

# PhotoMesh

## Release Notes

### V7.8.1

The screenshot displays the PhotoMesh software interface. The main window shows a 3D reconstruction of a city area with various buildings and terrain. The interface includes a top menu bar with options like Home, View, Tools, Tile, and Photo. Below the menu is a toolbar with icons for navigation and selection. On the left, there is a Project Tree panel showing a hierarchy of objects and layers, including 'Build\_2: outputBuild\_1\_WGS 84'. At the bottom, there is a Properties panel with a table of camera parameters for the selected photos.

Selection	Collection	Name	Visible	Exclude	Project Original	X	Y	Altitude	Omega	Phi	Kappa	Yaw	Pitch	Roll	K1	K2
<input checked="" type="checkbox"/>	1	006263-1210151633189-Cam1.jpg	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	463977.757692	3158673.086929	646.249920	0.109905	0.051977	179.979535	NA	NA	NA	-0.0617106875989802	0.07469735201
<input checked="" type="checkbox"/>	1	006264-1210151633203-Cam1.jpg	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	463974.646977	3158569.977678	645.698227	0.050085	0.051810	179.944327	NA	NA	NA	-0.0617106875989802	0.07469735201
<input checked="" type="checkbox"/>	1	006265-1210151633217-Cam1.jpg	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	463972.822301	3158465.081835	644.939634	0.047830	0.079315	179.911981	NA	NA	NA	-0.0617106875989802	0.07469735201
<input checked="" type="checkbox"/>	1	006266-1210151633231-Cam1.jpg	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	463971.841819	3158360.213313	643.737209	0.047803	0.009565	179.726809	NA	NA	NA	-0.0617106875989802	0.07469735201
<input checked="" type="checkbox"/>	1	006267-1210151633245-Cam1.jpg	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	463970.901787	3158256.186004	642.384891	0.157111	0.058209	179.839816	NA	NA	NA	-0.0617106875989802	0.07469735201
<input checked="" type="checkbox"/>	1	006268-1210151633259-Cam1.jpg	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	463969.668025	3158151.892208	641.086461	0.096473	0.075997	179.865163	NA	NA	NA	-0.0617106875989802	0.07469735201
<input checked="" type="checkbox"/>	1	006269-1210151633273-Cam1.jpg	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	463968.144824	3158047.676008	639.348194	0.105218	0.064799	179.869782	NA	NA	NA	-0.0617106875989802	0.07469735201
<input checked="" type="checkbox"/>	1	006270-1210151633287-Cam1.jpg	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	463966.509303	3157943.998846	637.179005	0.068960	0.119591	179.871332	NA	NA	NA	-0.0617106875989802	0.07469735201
<input checked="" type="checkbox"/>	1	006271-1210151633301-Cam1.jpg	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	463964.747482	3157840.310925	635.001262	0.087801	0.025969	179.913171	NA	NA	NA	-0.0617106875989802	0.07469735201
<input checked="" type="checkbox"/>	1	006272-1210151633315-Cam1.jpg	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	463962.757763	3157734.399007	634.030675	0.106376	0.073830	179.871189	NA	NA	NA	-0.0617106875989802	0.07469735201
<input checked="" type="checkbox"/>	1	006273-1210151633329-Cam1.jpg	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	463960.712863	3157631.626202	633.713767	0.163488	0.043970	179.900181	NA	NA	NA	-0.0617106875989802	0.07469735201
<input checked="" type="checkbox"/>	1	006274-1210151633343-Cam1.jpg	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	463958.963749	3157527.838217	634.149695	0.038389	0.023173	179.962347	NA	NA	NA	-0.0617106875989802	0.07469735201
<input checked="" type="checkbox"/>	1	006275-1210151633357-Cam1.jpg	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	463957.702798	3157423.427612	635.232562	0.119960	0.024003	179.895286	NA	NA	NA	-0.0617106875989802	0.07469735201

