BRIMAP

Plugin for Agisoft Metashape Pro

User Guide

Version 1.1.0 | November 2026

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1. Introduction

BRIMAP Metashape is a professional plugin for Agisoft Metashape Professional, designed for surveyors and photogrammetry companies producing drone surveys. The plugin automates and extends the standard Metashape workflow with advanced features that improve the accuracy and efficiency of survey work.

BRIMAP is built for processing large projects made up of many flights: each flight has its own camera calibration and photo position accuracies, and the processing pipeline handles many chunks in a single run — with no manual work between steps.

1.1. Main features of the plugin

- Processing Pipeline – the whole survey (import, alignment, GCP detection, optimization, report, products, export) in one run, for one or many chunks; ready-made templates and e-mail notifications
- Photo and GCP Import – photos from subfolders as separate calibration groups, splitting separate areas into chunks, coordinate system unification and height conversion
- Automatic GCP detection – detection of targets of any type with AI models, including existing features (parking lines, manholes) and targets only a few pixels in size, with a gross error check
- Iterative Alignment Optimization – observation accuracies estimated from the block data, separately for each flight, GCP count selection and a rolling shutter check
- Processing History – a record of operations, statistics and times in the chunk, accuracy class against the one expected from GSD, chunk comparison
- Height Conversion – conversion between vertical datums with a log of performed conversions
- Accuracy Report – a PDF report assessing the alignment against an accuracy class (including the one expected from GSD)
- Project Boundary Creation – an automatic AOI based on camera positions
- GUGiK Data Download – DTM, DSM, orthophotos (also with year selection), LIDAR point clouds and EGiB data from the Polish Geoportal
- Projecting Vectors onto Photos – overlaying vector layers (e.g. EGiB) on photos

1.2. Requirements

- Windows 10 or later (64-bit)
- Agisoft Metashape Professional (version 2.3.0 or later)
- A BRIMAP license — only for the premium features: GCP detection (with the gross error check), iterative alignment optimization, e-mail notifications and projecting vectors onto photos. All other features, including the processing pipeline, are free
- An Internet connection (required for: license activation and verification, downloading the AI model keys during activation, downloading GUGiK data and geoid models from the catalog, e-mail notifications from the pipeline). A perpetual license also works offline after activation.

1.3. Starting the plugin

After a successful installation, a BRIMAP item appears in the Metashape main menu. All plugin functions are available from this menu.

Interface language. The language (Polish or English) is chosen on the first screen of the installer; later — in the BRIMAP menu → Language (Język in the Polish interface). The change takes effect after restarting

Metashape. E-mails from BRIMAP (license key, reminders, pipeline notifications) arrive in the same language.

2. BRIMAP menu overview

The table below lists all BRIMAP menu items with a short description and requirements.

Free and premium features. The following work without a license and without a time limit: the processing pipeline (except premium steps), including optimized photo matching, products and export, photo and GCP import, the accuracy report, processing history, height conversion, project boundary and GUGiK data. The premium features require a license: GCP detection with the gross error check, iterative alignment optimization, e-mail notifications from the pipeline and projecting vectors onto photos.

Menu item	Description	License
`Photo and GCP Import`	Import of photos (subfolders as separate calibration groups), camera and GCP coordinates; CRS unification, height conversion, splitting separate areas into chunks	Free
`Processing Pipeline`	Editor, templates and running a pipeline of steps for one or many chunks; e-mail notifications	Free (premium steps — with a license)
`Processing History`	Operation history, chunk state and accuracy class, chunk comparison, CSV export	Free
`Height Conversion`	Conversion of camera and/or GCP heights between ellipsoidal and normal heights	Free
`GCP Detection`	AI-based detection of GCPs/CPs in two modes: accurate (gross error check of GCPs and photo positions, GCP/CP split) and fast (single pass, no GCP/CP split) — section 5	Required
`Iterative Alignment Optimization`	Observation accuracies from the block data (separately for flights), GCP count selection, rolling shutter check	Required
`Accuracy Report`	Generation of a PDF report assessing the photogrammetric alignment	Free
`Create Project Boundary`	Automatic creation of an AOI (outer boundary) based on camera positions	Free
`Download GUGiK Data`	DTM, DSM, orthophotos (current grid or map sheets with year selection), LIDAR point clouds, EGiB data (parcels, buildings) — Polish interface only	Free
`Project Vectors onto Photos`	Overlaying the project's vector layers on photos and saving annotated photos	Required
`License / Activate`	BRIMAP license activation with a license key	—
`License / Deactivate`	BRIMAP license deactivation on the current computer	—
`Check for Updates`	Checks whether a BRIMAP update is available	—
`About`	Information about the BRIMAP plugin. Access to the user guide and the EULA	—
`Language`	Interface language selection (Polish / English); takes effect after restarting Metashape	—
`Uninstall`	Removes the BRIMAP plugin from Metashape	—

✔️ Since version 1.1.0, “Automatic Alignment” has been replaced by the “Processing Pipeline” and “Photo and GCP Import” — see section 3.9.

###TODO Insert a current screenshot of the BRIMAP menu from version 1.1.0 (the previous screenshot showed the removed “Automatic Alignment” item).

3. Processing Pipeline

Available from the menu: BRIMAP → Processing Pipeline. A pipeline is an ordered list of steps — BRIMAP functions and built-in Metashape functions — executed automatically, one after another, for each selected chunk. The pipeline lets you complete the whole survey within a single run: from photo import, through block alignment, GCP detection and iterative optimization, to the accuracy report, photogrammetric products and their export. A pipeline, once prepared, can be saved to a file and reused in other projects.

✔️ The Processing Pipeline replaces the “Automatic Alignment” function of version 1.0.x. All its stages are available as pipeline steps, and the predefined processing profiles have been replaced by pipeline templates.

3.1. Requirements

- A BRIMAP license is not required. Without a license, the premium steps (“GCP Detection”, “Iterative Alignment Optimization”) are marked “Premium” in the editor and skipped during the run, and e-mail notifications are unavailable
- An open Metashape project — saving the project to disk beforehand is recommended (required by the “Save project” step and by export to the project folder)
- Photos in the chunk, or the “Photo and GCP Import” step as the first pipeline step
- For the detection, optimization and report steps — GCPs with reference coordinates

3.2. Pipeline editor window

The window consists of a toolbar and three panels: the step library (left), the list of pipeline steps (center) and the parameters of the selected step (right).

###TODO Insert a screenshot of the “BRIMAP — Processing Pipeline” window.

Parameter	Type / values	Default value	Description
`Pipeline`	text	—	Pipeline name saved in the file.
`Scope`	list	Active chunk	Active chunk / Selected chunks… (chunk selection window) / All chunks. When the first step is import, the pipeline works on the chunks created by the import.
☰ `Pipeline templates…`	window	—	Template gallery: built-in (section 3.7) and your own from the Documents\BRIMAP\Pipeline templates folder. Preview of the description and steps; “Use template” replaces the current pipeline, “Save current pipeline as template…” adds your own.
`Open… / Save…`	file .brimap-pipeline.json	—	Reading and saving the pipeline to a JSON file. Pipelines from earlier format versions are converted automatically when opened.
`Step library`	list	—	Steps grouped as: BRIMAP, Metashape, Export, Control. The “Add to pipeline ›” button or a double-click adds a step.

