline numbers — **confirmed points, RMS (3D), and how many are over tolerance** — plus a **ΔH mean** that reveals any systematic height bias. Click **Accuracy report** to generate a client-ready **Accuracy Report** (HTML + PDF) with the per-point table and a snapshot of each marked point. (Only confirmed points count toward the statistics; skipped points are listed honestly and excluded.)



Tips

- **Zoom in before you click** — the result is only as good as your pick; use the orange handle for the final nudge and confirm only when Δ3D is green.
- **Skip honestly** — if a control point wasn't scanned, press **S** rather than forcing a bad mark; it's excluded from the RMS.

- **Read the ΔH mean, not just the RMS** — a non-zero ΔH mean means a systematic vertical offset (a datum/geoid issue) that the RMS alone can hide.

Where it shines: survey acceptance and QA against control, and handing a client documented proof — RMS, per-point deviations, and photo evidence — that your deliverable meets tolerance.

11.3 Align two scans (Registration)

`Process ▸ Register` aligns two overlapping scans of the same area into one. You can either pick a few matching points in both clouds, or let MVPStudio align them automatically when they're already close. Choose **Register** to align, or **Merge** to combine them into a single cloud.

11.4 Report Center

`Home ▸ DATA ▸ Report` generates client-ready reports from your current data:

- **Accuracy Report** — the check-point verification and statistics.
- **Transformation Report** — a traceable record of the coordinate conversion applied (which system, which grids).
- **Volume & Billing Report** — cut/fill volumes per area, with optional pricing.

Reports export as **HTML** and **PDF**, and can include a snapshot of the scene.

MVPStudio
SURVEY REPORT

DOCUMENT ID
ACC-20260714-141912

Survey Accuracy Report

PROJECT	GENERATED	SOFTWARE
2026-03-05_10-58-54-RTK-HOUSE	07/14/2026, 02:19 PM	MVPStudio V1.0.7 RC1

01 PROJECT OVERVIEW

Dataset	2026-03-05_10-58-54-RTK-HOUSE
Point clouds	2026-03-05_10-58-54-RTK-HOUSE (20,105,856 pts)
Total points	20,105,856
Display unit	m
Extent (E × N × H)	126.5 m × 126.5 m × 126.5 m
Avg. density (bounding-box estimate)	1,257 pts/m²