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# OVERVIEW

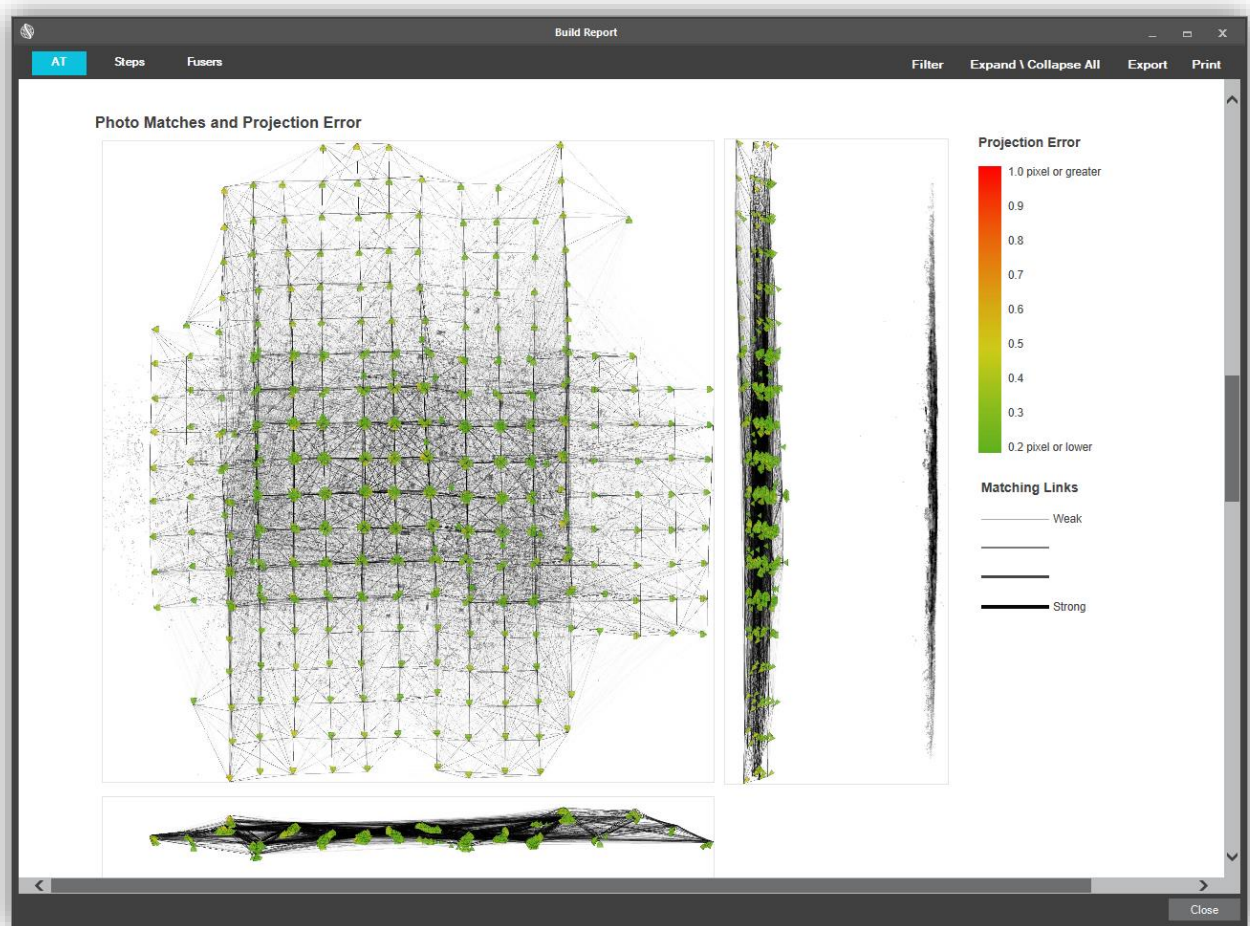
Skyline's PhotoMesh application fully automates the building of high-resolution, textured, 3D mesh models. from oblique and nadir photographs and Lidar captured from street view, drones, UAV and airplanes. PhotoMesh's breakthrough technology is based on the highest-performance photogrammetry, computer vision, and computational geometry algorithms. PhotoMesh offers a range of output options including standard 3D model (3DML, OSGB, DAE, OBJ), raster (Orthophoto, DSM, DTM) and point cloud (LAS) formats. PhotoMesh's 3DML format can be transformed into powerful geospatial data that fully supports spatial operations and attribute queries, by loading it into TerraExplorer and merging it with classification information. All supported formats can be published from TerraExplorer Pro to SkylineGlobe Server for viewing in Skyline 3D viewers (TerraExplorer for Desktop, TerraExplorer for Web and TerraExplorer for Mobile) and 3rd party viewers (Cesium, ESRI, etc.).



## Enhancement of Aerotriangulation Reports with Visual Graphs

PhotoMesh 7.8.1 features a set of reports with a range of graphics that help you to easily visualize and identify issues with data collection or the aerotriangulation solution:

- **Distance Map** - Graphically depicts the vertical and horizontal distance between every photo's original input position and the position computed through aerotriangulation.
- **Photo Matches and Projection Error** - Provides a graphical representation of the projection error - median of the triangulation errors of all the features in the photo.
- **Connection Map** – Color-coded map that enables you to evaluate the number of matches between photos.
- **Ground Resolution Map** - Color-coded map that provides information on the level of detail achieved in cm per pixel for each feature in the defined AT area.