Parameter	Type / values	Default value	Description
`Pipeline steps`	list	—	Order of execution. Steps can be moved, disabled (checkbox) and removed. The ⑂ symbol marks a run condition, ■N — the number of stop criteria.
`Save project after each step`	checkbox	off	Saves the Metashape project after each completed step — protects the results of long runs.
`E-mail notifications`	button	off	Recipients and events for which a message is sent (section 3.8). The settings are saved in the pipeline.
▶️ `Run pipeline`	button	—	Bottom-right corner of the window. Runs the pipeline for the selected chunk scope (section 3.8).

Below the step list, the pipeline validation result is shown ("✓ The pipeline looks correct." or a list of notes). Validation checks, among others, the order of steps (e.g. detection requires prior alignment, DEM export requires a DEM) and whether new chunks will have a coordinate system set. The last used pipeline, scope and chunk selection are remembered between sessions.

3.3. Photo and GCP Import

Import is available as a separate menu function (BRIMAP → Photo and GCP Import) and as the first pipeline step — in the latter case, the "Configure import..." button opens the same window in configuration mode, and the settings are saved in the pipeline and executed during the run.

###TODO Insert a screenshot of the "BRIMAP — Photo and GCP Import" window.

Parameter	Type / values	Default value	Description
`Chunk selection`	radio	Create new chunk	Create new chunk (with a name) / Use active chunk / One chunk per subfolder (each subfolder with photos → a separate chunk named after the folder).
`Chunk CRS`	"Change..." button	from the active chunk	Coordinate system of the chunk. Required for new chunks. Changing it in a chunk with data converts the reference coordinates of photos and markers (after confirmation).
`Photo import – Folder`	path	—	Folder with photos, including subfolders. When importing into one chunk, photos from each subfolder (flight) go to a separate photo group and a separate calibration group — each flight has its own camera calibration. Photo coordinates and accuracies are read from EXIF.
`Split into separate chunks when photos cover separate areas`	checkbox	on	Clusters of photos separated by a clear gap go to separate chunks; small clusters are attached to the nearest area. Applies to a chunk that had no photos before the import.
`Camera requires rolling shutter compensation`	checkbox	off	Enables the rolling shutter model (Full) for the cameras of imported photos — for cameras with an electronic shutter (e.g. DJI Mini, Mavic 3 non-Enterprise). Alignment optimization also checks the opposite setting (section 6).

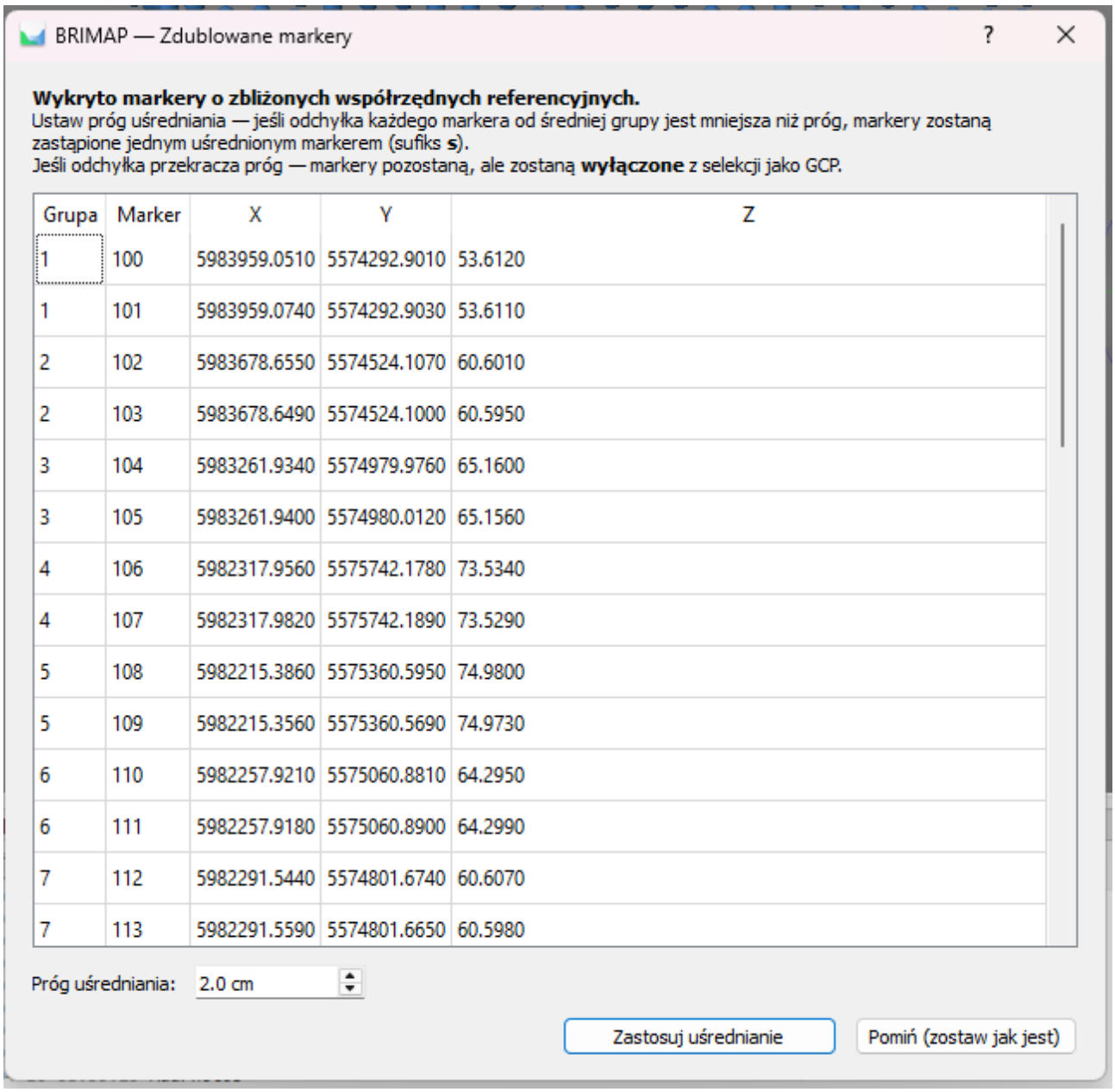
Parameter	Type / values	Default value	Description
`GCP import`	CSV / TXT file	off	A text file with GCP coordinates, with column assignment and the file's coordinate system. The separator is detected automatically; a decimal comma is also supported.
`Import only GCPs within the project area`	checkbox + buffer [m]	off, 100 m	Skips GCPs outside the hull of photo positions enlarged by the buffer. Requires photos with coordinates.
`Height conversion`	group	off	Convert for photos and/or GCPs: ellipsoidal → normal (H = h − N), normal → ellipsoidal (h = H + N) or a constant N; geoid model PL-EVRF2007-NH, PL-KRON86-NH, a model from the BRIMAP catalog (downloaded on first use, section 4.2) or a custom .tif file.