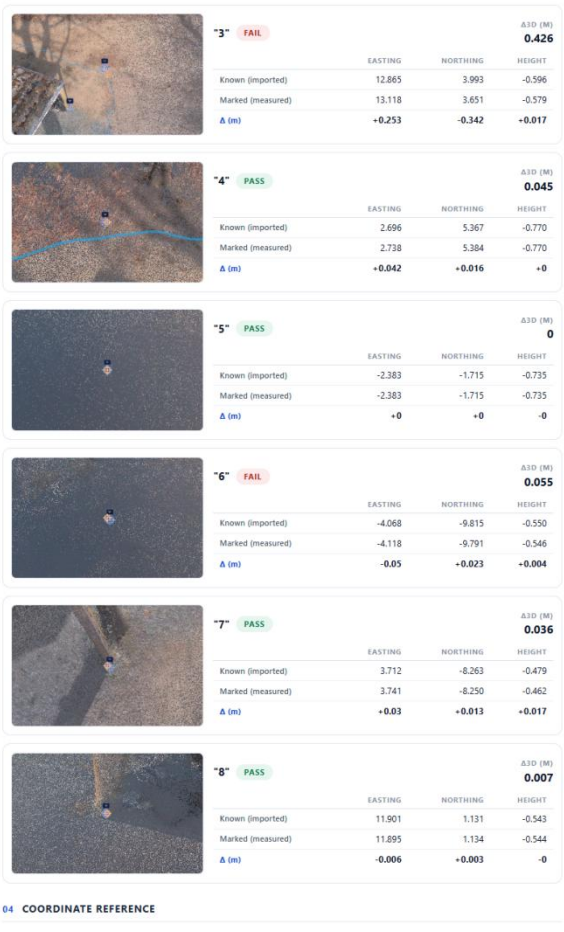
02 CHECK POINT VERIFICATION

Check point file	captured_points_2026-07-14_06_13_49.csv
Points checked	8
Verified points	8 / 8
Search radius	0.5 m
Tolerance (3D)	0.05 m
Mean deviation	0.103 m
Max deviation	0.426 m
RMS deviation	0.17 m
ΔH mean (cloud − known)	+0.005 m
ΔH RMS	0.009 m

Acceptance criteria applied

ACCEPTANCE CRITERIA APPLIED	
RMS deviation	pass ≤ 0.05 m, review ≤ 0.1 m
Max deviation	pass ≤ 0.1 m, review ≤ 0.2 m
Matched ratio	at least 80% of imported points matched

POINT	EASTING	NORTHING	HEIGHT	ΔE (M)	ΔN (M)	ΔH (M)	Δ3D (M)	METHOD	STATUS
"1"	10.563	-14.973	-0.399	+0.056	-0.007	-0.006	0.057	Marked	FAIL
"2"	16.584	-1.197	-0.526	-0.01	-0.199	+0.008	0.2	Marked	FAIL
"3"	12.865	3.993	-0.596	+0.253	-0.342	+0.017	0.426	Marked	FAIL
"4"	2.696	5.367	-0.770	+0.042	+0.016	+0	0.045	Marked	PASS
"5"	-2.383	-1.715	-0.735	+0	+0	-0	0	Marked	PASS
"6"	-4.068	-9.815	-0.550	-0.05	+0.023	+0.004	0.055	Marked	FAIL



"3" FAIL — Δ3D (M) 0.426

	EASTING	NORTHING	HEIGHT
Known (imported)	12.865	3.993	-0.596
Marked (measured)	13.118	3.651	-0.579
Δ (m)	+0.253	-0.342	+0.017

"4" PASS — Δ3D (M) 0.045

	EASTING	NORTHING	HEIGHT
Known (imported)	2.696	5.367	-0.770
Marked (measured)	2.738	5.384	-0.770
Δ (m)	+0.042	+0.016	+0

"5" PASS — Δ3D (M) 0

	EASTING	NORTHING	HEIGHT
Known (imported)	-2.383	-1.715	-0.735
Marked (measured)	-2.383	-1.715	-0.735
Δ (m)	+0	+0	-0

"6" FAIL — Δ3D (M) 0.055

	EASTING	NORTHING	HEIGHT
Known (imported)	-4.068	-9.815	-0.550
Marked (measured)	-4.118	-9.791	-0.546
Δ (m)	-0.05	+0.023	+0.004

"7" PASS — Δ3D (M) 0.036

	EASTING	NORTHING	HEIGHT
Known (imported)	3.712	-8.263	-0.479
Marked (measured)	3.741	-8.250	-0.462
Δ (m)	+0.03	+0.013	+0.017

"8" PASS — Δ3D (M) 0.007

	EASTING	NORTHING	HEIGHT
Known (imported)	11.901	1.131	-0.543
Marked (measured)	11.895	1.134	-0.544
Δ (m)	-0.006	+0.003	-0

04 COORDINATE REFERENCE

12. Exporting Your Results

When your data is ready, export it to the formats your project needs — point clouds, CAD drawings, GIS files, images, and reports.