## Model Quality Improvements

PhotoMesh 7.8.1 features a set of algorithm adjustments that improve overall model quality:

- Noise reduction around edges of model
- Noise reduction above water polygons
- Improved model quality across all levels of resolution pyramid

## General Enhancements

- New option to deploy additional vertical datum grid files (GTX), during installation
- Support for Lidar datasets with additional LAZ formats
- Accelerated production when working with fuser machines with 32 cores or more
- Optimized photo selection in projects with non-rectangular AT areas ensures that only photos that overlap with the AT area are included in the build
- Gigapixel credit licensing mechanism is now also supported when using REST APIs for automating PhotoMesh project and queue tasks

## Stability and Bug Fixes

- Fixed bug that resulted in unnecessary repeat conversions of Lidar datasets to PhotoMesh's internal format (CPT)
- Resolved issue that caused the "Enhance Trees" preset to be ignored
- Corrected bug that in some cases cropped tree's top when working with Lidar datasets
- Fixed bug that caused a texturing phase to fail for a very diluted tile

## Quality Improvements to Support High-Resolution, Close Range Projects

With PhotoMesh 7.8, you can build ultra-realistic, close range 3D models such as towers, bridges, factories and more. The latest PhotoMesh features several enhancements for working with close range, sub-centimeter data collections:

- Modifications of aerotriangulation process to support data collection of close-range objects such as towers and antennas.
- Automatic identification and cleaning of sky background
- Better sharpening and modeling of thin elements such as poles and pipes to produce higher quality, detailed point clouds and mesh models
- Noise reduction around edges of complex models
- Improved model quality across all levels of resolution pyramid



## Higher-Quality Orthophoto

Quality-optimized image compression produces cleaner and higher quality orthophoto output.

New preset offers the following advantages:

- Higher quality texture resolution:
  - Higher compression rate for the photos
  - Higher compression rate for the final ortho
  - Improved quality for ortho texturing
- Sharper building edges
- Reduced noise



## New Option to Use Reference Projects to Improve Project Alignment

This mechanism automatically geo-references a new project based on the aerotriangulation results of a previously built project, to ensure both projects are completely aligned.

- This tool can be particularly useful for multiple flights over the same area. Ground control points, or high accuracy GPS locations (RTK, PPK) can be used for the first flight and then the Reference Project mechanism can be used to accurately register the other flights, even without GCPs or accurate location information.
- The Reference Project mechanism can ensure perfect horizontal and vertical alignment for visualization and difference comparison tools.
- The Reference Project can also be used with partially overlapping projects. For best success, the same sensor and flight pattern should be used for both projects although the Reference Project mechanism can support different sensors and patterns.





## Export Undistorted Photos

New option to save the undistorted photos created in the AT process when exporting AT results. During the photo preparation steps, PhotoMesh calculates the photos' distortion parameters (that result from most cameras lens properties) and uses these parameters to undistort the photos so that feature matching, AT, and 3D reconstruction can be performed properly.