When adding photos or GCPs to a chunk that already contains data, BRIMAP compares the vertical datums of the existing and new data (conversion log — section 4.3) and proposes converting the new data to the datum of the existing data. The decision can be applied to subsequent chunks in the same state.

After importing photos, BRIMAP checks the sensor data. When the focal length or pixel size is missing from EXIF, the “Missing sensor data” window opens — fill in the values from the camera documentation. They are needed for correct photo alignment and for computing the GSD.

The function automatically detects markers with very similar reference coordinates (duplicate markers). If duplicate markers are found, a dialog opens that lets you:

- Review the table of duplicate marker groups and their coordinates
- Set the averaging threshold (in cm). If all markers in a group are within the threshold, they are averaged into one marker (with the suffix 's'). If the deviation exceeds the threshold, the markers are kept but excluded from GCP selection



3.4. Step library

Each step has its own parameters (form in the right panel), may have stop criteria checked after the step (section 3.6) and an “On error” setting. Default parameter values correspond to the settings recommended for typical UAV flights.

Step	Group	Description
Photo and GCP Import	BRIMAP	Only as the first step. Creates chunks (e.g. a separate chunk for each flight subfolder), imports GCPs and converts heights — like the menu function (section 3.3).
GCP Detection	BRIMAP	Premium feature. GCP detection with AI models (section 5). The “Detection mode” parameter: accurate (default) — two passes, check of erroneous GCPs and photo positions, GCP/CP split; fast — a single pass, no GCP/CP split and no optimization (section 5.8). Requires aligned photos. When run again (e.g. after merging chunks), it fills in missing projections — with a run condition (section 3.5).

Step	Group	Description
Iterative Alignment Optimization	BRIMAP	Premium feature. Observation accuracies from the block data, GCP count selection, rolling shutter check — section 6.
Oblique photos: disable / enable	BRIMAP	Disables or re-enables photos tilted from the vertical by more than the given angle (default 10°). E.g. disable before detection, enable after detection, disable before the point cloud.
Photo quality: disable / enable	BRIMAP	Estimates image quality (Image Quality) and disables / enables photos below the threshold (default 0.5).
Project boundary	BRIMAP	Boundary from the hull of camera positions with a buffer (default 20 m) — used by export with the "Clip to project boundary" option.
Accuracy Report	BRIMAP	PDF report — a separate file for each chunk (section 7).
Optimized photo matching	BRIMAP	Photo matching with parameters selected by BRIMAP (10,000 / 1,000) — several times shorter for typical flights. When ≥ 10 photos are unaligned or ≤ 90% are aligned, it automatically adds them with 40,000 / 4,000; finally it removes tie points with a reprojection error larger than 3 × RMS. The default step in BRIMAP templates.
Photo matching	Metashape	matchPhotos + alignCameras with Metashape default parameters: accuracy, Keypoint limit (40,000), Tiepoint limit (4,000), optional reset of individual camera accuracies.
Align by reference data	Metashape	Align Cameras by Reference — position and orientation of unaligned photos directly from GNSS / IMU, without tie points.
Optimize cameras	Metashape	Optimize Camera Alignment — calibration parameters (f, cx, cy, k1–k4, p1, p2, b1, b2, Fit additional corrections) as in the Metashape dialog.
Tie point filtering	Metashape	Gradual Selection: Image Count 2, Reconstruction Uncertainty 12, Projection Accuracy 8, Reprojection Error 0.75 px (editable values).
Dense point cloud	Metashape	Depth maps and point cloud: quality, depth map filtering (default Aggressive), colors, point confidence, max. neighbor photos.
Dense point cloud filtering by confidence	Metashape	Removes points with confidence in the given range (default 0–1). Point confidence is enabled automatically in the "Dense point cloud" step.
Classify ground points	Metashape	Classify Ground Points: max_angle, max_distance, max_terrain_slope, cell_size, erosion_radius.
Classify points (multiclass)	Metashape	Classify Points — classification of the dense cloud into the selected classes (by default ground, high vegetation, buildings, road surface, cars, man-made objects); source class, required confidence.
Digital Elevation Model (DEM)	Metashape	Build DEM from the point cloud or model; resolution (0 = auto), interpolation. With the "Point cloud" source, point classes can be selected (e.g. ground only — after the "Classify ground points" step).

Step	Group	Description
Color calibration	Metashape	Calibrate Colors — evens out brightness and colors between photos before the orthomosaic (and the 3D model texture). Source: automatic (DEM; tie points if there is no DEM), DEM or tie points; optional white balance calibration. Place it after the DEM step, before the orthomosaic.
Orthomosaic	Metashape	Build Orthomosaic: rectification surface, resolution, seamline refinement.
Merge chunks	Metashape	Merge Chunks. Steps BEFORE it run for each chunk separately, steps AFTER it — only for the new, merged chunk. GCPs with the same name are merged; tie points can be merged or skipped (when photo matching follows the merge). Source chunks are kept.
Export point cloud	Export	LAS / LAZ as PointCloud_<chunk>, with classification, optionally clipped to the project boundary.
Export DEM	Export	GeoTIFF as DEM_<chunk>.tif.
Export orthomosaic	Export	Tiled GeoTIFF with JPEG compression (quality 90) as Ortho_<chunk>.tif.
Metashape report (PDF)	Export	Export Report — Metashape processing report as Report_<chunk>.pdf; title (empty — chunk name), description, font size, page numbers, system information. The BRIMAP accuracy report is created by the "Accuracy Report" step.
Export 3D model	Export	OBJ / PLY / FBX / glTF (GLB) as Mesh_<chunk>, optionally with texture.
Save project	Control	Saves the Metashape project (the project must already be saved to disk).

3.5. Detection step parameters

The "GCP Detection" step has the same parameters as the menu function (section 5.3) plus a run condition:

Parameter	Type / values	Default value	Description
`Condition: Avg. % of GCP projections ≤`	checkbox + %	off, 70%	The step starts when the average share of GCP projections is not greater than the threshold.
`Condition: Undetected GCPs ≥`	checkbox + number	off, 1	GCPs that should be visible on at least 3 aligned photos but have fewer than 3 projections (they do not take part in the alignment). One satisfied condition is enough.

There is no longer a separate "GCP re-detection" step from version 1.0.x — detection itself fills in missing projections after the block is fitted. A further "GCP Detection" step in the pipeline (e.g. after merging

chunks) fills in projections from the current block geometry; set a run condition for it so that it runs only when projections are missing. Pipelines from earlier versions are converted when opened.

3.6. Run conditions and stop criteria

The “GCP Detection” and “Iterative Alignment Optimization” steps have a run condition in their parameters — a step whose condition is not met is skipped (status “skipped — condition”). For detection, one satisfied condition is enough; for optimization, all selected conditions must be met (e.g. CP accuracy class ≥ 5 cm and at least 5 GCPs with ≥ 3 projections).