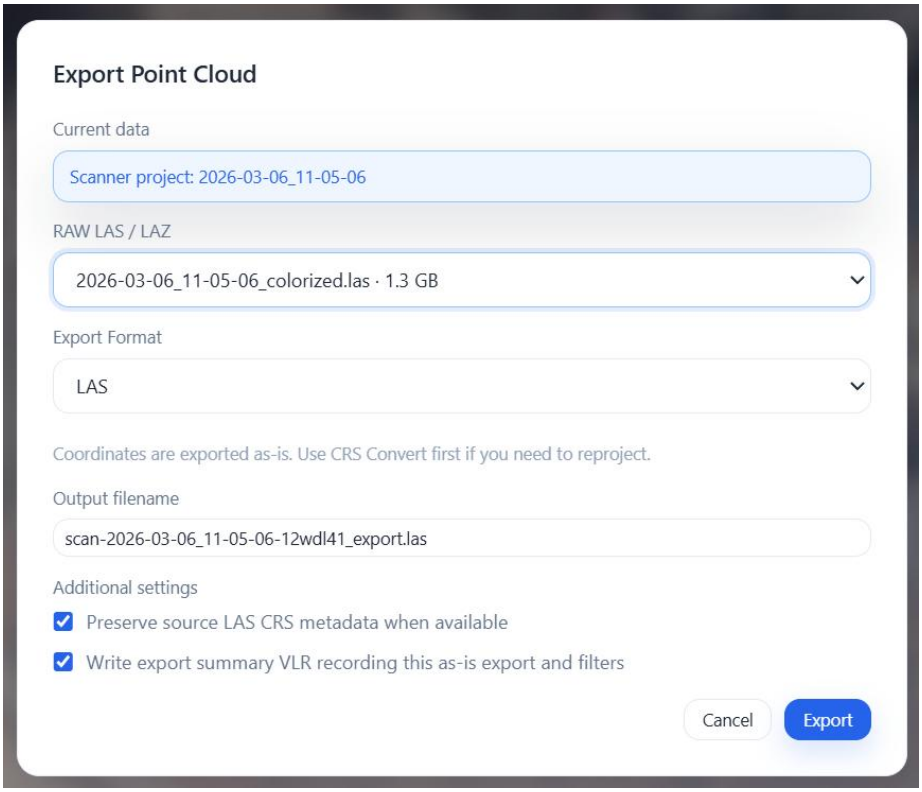
> ⚠ **Warning:** Export writes coordinates **as they are stored**. For a real-world coordinate system, run **Coordinate Convert** (Chapter 6) first, then export the converted result. (See §3.5.)