Stop criteria (the “+ Add criterion” button) are checked AFTER the step. Each criterion is a metric, a condition (≤ / ≥), a value and an action: “Warn only”, “Stop chunk” — further steps are not run for this chunk, other chunks are processed further — or “Stop pipeline” — the run ends for all chunks. Available metrics:

Metric	Unit	Description
`% aligned photos`	%	Share of photos with a computed orientation.
`Unaligned enabled photos`	number	Number of enabled photos without a computed orientation.
`Avg. % of GCP projections`	%	Average share of photos on which the GCP has a projection, among the photos it projects onto.
`Detected / visible GCPs`	%	Share of GCPs with at least one projection.
`GCPs with ≥ 3 projections`	number	Number of GCPs usable in the alignment.
`Undetected GCPs`	number	GCPs with ≥ 3 theoretical occurrences on aligned photos but fewer than 3 projections.
`Accuracy class (CP)`	cm	max(CP_RMSE_3D × 1.96; CP_MAX_3D / 1.53) — as in section 6.1.

The “On error” setting decides what happens when a step ends with an error: “Log and go to the next step”, “Skip the rest of the chunk” or “Stop the whole pipeline”.

3.7. Pipeline templates

The “☰ Pipeline templates…” gallery contains ready-made pipelines for typical scenarios. A template can be adjusted and saved as your own:

- **BRIMAP – alignment with full accuracy analysis** — optimized photo matching, GCP detection in accurate mode, iterative optimization with GCP count selection and a rolling shutter check, alignment by reference data, accuracy report, project save. The editor's default pipeline (with a license).
- **BRIMAP – fast alignment** — optimized photo matching and GCP detection with the gross error check and GCP/CP split, without iterative optimization; report and project save. Shorter processing time — best for RTK flights.

- **BRIMAP – alignment and products** — alignment with full accuracy analysis, followed by a dense point cloud with confidence filtering, DEM, orthomosaic, project boundary and product export.
- **BRIMAP – photo import and alignment** — import into a new chunk as the first step (configure the import before running), then alignment with full accuracy analysis.
- **BRIMAP – flights in separate chunks: joint alignment** — chunks are merged before alignment, so tie points are also created between flights and the whole block is aligned together. Recommended with weak GNSS. Select only chunks of one area.
- **BRIMAP – GCP check and optimization of an aligned block** — detection, optimization, alignment by reference data, report and save, without re-matching photos.
- **Products: point cloud, DEM, orthomosaic and export** — product generation and export only.
- **BRIMAP – photo matching and products (no premium features)** — works without a license: optimized photo matching, dense point cloud with confidence filtering, DEM, orthomosaic, project boundary and export. Georeferencing from photo positions (GNSS / RTK). The editor's default pipeline without a license.

Your own templates are saved with the “Save current pipeline as template...” button in the gallery. They go to the Documents\BRIMAP\Pipeline templates folder and appear in the gallery next to the built-in templates.

Without a license, templates containing premium steps are marked “Premium” in the gallery; they can be used — the premium steps will be skipped with a note in the summary.

3.8. Run and summary

After starting, the “BRIMAP — Pipeline run” window opens with a chunk × step table. The status of each step is updated live: ✓ done, ! done — warning (criterion), ↷ skipped — condition, ■ stopped — criterion, ✗ error, · disabled. The “Stop after current step” button ends the run once the current operation finishes. Afterwards, the “BRIMAP — Pipeline summary” window shows the results for each chunk.

⚠ The pipeline changes the Metashape project (disables photos, changes the GCP/CP split, removes points, merges chunks, overwrites products and export files). Save a copy of the project before running.

Each run is recorded in the processing history of the chunks (section 8) — with step parameters, criteria results and duration.

E-mail notifications. Premium feature. In the notifications window, enter up to 5 recipient addresses and choose the events: a summary when the pipeline finishes, a message on a step error, a message when a criterion stops a chunk. The message can include accuracy results (GCP/CP, RMSE, accuracy class), the last log lines and the PDF accuracy report as an attachment (up to 5 MB). The “Send test message” button checks the settings. Messages are sent by the BRIMAP server — no mail configuration is needed; an Internet connection and an active license are required. Messages are in the plugin's interface language.

3.9. Migrating from “Automatic Alignment”

The stages of the former “Automatic Alignment” window correspond to the following pipeline steps:

Automatic Alignment (1.0.x)	Processing Pipeline (1.1.0)
Step 0 – Project and photos	Photo and GCP Import (first pipeline step)
Step 1 – Height conversion	Photo and GCP Import → Height conversion
Step 2 – Photo alignment	Optimized Photo Matching (adds unaligned photos) or Photo matching
Step 3 – GCP detection	GCP Detection (with filling in projections and the gross error check)
Step 4 – Iterative optimization	Iterative Alignment Optimization
Step 5 – Photo and tie point filtering	Oblique photos: disable / enable; Tie point filtering
Step 6 – Photogrammetric products	Dense point cloud, Confidence filtering, Classify ground points or Classify points (multiclass), DEM, Color calibration, Orthomosaic, Export steps, Metashape report (PDF)
Step 7 – Accuracy report	Accuracy Report
Processing profiles (RTK / nRTK)	Pipeline templates (e.g. “BRIMAP – alignment with full accuracy analysis”, “BRIMAP – fast alignment”) and your own .brimap-pipeline.json files

4. Height Conversion

Available from the menu: BRIMAP → Height Conversion. Converts the heights of cameras (GPS positions) and GCPs between ellipsoidal heights (GPS/WGS84) and normal heights. The conversion uses a geoid model from the list — all geoid models of the PROJ-data collection (OSGeo), grouped by country, including the Polish PL-geoid-2021 and PL-geoid-2011 and the global EGM2008 and EGM96 — or a custom GeoTIFF file.

4.1. Requirements

- An open project with at least one chunk
- The chunk must contain cameras or GCPs with coordinates

4.2. Dialog parameters

Parameter	Type / values	Default value	Description
`Cameras`	checkbox	checked	Converts the heights of camera positions. Applies to the Z value of the cameras' reference coordinates.
`GCPs (Markers)`	checkbox	checked	Converts the heights of GCPs (GCP and CP). Applies to the Z value of the markers' reference coordinates.
`Ellipsoidal → Normal`	radio	default	H_norm = H_ellips − N. Use when the heights in the project are ellipsoidal (GPS data from the drone/GNSS) and the survey requires normal heights.
`Normal → Ellipsoidal`	radio	—	H_ellips = H_norm + N. Use when your data are normal heights and you need to convert them to WGS84/ellipsoidal heights.
`Add a constant N`	radio + spinbox [m]	—	Adds a uniform constant value to all heights (without a geoid model). Negative values are allowed. Useful for a quick height offset correction.
`Geoid model`	list (grouped by country)	PL-geoid-2021 (Polish interface), EGM2008 (English)	All geoid models of the PROJ-data collection (OSGeo), grouped by country ("World" — EGM2008, EGM96 — first). For Poland: PL-geoid-2021 (PL-EVRF2007-NH) and PL-geoid-2011 for the PL-EVRF2007-NH and PL-KRON86-NH datums (they correspond to the models supplied with earlier versions — old settings point to them automatically). The list shows whether a model is downloaded or the size of the file to download. The file is downloaded only once, on first use, from the PROJ project server (cdn.proj.org; the SHA-256 checksum is verified) to the %LOCALAPPDATA%\BRIMAP\Geoids folder. The tooltip shows the model's vertical datum, area, source and license. The last choice is remembered.
`Custom geoid file…`	list item + path (.tif)	—	Select your own GeoTIFF file with the geoid undulation N. The file must be a GeoTIFF raster with N values [m].

The N value is bilinearly interpolated from the four neighboring cells of the model grid (in earlier versions — the value of the cell containing the point). Catalog models have a grid spacing of about 1–5 km, so interpolation matters for the accuracy of the conversion.

⚠ The conversion modifies height values directly in the Metashape project. Saving the project beforehand is recommended.

4.3. Height conversion log

BRIMAP stores a log of operations on camera and GCP heights in the chunk (backup in the <project>.files/brimap folder). This lets the plugin:

- show the current vertical datum of cameras and GCPs,
- warn against converting the same data twice and block it without confirmation,
- detect height changes made outside BRIMAP and changes to the set of cameras / markers since the last operation,
- propose converting new data to the datum of the existing data when adding data to a chunk.

✔ The log also works in Photo and GCP Import and in the processing pipeline.

5. GCP Detection

Available from the menu: BRIMAP → GCP Detection. Automatically detects and precisely locates ground control points (GCPs) and check points (CPs) in photos using artificial intelligence (AI) models. It eliminates the need to mark GCPs on photos manually.

Detection is based on proprietary deep learning models trained and validated on more than 85,000 samples from real survey projects — covering various GCP types (from painted marks to dedicated targets), lighting conditions, flight heights, ground types and cameras (DJI, Sony and others).

For each photo–GCP pair, BRIMAP computes the predicted position of the GCP in the photo, and the AI models check whether there is a target at that location and determine its position with sub-pixel accuracy. After fitting the block to the detected GCPs, BRIMAP fills in the missing projections. Erroneous projections, GCPs and photo positions are detected and rejected (section 5.5).

Targets of any type are detected, including existing ground features (parking lines, manholes, road marking corners) and small painted circles about 10 cm in diameter — from about 5 × 5 px in the photo. Coded targets are not needed; for automatic detection in Metashape they must span several dozen pixels in the photo — at a GSD of 1–2 cm that is a target 0.5–1 m across.

Validation result	Value
Detection rate — validation set	98.0%
Detection rate — independent test set	93.2%
Median localization error	0.49 px
Field test (project of 1,265 photos)	95.4% correct detections

✔️ The AI models are supplied in encrypted form. The model key is downloaded from the license server during activation and stored locally — after activation, detection also works without an Internet connection (perpetual license).

5.1. Requirements

- An active BRIMAP license (premium feature)
- Aligned photos in the active chunk (cameras must have a computed transformation)
- GCPs with entered ground coordinates (Reference tab in Metashape)

✔️ The more photos a GCP appears on and the better the photo quality, the higher the accuracy of automatic detection.

5.2. Project information (preview panel)

The top part of the window shows a summary of the project state before detection:

- **Aligned photos** – the number of cameras with a computed transformation. Detection requires aligned photos to project marker positions.
- **GCPs** – markers with the reference option enabled (Reference enabled = True), used to align the block.
- **Check points (CP)** – markers with the reference option disabled (Reference enabled = False), serving as independent accuracy check points.

5.3. Dialog parameters

Parameter	Type / values	Default value	Description
GCP/CP split strategy	radio	Automatic split	Automatic split — check points distributed across the whole block — or keeping the Enable (GCP) / Disable (CP) split from the project.
Percentage of CPs	number 0–100%	50% (BRIMAP templates: 25%)	Share of check points among GCPs with at least 3 projections; at least 1 point is always a CP.
Extended search	checkbox	off	When a GCP is not found in the basic area, an area twice as large is searched. Useful with inaccurate photo coordinates.
Clear existing projections before detection	checkbox	off	On — removes all projections and detects from scratch. Off — detection only on photos without a projection of the given GCP.
Search radius	slider 0.5–3 m	2.5 m (fast mode: 1.5 m)	Area around the GCP position predicted from the coordinates. The radius depends on the expected accuracy of the photo coordinates: RTK / PPK fix 0.5–1.5 m, RTK float 1.5–2 m, navigation-grade GNSS 3 m with extended search.
Fill in missing projections after fitting the block	checkbox	on	Second detection phase. Recommended; turning it off shortens detection.
Detection mode	radio	Accurate	Accurate — full analysis: two detection passes, gross error check (section 5.5), GCP/CP split. Fast — a single pass, no GCP/CP split, optimization or gross error check (section 5.8). In fast mode the window shows only the search parameters.
Detect erroneous RTK photo positions	checkbox	on	Lowers the weight of photos with a momentary loss of the RTK fix solution; a shift of a whole flight is reported (section 5.5).
Linear (corridor) flights	checkbox	off	For corridors and single strips: erroneous GCPs are detected by cross-validation (each GCP is checked in an adjustment without it).

Examples of detected GCPs:





5.4. Detection progress bar

During detection, a progress window shows the GCP being processed and the number of photos it was detected on. Detection can be cancelled with the Cancel button.

5.5. Gross error check

An erroneous GCP (a numbering mistake, a displaced target, a GNSS survey error) or a photo with a wrong RTK position can distort the whole block — and when the erroneous point is a GCP, the distortion is not visible in the GCP errors. BRIMAP checks both kinds of errors during detection.

Erroneous GCPs. Each GCP is checked as an independent check point. A GCP whose error clearly exceeds the accuracy achievable in this block is first detected again and, if the error repeats, rejected: it is neither a GCP nor a CP and is excluded from the accuracy statistics. When doubts concern many GCPs at once (a likely block or calibration error), nothing is rejected and BRIMAP issues a warning.

Scope of the check. The gross error check runs in the accurate detection mode (default): suspicious GCPs are confirmed in the adjustment, erroneous projections are detected again and RTK photo positions are checked (option). The fast detection mode (section 5.8) performs no gross error check. For linear (corridor) flights, select the “Linear flights” option — the corridor geometry does not allow the usual screening.

Erroneous photo positions. Photos with a wrong GNSS position (e.g. loss of the RTK fix solution) get a lower weight in the alignment — also in iterative optimization. A systematic shift of a whole flight is not corrected but reported: check the vertical datum, antenna offset, RTK base station or shutter delay.

✔️ Rejected GCPs and down-weighted photos are marked in the project, and the check results are available in the summary and in the processing history (section 8).

5.6. Expected accuracy and rolling shutter

Results are assessed against the accuracy achievable at the given GSD: the expected accuracy class is about 3.5 × GSD (e.g. about 9 cm at a GSD of 2.5 cm). This value is shown in the optimization window, in the accuracy report and in the processing history.

When the results indicate missing rolling shutter compensation, BRIMAP checks the rolling shutter model and — if it clearly improves the result — keeps it, with a warning in the summary.

5.7. Detection in the processing pipeline

In the processing pipeline, detection runs without blocking dialogs — notes (e.g. no GCPs projecting onto aligned photos, rejected GCPs, down-weighted photos) go to the run summary and processing history. Running the step again fills in missing projections (section 3.5).

5.8. Fast detection mode

Selected in the “GCP Detection” window (the “Detection mode” switch) and in the “GCP Detection” pipeline step (the “Detection mode” parameter); a premium feature. A single detection pass with the AI models in a window of the given radius around the GCP position predicted from the coordinates, with automatic rejection of geometrically inconsistent projections (not consistent with a single ground position of the GCP).