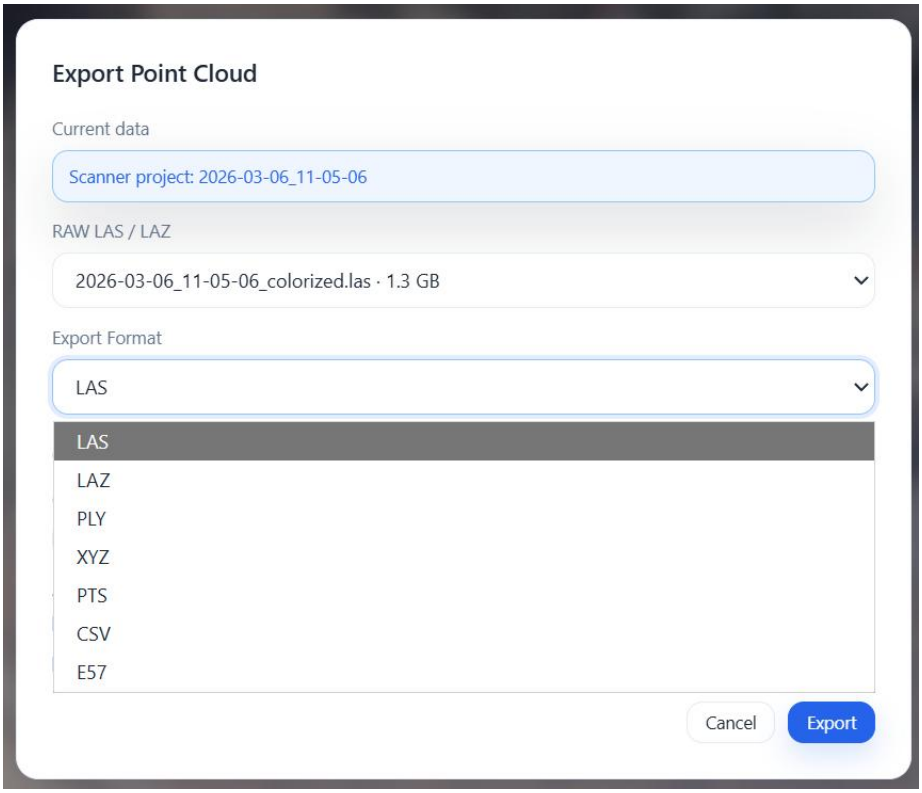
12.1 Export a point cloud

Click `Home ▸ DATA ▸ Export`. Any edits you've made — clipping, ghost removal, deleted regions — are applied to the export; your source files are never modified.

1. Choose an **Export Format** (see the table).
2. Pick the **unit** and, for LAS/LAZ, whether to keep the coordinate-system information.
3. Name the file and click **Start Export**.

Format	Best for
LAS	The standard survey/GIS point-cloud format; carries color, intensity, classification.
LAZ	Same as LAS, compressed (smaller files).
PLY	Mesh and graphics tools (Binary or ASCII).
XYZ / PTS / CSV	Simple point lists for scripting or spreadsheets.
E57	Multi-scan survey interchange.





12.2 Ortho image

A scaled, top-down (or side-on) picture of your cloud — ideal as a backdrop to trace CAD over, a floor-plan base, or a façade drawing.

Where: `Home ▸ DATA ▸ Ortho` (the **Ortho Image** window).

Two modes

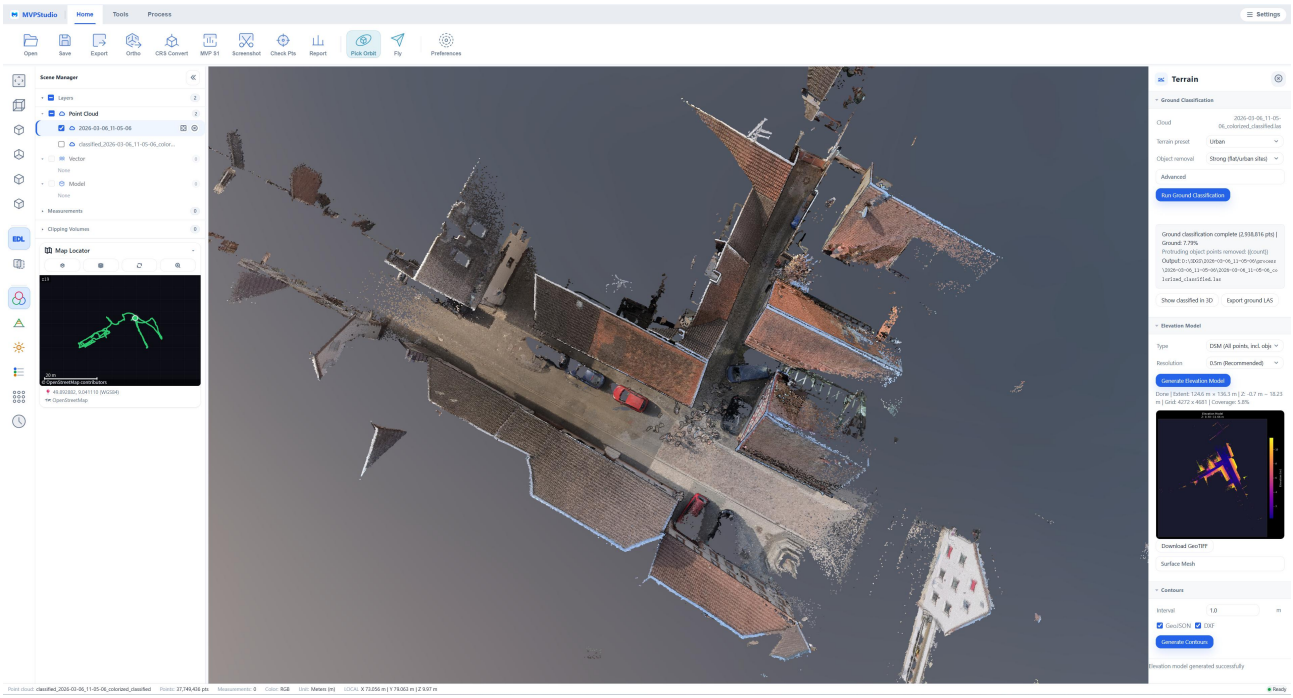
- **Full ortho** — projects the whole cloud onto a plane. Choose the **Cut plane**: **Top** (plan view), **Front**, **Side**, or **Current view**.
- **Section slice** (default) — a thin slab around a cut plane, for a clean plan or elevation. Set the **Cut height** (drag the slider or **Pick height on cloud**) and the **Section thickness** (default 0.5 m). Use **Preview slice** to check the slab before exporting.