Search radius. The radius depends on the expected accuracy of the photo coordinates: RTK / PPK fix — 0.5–1.5 m, RTK float — 1.5–2 m, navigation-grade GNSS — 3 m with extended search (2 × radius). Too small a radius means missed detections, too large — longer detection. The fast-mode radius is remembered (default 1.5 m).

What it does not do. Fast mode does not change the GCP/CP split (the Enable/Disable state of GCPs), does not optimize the cameras, and performs no second pass and no gross error check. Afterwards, check the projections and run camera optimization or Iterative Alignment Optimization. The result (new projections, rejected inconsistent projections, GCPs with ≥ 3 projections) is shown when finished and saved in the processing history.

6. Iterative Alignment Optimization

Available from the menu: BRIMAP → Iterative Alignment Optimization, and as a pipeline step. It sets the a priori observation accuracies and the number of GCPs so that the error on check points (CP) is as small as possible while the CPs remain an independent check of the alignment. The same project always gives the same result.

6.1. How it works

The measure of alignment quality is the accuracy class: **class = max(CP_RMSE_3D × 1.96; CP_MAX_3D / 1.53)**, where CP_RMSE_3D and CP_MAX_3D are the 3D RMSE and the maximum 3D error on check points. The optimization includes:

- **Observation accuracies from the block data** — accuracies of photo positions (separately for each flight), GCP projections and tie points estimated from the current alignment instead of values from the metadata. The GCP survey accuracy (GNSS) stays as declared.
- **Gross errors** — when GCPs were marked manually, the check described in section 5.5 is performed.
- **GCP count selection** — within the given range, BRIMAP selects which GCPs are GCPs and which are CPs. A GCP that clearly worsens the result as a GCP is reported for checking.
- **Rolling shutter** — when the accuracy clearly deviates from the expected one, the opposite rolling shutter setting is checked; the better one is kept, with a warning.
- **Final result** — when the result would be worse than the state before optimization, the initial state is restored.

In multi-flight projects, each flight (calibration group) gets its own photo position accuracies — flights with different GNSS quality (RTK fix, float, navigation-grade GNSS) do not distort the common block.

✔️ The estimated accuracies, the number of GCPs and the selection process are shown in the summary, in the processing history (section 8) and — optionally — in CSV files.

6.2. Requirements

- An active BRIMAP license (premium feature)
- Aligned photos in the active chunk
- GCPs with at least 3 projections — at least 5 recommended (some of them act as CPs)

6.3. Dialog parameters

Parameter	Type / values	Default value	Description
`Estimate observation accuracies from the block data`	checkbox	on	Off — the accuracies declared in the project.
`Detect erroneous GCPs and photo positions`	checkbox	on (when no detection was run)	For manually marked GCPs — section 5.5.
`Select the number of GCPs`	checkbox	on	Off — the current GCP/CP split is kept.
`GCP range from / to`	number [%]	25% / 75%	The minimum and maximum share of GCPs among GCPs with ≥ 3 projections.
`Check the rolling shutter model`	checkbox	on	When the accuracy clearly deviates from the expected one.
`Do not exceed the expected accuracy class`	checkbox + class [m]	off; from GSD	GCP count selection will not go below the number at which the class would exceed the expected one.
`Save project when finished`	checkbox	off	Saves the project after optimization (function window).
`CSV results folder`	path	empty	Optional record of the optimization run. Empty — no files.
`Run condition (in the pipeline)`	checkbox + values	off; 5 cm; 5	CP accuracy class ≥ threshold and/or at least N GCPs with ≥ 3 projections (section 3.6).

7. Accuracy Report

Available from the menu: BRIMAP → Accuracy Report. Generates a PDF report documenting the accuracy of the photogrammetric alignment. The report contains error statistics on GCPs and check points, an assessment against the selected accuracy class, residual charts and a table of results for each GCP/check point.

7.1. PDF report contents

- Project information (name, date, descriptive data)
- Number of aligned photos, GCPs and check points (CP)
- Error statistics: RMSE XY, RMSE Z, RMSE 3D, maximum error MAX 3D
- Assessment of the alignment against the selected accuracy class (verdict: meets / does not meet)
- Expected accuracy class from GSD — comparison with the achieved class
- Bar charts of errors for individual point groups
- Detailed table with errors at each point (dX, dY, dZ, 3D_err)
- Coloring: red = the permissible MAX error exceeded, yellow = the class value exceeded
- A thumbnail orthomosaic with marker positions (GCPs and check points)
- Appendix: processing history of the chunk (optional)

7.2. Requirements

- No license required (free feature)
- Aligned photos in the active chunk
- At least 1 check point (CP)

7.3. Dialog parameters

Parameter	Type / values	Default value	Description
`Operator`	text	—	Name of the person responsible for the survey (in the report header).
`Accuracy class`	Auto / value [cm]	Auto	The accuracy class against which the alignment is assessed. Auto mode determines the class from the CP results. The report also gives the expected class from GSD.
`Photo crops with projections`	checkbox	on	After the GCP and CP error tables, adds photo crops with the GCP projections marked.
`Orthomosaic with error vectors`	checkbox	off	Adds an orthomosaic with horizontal error vectors at the beginning of the report.
`Processing History`	checkbox	on	Adds the chunk's operation history (section 8) at the end of the report. When the chunk has no history, the appendix is skipped.
`Report folder`	path	project folder	Target folder for the PDF file. The file name is generated automatically. In the pipeline — a separate file for each chunk.

7.4. Accuracy assessment thresholds

For the selected class X [cm], the following thresholds are calculated:

Parameter	Type / values	Default value	Description
`CP_RMSE threshold`	formula	—	RMSE_thr = class_m / 1.96 — permissible CP RMSE 3D error.
`CP_MAX threshold`	formula	—	MAX_thr = class_m × 1.53 — permissible maximum 3D error.
`CP_MEAN threshold`	formula	—	MEAN_thr = class_m / 5 — permissible systematic error.
`CP_PIX threshold`	constant	1.0 px	Permissible reprojection error in photos (1 pixel).
`Min. number of CPs`	constant	≥ 4	Minimum number of CPs for a reliable assessment.

8. Processing History

Available from the menu: BRIMAP → Processing History. BRIMAP records an operation history in each chunk: pipeline runs (each step), use of BRIMAP tools (import, detection, optimization, report, height conversion) and changes made in Metashape outside BRIMAP (e.g. a built model, a rebuilt DEM), detected from the difference in chunk state. After each operation, a summary of chunk statistics and the duration are saved. The history is part of the project (.psx) — it travels with the file, and after merging chunks the new chunk takes over the history of the source chunks.

###TODO Insert a screenshot of the "BRIMAP — Processing History" window.

8.1. Window views

View / element	Description
Chunk	List of chunks, state card (aligned photos, GCP/CP, % projections, RMSE on CP and GCP, accuracy class, GSD, processing time), products with a link to the PDF report, operation timeline with filters, accuracy class chart against the expected class, notes.
Details	After selecting an entry: run steps, state before → after, parameters, criteria results, result tables (e.g. GCP validation, photo down-weighting, GCP averaging) and the log. "Open pipeline in editor" recreates the pipeline from the given run.
Chunk comparison	Table of all project chunks against the expected accuracy class.
Expected accuracy class	For each chunk: your own value or — by default — the class from GSD (1.96 × RMSE 3D from GSD rounded up, 1–20 cm). When the GSD is unknown — the project default.
Export ▾	Chunk history or chunk comparison to CSV (semicolon — opens directly in Excel); "Clear history of the current chunk…".
Refresh statistics	Re-reads the state of the chunks.

✔️ Opening the window changes nothing in the project (except the "Clear history" command). A backup of the history is saved in the <project>.files/brimap folder.

8.2. Requirements

- No license required (free feature)

- An open project — the chunk history starts with the first operation performed in BRIMAP 1.1.0

9. Project Boundary Creation

Available from the menu: BRIMAP → Create Project Boundary. Automatically creates an AOI (Area of Interest) as a vector layer (Shape) in the active Metashape chunk, based on the GPS positions of the cameras. The boundary is computed as a concave hull enlarged by the given buffer.

9.1. Requirements

- An open project with a chunk containing photos
- Photos must have GPS coordinates (camera locations)

9.2. Dialog parameters

Parameter	Type / values	Default value	Description
`Buffer around cameras [m]`	spinbox (0–5000 m)	20 m	Buffer added to the outer boundary of the area defined by the camera positions. Too small a buffer may cut data at the edges of the area. Recommended: 10–50 m.
`Camera filtering`	drop-down list	All cameras	All cameras: includes all photos with GPS. Enabled only: includes only active cameras. Nadir only: excludes oblique photos (tilt from the vertical > threshold).
`Limit angle [°]`	spinbox (1–90°)	30°	Maximum tilt of the camera from the vertical for a photo to be treated as nadir. Active only with the 'Nadir only' option.

9.3. Result

When finished, a new layer named Boundaries_[buffer] appears in the Shapes of the active chunk, containing the project boundary polygon marked as OuterBoundary. Metashape can use this type of boundary to clip rasters during export.

10. GUGiK Data Download (Polish interface)

Available from the menu: BRIMAP → Download GUGiK Data (Polish interface only — data for Poland). Downloads reference data from the Polish Geoportal (GUGiK) and imports it into the active Metashape chunk: raster data (DTM, DSM, orthophotos) — from the current grid (WCS service) or from map sheets with year selection (WFS indexes), LIDAR point clouds and EGiB vector data (WFS service). The download area (AOI) is determined from the camera positions or from the polygons of a project shapes layer.

10.1. Available data layers

Parameter	Type / values	Default value	Description
`DTM`	elevation data	resolution: 1 m/pix	Digital Terrain Model – represents the bare-earth surface without buildings and trees. Format: GeoTIFF in PL-KRON86-NH or PL-EVRF2007-NH.
`DSM`	elevation data	resolution: 1 m/pix	Digital Surface Model – represents the highest point of land cover (buildings, trees). Format: GeoTIFF.
`Standard orthophoto`	raster image	resolution: 0.25 m/pix	Orthophoto at the standard resolution of 20 cm/pix. Does not require a vertical datum selection.
`High-resolution orthophoto`	raster image	resolution: 0.05 m/pix	Orthophoto at a high resolution of 5 cm/pix. Does not require a vertical datum selection.
`True orthophoto`	raster image	resolution: 0.10 m/pix	Orthorectified orthophoto with building lean removed. Does not require a vertical datum selection.
`Parcels (EGiB)`	vector data	—	Cadastral parcel boundaries from the EGiB aggregate service. Saved as GML, converted to GeoJSON (WGS84) and imported into the chunk as a vector layer.
`Buildings (EGiB)`	vector data	—	Building outlines from the EGiB aggregate service. Saved as GML, converted to GeoJSON (WGS84) and imported into the chunk as a vector layer.
`LIDAR point clouds`	survey data	—	LIDAR survey data from index map sheets, with year selection. Optionally imported into the chunk (one cloud per year) and clipped to the AOI.

10.2. Dialog parameters

Parameter	Type / values	Default value	Description
`Download area (AOI)`	radio	Camera positions	Camera positions (convex hull) or shapes polygons from the project (selected layer, optionally selected shapes only). Lines and points are skipped.
`Buffer around the area [m]`	spinbox	100 m	Enlarges the download area. Too small a buffer risks missing data at the edges. Recommended minimum: 100–200 m.

Parameter	Type / values	Default value	Description
`Rasters: product and source`	checkbox + list	WCS — grid (current)	For DTM, DSM and orthophotos: WCS — current grid, or WFS — map sheets with year selection. “Latest” mode assembles the area from the sheets of the latest available years; each year is a separate GeoTIFF mosaic.
`Vertical datum`	radio	PL-EVRF2007-NH	Vertical reference for DTM, DSM and LIDAR. EVRF2007-NH: recommended for new surveys. KRON86-NH: for surveys in the Kronstadt datum.
`Orthophoto composition`	list	RGB — natural color	RGB or CIR (infrared) — for WFS sheets.
`Clip rasters to the AOI shape`	checkbox	—	Rasters from WFS sheets are clipped to the AOI (outside the AOI: NoData).
`LIDAR survey data`	checkbox + year	off	“Check availability…” shows the years, number of sheets and estimated data size. Options: import into the chunk (one cloud per year), clip the cloud to the AOI.
`EGiB data`	checkbox	off	Buildings and/or parcels from the EGiB aggregate service.
`Data folder`	path	—	Target folder for the downloaded files; separate subfolders for data types.

10.3. Download progress

During the download, a progress window shows the layer being downloaded, the number of the current grid sector and the estimated remaining time. The download can be stopped with the Cancel button.

10.4. Requirements

- The Metashape project must be saved to disk
- The chunk must contain photos with GPS coordinates
- An active Internet connection is required

⚠️ Downloading large areas (more than a few km²) may take from several to over a dozen minutes. Do not close Metashape during the download.

11. Projecting Vectors onto Photos

Available from the menu: BRIMAP → Project Vectors onto Photos. Overlays the vector layers (Shapes) of the active chunk — e.g. EGiB parcels and buildings downloaded with “Download GUGiK Data” — on the aligned photos and saves annotated copies of the photos (suffix _annotated). Makes it easier to identify objects and check the consistency of vector data with the image.

11.1. Requirements

- An active BRIMAP license (premium feature)
- Aligned photos in the active chunk
- Vector layers assigned to groups (Shapes → groups) with vertex heights (Z) — points without Z are skipped

11.2. Dialog parameters

Parameter	Type / values	Default value	Description
`Output path for photos`	folder	—	Target folder for the annotated photos (created automatically).
`Draw on photos`	checkbox (for each group)	on	Turns drawing of the given vector group on / off.
`Color`	color picker	—	Line color of the given group.
`Width [pix]`	number	—	Line width in pixels of the output photo; readable values: 2–5 px.
`Update polygon heights`	checkbox	off	Before projecting, recomputes the Z of the vectors from the DEM. Recommended when the vectors were imported without heights.
`Photo selection`	radio	All photos	All photos / Enabled photos only / Only with projected points (only photos onto which at least one vertex projects are saved).