Settings

Setting	Default	What it does
Mode	Section slice	Full projection vs a thin slab.
Cut plane	Top	The viewing direction (Top / Front / Side / Current view).
Cut height / thickness	centre / 0.5 m	Where the slice sits and how thick it is (Section mode).
Resolution	Auto safe	Metres per pixel. Leave it on **Auto safe** — settings finer than the safe limit aren't offered.

Click **Export** to produce a **PNG** with a transparent background, so it drops straight onto a CAD/GIS drawing. When the cloud is in a real coordinate system, a **world file** and **.prj** are written alongside it, so the image lands in the right place in GIS.

> ⚠ **Warning:** The ortho uses the cloud's **stored coordinates**. For a georeferenced (real-world) ortho, run **CRS Convert** (Chapter 6) first, then export.



Common uses

- **Plan basemap to trace over** — Full ortho, Top.
- **Floor-plan backdrop** — Section slice, Top, a thin thickness at floor height (use **Pick height on cloud** to set it precisely).
- **Façade / elevation** — Section slice, Front or Side, with **Preview slice** to confirm the slab captures the wall.

12.3 CAD and GIS

- **DXF (R12)** with real coordinates — from the DXF drawing panel, section trace, line trace, and contours (Chapter 10). Opens cleanly in CAD and 3D-Win.
- **Shapefile** — for GIS software, from the DXF panel's **Export Shapefile** (Chapter 10).

12.4 Reports

Client-ready **HTML** and **PDF** reports — accuracy, coordinate transformation, and volume/billing — come from the **Report Center** (Chapter 11); the scan health report is a one-click HTML export from the **Data Health Check** (Chapter 11).

12.5 Format summary

Category	Formats

Point cloud	LAS, LAZ, PLY, XYZ, PTS, CSV, E57
CAD	DXF (R12 / AC1009, real coordinates)
GIS	Shapefile (.shp/.shx/.dbf/.prj, zipped)
Image	PNG (orthophoto / section, screenshots)
Reports	HTML, PDF

13. Settings & Preferences

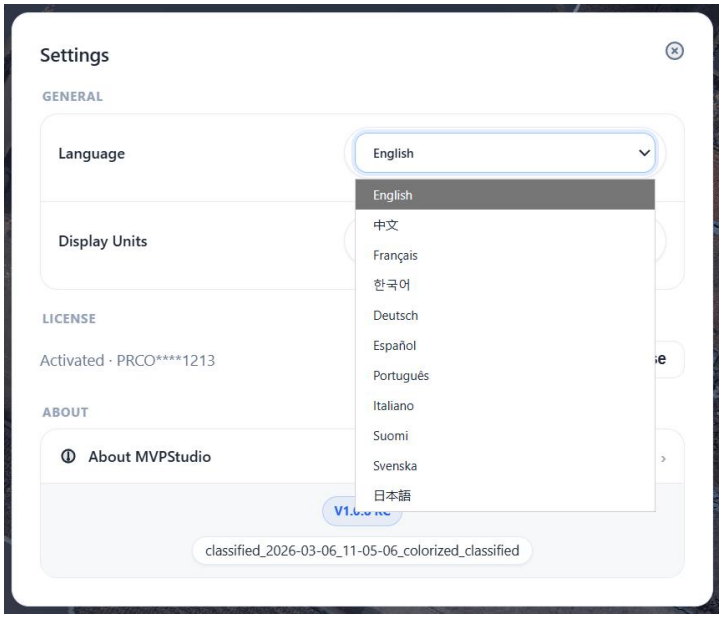
MVPStudio keeps two kinds of settings apart: **Settings** (language and units — how the software talks to you) and **Preferences** (how the 3D view looks).

13.1 Settings — language and units

Open **Settings** (the **Settings** button at the end of the ribbon tabs), then the **General** section:

- **Language** — 11 languages: English, 中文, Français, 한국어, Deutsch, Español, Português, Italiano, Suomi, Svenska, 日本語.
- **Display Units** — the unit used for measurements, labels, and coordinate readouts: Meters, U.S. survey foot, International foot, Kilometers, Yards, Inches, Centimeters, Millimeters. (Angles and latitude/longitude always stay in degrees.)

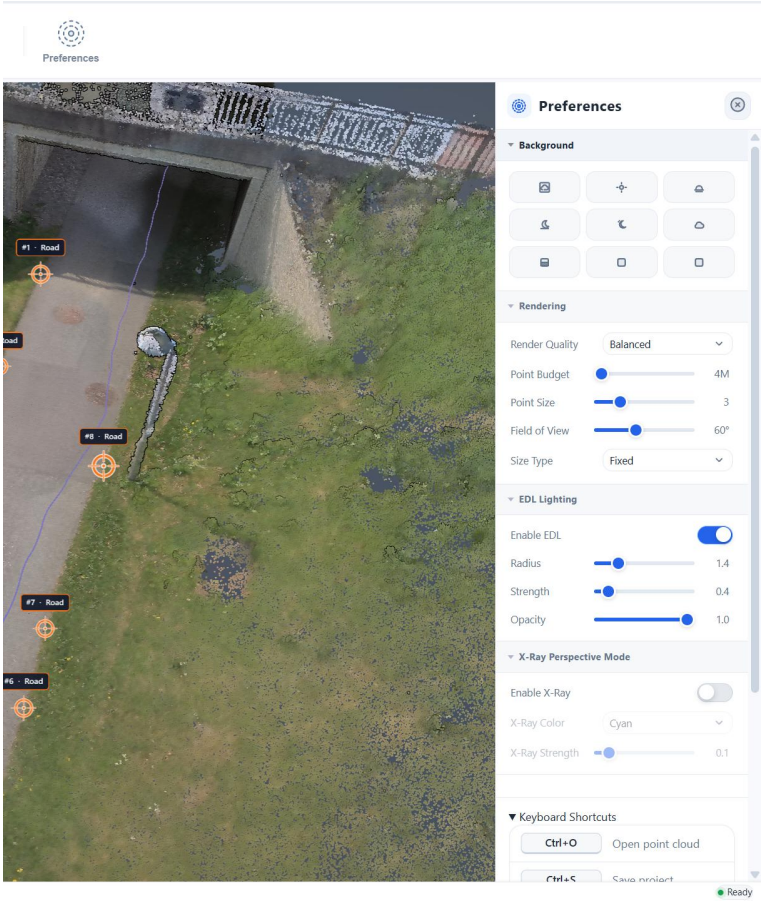
The **About** section shows the version and credits.



> **Tip:** The current unit is always shown in the status bar, so you can see at a glance which unit your measurements are in.