12. License management

A BRIMAP license is activated once per computer. License operations are available from the menu: BRIMAP → License.

12.1. License activation

Menu: BRIMAP → License → Activate...

- Enter the license key received with your purchase
- Confirm with OK
- The license is verified online – an Internet connection is required
- After successful activation, all features are available immediately (without restarting Metashape)
- During activation, the key for the AI models used by GCP detection is downloaded; the key is stored locally in encrypted form (bound to the Windows account)
- The license is verified when Metashape starts and every 24 hours. Without a connection to the server, only a perpetual license works
- The license is bound to the computer identifier (Windows). Changing network cards or the computer name does not require reactivation; after reinstalling Windows the license must be moved (deactivation or contact support@brimap.pl)
- After updating from version 1.0.x, start Metashape once with Internet access — the plugin will download the AI model key and automatically bind the license to the new computer identifier

12.2. License deactivation

Menu: BRIMAP → License → Deactivate...

- Deactivation releases the license on the current computer
- The key can then be activated on another device
- Requires an Internet connection

⚠ After deactivation, the premium features (GCP Detection, Iterative Alignment Optimization, e-mail notifications, Projecting Vectors onto Photos) become unavailable until reactivation; in the pipeline, premium steps are skipped. The free features keep working.

12.3. Checking the license status

The activation status is visible indirectly through the available BRIMAP menu items and the markings in the pipeline editor: without a license, the menu contains the free features and premium steps are marked “Premium”. License details (owner, type, expiry date) are printed in the Metashape console at startup.

“No active license” window. Without a license, a message about the free and premium features appears when Metashape starts, with the “Activate license...” and “Continue without a license” buttons. Selecting “Do not show this window again” turns it off permanently — the information then goes only to the Metashape console.

Updates. An annual license includes updates during its validity period. A perpetual license includes updates released during 12 months from activation; the version you have works indefinitely. When a newer version was released after that period, BRIMAP → Check for Updates informs you that the updates need to be renewed.

13. Troubleshooting

Problem	Solution
No BRIMAP menu in Metashape	The plugin was not installed correctly. (1) Try reinstalling the BRIMAP plugin, (2) restart Metashape, (3) contact support@brimap.pl
Error 'No active project'	Open a Metashape project or create a new one before running a BRIMAP function.
Detection does not find GCPs	Check: (1) whether the photos and points are loaded in the correct coordinate systems, (2) whether the GCPs use the same vertical datum as the photo coordinates, (3) decrease or increase the search radius.
GUGiK data download error	Check your Internet connection. The Geoportal may be temporarily unavailable – try again in a few minutes.
Optimization does not improve accuracy	Check the number of GCPs with ≥ 3 projections (≥ 5 recommended) and the gross error check results in the processing history. When the result would be worse than the initial one, BRIMAP restores the state before optimization.
Height conversion – point outside the geoid extent	Check the project coordinate system and the selected model — national models (e.g. PL-geoid-2021, PL-geoid-2011) cover only the area of the given country; for other areas select a model from the list (section 4.2), e.g. EGM2008.
No "Automatic Alignment" item in the menu	Since version 1.1.0 the function is replaced by BRIMAP → Processing Pipeline (section 3). The stages of the former window correspond to pipeline steps — see the table in section 3.9.
"BRIMAP AI models are unavailable"	The model key was not downloaded or cannot be read. (1) Connect to the Internet and restart Metashape (license verification downloads the key), (2) run BRIMAP → License → Activate again, (3) reinstall the plugin or write to support@brimap.pl.
The pipeline stopped processing a chunk	A "Stop chunk" criterion was met (status ■) or a step ended with an error (✕). Details are in the summary window and in the Metashape console ([BRIMAP] entries). Correct the data or the criterion threshold and run the pipeline again — e.g. only from the step where it stopped.
Warning about a possible double height conversion	The conversion log shows that the data were already converted (section 4.3). Check the current vertical datum of the cameras and GCPs before confirming the operation.
"License active on another computer"	After the update, start Metashape with Internet access — the license will move to the new computer identifier. After reinstalling Windows, write to support@brimap.pl.
GCP rejected as erroneous	Check the GCP number, coordinates and vertical datum, as well as its projections (validation table in the processing history, section 8). After correcting the data, run detection again.
Warning about a shift of a flight's photo positions	The median photo position error of the flight deviates from the block. Check the vertical datum of the photos, antenna offset, RTK base station and shutter delay for this flight.
Rolling shutter warning	The variant with the opposite rolling shutter setting gave a clearly

Problem	Solution
	better result and was applied. Check the camera's shutter type; for an electronic shutter, select the rolling shutter option during import.
“Missing sensor data” window	The focal length or pixel size is missing from the photos' EXIF. Fill in the values from the camera documentation.
The Metashape process stays in Task Manager after closing	BRIMAP ends such a process automatically a few seconds after the program closes (log: %LOCALAPPDATA%\BRIMAP\logs\ brimap_shutdown.log). The installer also closes leftover Metashape processes.
A pipeline step marked “Premium” was skipped	The step requires a BRIMAP license (premium feature). Activate the license (BRIMAP → License → Activate) or use the “BRIMAP – photo matching and products (no premium features)” template.
The geoid model could not be downloaded	Check your Internet connection. The model is downloaded from the PROJ project server (cdn.proj.org) — access to this domain must not be blocked. You can also select your own GeoTIFF file.

14. Recommended workflow

Below is the recommended workflow for a typical photogrammetric survey with BRIMAP 1.1.0. Steps 3–6 can be performed within a single pipeline run.

#	Step	Description
1	Project preparation	Create and save a Metashape project. Prepare a folder with photos (a separate subfolder for each flight) and a file with GCP coordinates.
2	Choosing a pipeline	BRIMAP → Processing Pipeline → ☰ Pipeline templates…: “BRIMAP – photo import and alignment” (new project) or “BRIMAP – alignment with full accuracy analysis” (data already in the chunk); for a shorter time — “BRIMAP – fast alignment”, for products — “BRIMAP – alignment and products”; without a license — “BRIMAP – photo matching and products (no premium features)”.
3	Data import	The “Photo and GCP Import” step (Configure import…): chunk CRS, photo folder (subfolders = flights → calibration groups), GCP file, height conversion, rolling shutter for an electronic shutter.
4	Alignment, detection and optimization	Optimized photo matching → GCP Detection (with the gross error check) → Iterative Alignment Optimization → Align by reference data.
5	Accuracy check	The “Accuracy report” step, optionally with a stop criterion (e.g. CP accuracy class ≥ required → Stop chunk), so that products are created only for correctly aligned blocks. E-mail notification when finished.
6	Products and export	Project boundary, dense point cloud, DEM, color calibration, orthomosaic and Export steps (clipped to the project boundary).
7	Run and verification	Run the pipeline; check the summary, the PDF reports and BRIMAP → Processing History (class against the one expected from GSD, rejected GCPs, down-weighted photos). Save the pipeline as your own template.
8	Reference data (optional)	BRIMAP → Download GUGiK Data (Polish interface): DTM / orthophoto / LIDAR for verification, EGiB for cartographic work.
9	Projecting vectors (optional)	BRIMAP → Project Vectors onto Photos — checking vector data on photos.