13.2 Preferences — the 3D view

Display and appearance settings — background, render quality, point size, EDL, X-Ray, and color ramps — live in the **Preferences** panel (`Home ▸ VIEW ▸ Preferences`). These are covered in Chapter 7.


Preferences
#1 · Road
#8 · Road
#7 · Road
#6 · Road
Preferences
Background
Rendering
Render Quality
Balanced
Point Budget
4M
Point Size
3
Field of View
60°
Size Type
Fixed
EDL Lighting
Enable EDL
Radius
1.4
Strength
0.4
Opacity
1.0
X-Ray Perspective Mode
Enable X-Ray
X-Ray Color
Cyan
X-Ray Strength
0.1
Keyboard Shortcuts
Ctrl+O
Open point cloud
Ready

14. Troubleshooting & FAQ

14.1 New to MVPStudio? Start here

"I'm used to choosing a coordinate system when I turn on RTK for processing. Where is that here?"

It's a separate step, on purpose. In MVPStudio, processing (solving) and choosing a coordinate system are **two steps**: solve first to build a clean, level cloud (with RTK on to anchor it accurately), then run **Coordinate Convert** whenever you're ready to put it on a specific grid. This means one solve can be delivered in any coordinate system, mistakes are cheap to fix, and your solved data is never overwritten. See Chapter 3 — it explains the whole idea in a few minutes.

"After solving, my cloud is in small local coordinates, not my national grid."

That's expected — solving produces a *local* cloud. Run **Coordinate Convert** (Chapter 6) to put it on your grid, then export.

"Do I have to convert every scan?"

No. If you only measure, clean, or model in local coordinates, you can skip conversion entirely (§3.5).

14.2 Solving problems

Symptom	What to do
The RTK option is greyed out	The scan has no usable RTK fix (weak or no satellite corrections during capture). You can still solve without RTK — the cloud just won't be anchored to real-world coordinates.
Solve fails with an error code	Read the plain-language reason. Common causes: graphics driver/GPU issue, not enough disk space, or invalid input. Fix it and click **Retry**.
It won't accept my folder	Make sure you selected the **original raw scan folder** from the scanner card — not an already-processed or converted result.
Solving is very slow	Scan processing is the most demanding task and runs best on a capable PC (especially the graphics card). Update your NVIDIA graphics driver, use **Fast** mode for field checks, keep the PC plugged in, and see the recommended configuration below.

Recommended computer for smooth solving

Component	Recommended
Operating system	Windows 10 / 11 (64-bit)
CPU	Intel® Core™ i7-10700H @ 2.90 GHz (or AMD equivalent), or better
GPU	NVIDIA GeForce RTX 2060 (6 GB) or better
RAM	32 GB
Storage	SSD with 64 GB+ free

(Full requirements are in §2.2.)

14.3 Coordinate & height problems

Symptom	What to do
Heights look too high / wrong	They're likely ellipsoidal heights. Attach a **geoid model** in Coordinate Convert (§6.4) for true elevations.
Result doesn't match my control points	You probably used **Auto** (generic UTM). Choose the exact national/local system under **Built-in** or **EPSG** (§6.3).
Conversion is disabled	The project has no real-world origin (not solved with RTK/a global source), or it's already a converted result. Convert from the **original** solved project.
My export isn't in the right coordinates	Convert first (Chapter 6), then export the *converted* result (§3.5).
Part of my cloud won't convert (geoid coverage)	The geoid you attached doesn't cover the whole area. Pick a geoid that covers your survey.

14.4 General

Symptom	What to do
The app won't start / shows a blank screen	Restart it. If it persists, gather the logs from `…\MVPStudio\data\desktop-logs` and contact support.
A feature says a license is required	Viewing works without a license; processing, conversion, and export need activation. Activate with your license key (§2.4).
The app looks like a "testing version"	This is a release-candidate build. It's fully usable — just verify critical results against known values before final delivery.
I need to move my license to another PC	Return the license on the old PC first (§2.4), then activate on the new one.

> **Tip:** When contacting support, include your MVPStudio version (**Settings ▸ About**), a description of what you did, and the logs from your data folder's `desktop-logs`.

15. Support & Contact

Getting help

Your first point of contact is the dealer or distributor you bought from — they handle licenses, activation, and regional support. For technical questions you can also reach Tersus GNSS directly:

- **Technical support:** support@tersus-gnss.com
- **Sales enquiries:** sales@tersus-gnss.com
- **Web:** www.tersus-gnss.com

Before you contact support

Having a few details ready makes help faster:

1. Your **MVPStudio version** (**Settings ▸ About**).
2. A short description of **what you did** and **what happened**.
3. The **logs** from `…\MVPStudio\data\desktop-logs` (and a screenshot of any error message).
4. If it's about a specific scan, the **Data Health Check** report for that scan (Chapter 11).

A note on versions

MVPStudio is updated regularly. Screens and wording in this manual match **V1.0.9 RC**; your build may differ slightly. To update, run the latest **`MVPStudio-Setup`** installer from your dealer.

MVPStudio — 3D point cloud processing software for the MVP S1 handheld scanner.

Appendices

Appendix A — Keyboard Shortcuts

Shortcut	Action
`Ctrl + O`	Open a point cloud
`Ctrl + S`	Save the project
`Ctrl + Z`	Undo
`Ctrl + Y`	Redo (in the DXF drawing panel)
`F`	Fit the view to your data
`Esc`	Cancel the current tool / close a dialog
Right-click	Finish drawing a line or region
Double-click	Complete an area measurement
Mouse wheel	Zoom toward the cursor

Appendix B — Supported File Formats

Import

Type	Formats
Scanner data	MVP S1 raw scan folder (for solving); solved result folders
Point cloud	LAS, LAZ (single file or folder)
Check points	CSV, TXT
Vector overlay	DXF

Export

Type	Formats
Point cloud	LAS, LAZ, PLY, XYZ, PTS, CSV, E57
CAD	DXF (R12 / AC1009, real-world coordinates)
GIS	Shapefile (.shp/.shx/.dbf/.prj, zipped)
Image	PNG (orthophoto, section, screenshot)
Reports	HTML, PDF

Appendix C — Glossary

Point cloud — a set of millions of 3D points that together form a scan of the real world.

Solve / solving — the processing that fuses your raw scan into one clean, consistent point cloud (Step 1).

RTK — a satellite-positioning technique that, using live corrections in the field, pins your scan to accurate real-world positions.

Georeferencing — knowing where your data sits on the Earth. A solved cloud can be georeferenced (via RTK) even while its coordinates are still local.

Local coordinates — small, convenient coordinates measured from a point near your scan. What a solved cloud uses before conversion.

Coordinate system / CRS — the real-world grid your data is expressed in (for example a national grid or a UTM zone).

Coordinate Convert — the step that expresses your cloud in a chosen coordinate system (Step 2).

EPSG code — a standard number that identifies a coordinate system (for example `EPSG:4326`).

UTM — a common worldwide grid split into numbered zones.

Datum — the reference model of the Earth a coordinate system is built on.

Ellipsoidal height — height above a mathematical model of the Earth. What you get before applying a geoid — *not* above-sea-level height.

Orthometric height — true, above-sea-level elevation, obtained by applying a geoid model.

Geoid — a model of mean sea level used to turn ellipsoidal heights into true elevations.

DTM — Digital Terrain Model: a bare-earth surface built from ground points.

Contours — lines of equal elevation on a terrain surface.

LAS / LAZ — the standard point-cloud file formats (LAZ is compressed LAS).

DXF — a CAD drawing file. MVPStudio writes R12 DXF with real coordinates for wide compatibility.

Shapefile — a common GIS vector format.