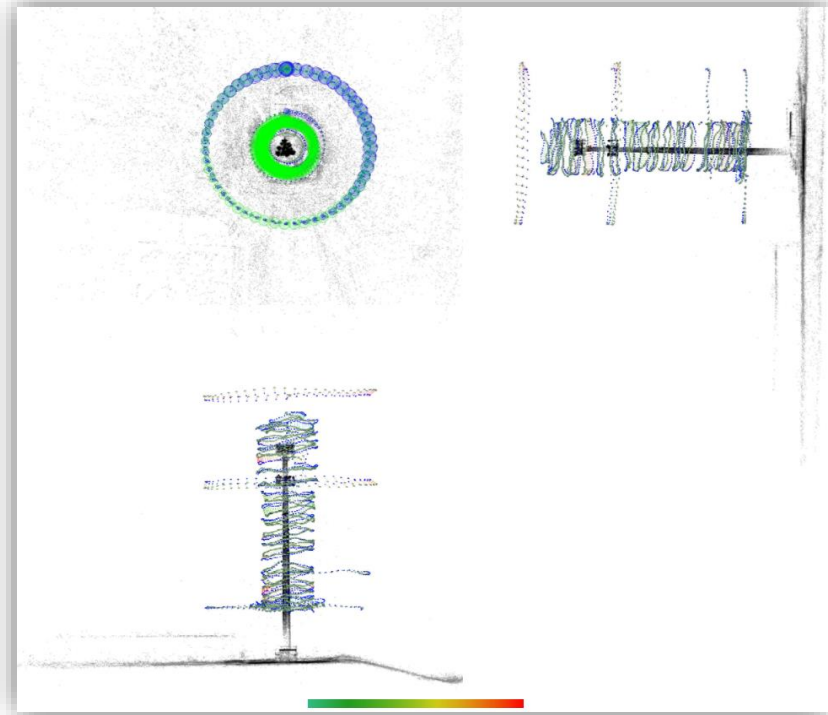


## Performance Improvements

- Close range project memory usage optimized for 16GB machines
- Optimized production time for close range projects
- Overall performance improvements accelerate production

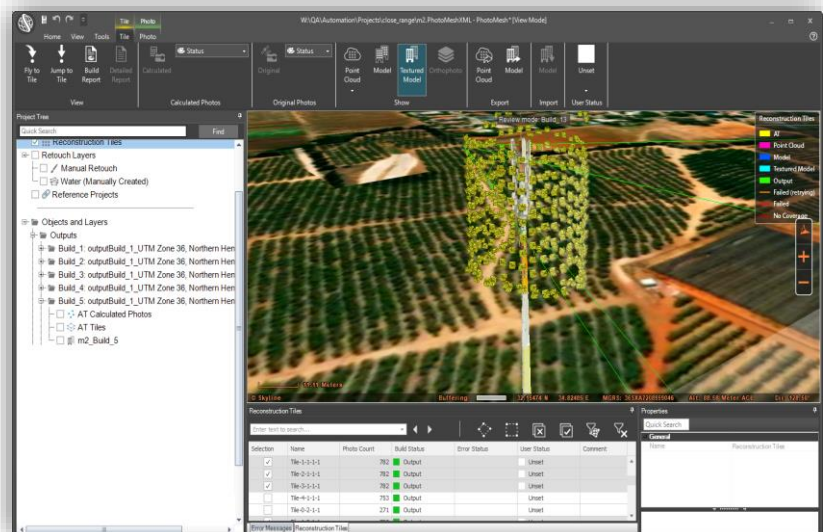
## Quality Report API

PhotoMesh provides a REST API for PM Production to automate the production phases, e.g., load photo files or list, set AT and reconstruction areas, begin and manage a build, and create new build versions. PhotoMesh 7.8 features the addition of a new method to the API for generation of a report in JSON format with information about the general project, photo collections, AT results, control points, reference projects and reconstruction results.



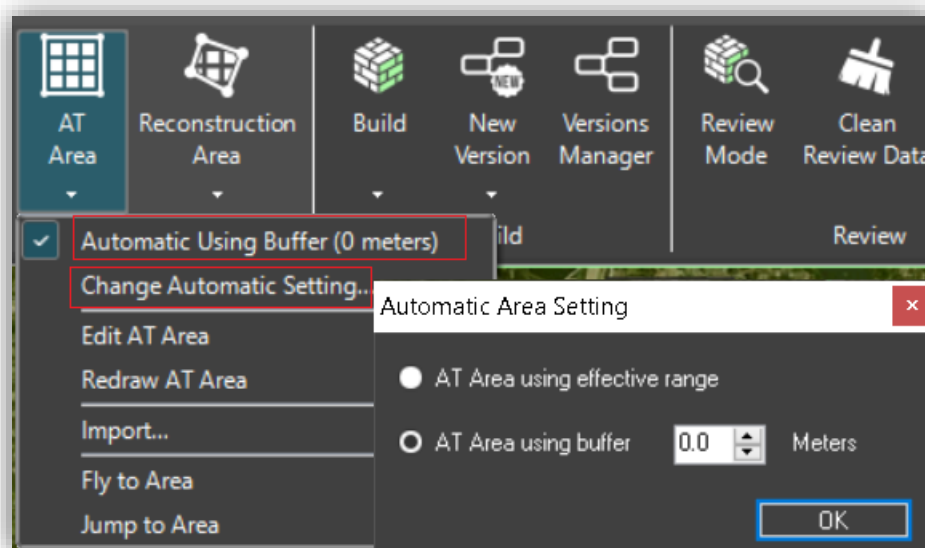
## Usability Improvements

- Close range navigation - Improved 3D navigation to support close range and vertical objects
- Relative path – Project can be copied or moved to a new folder or drive location after any build step. It can then be resumed from any step from its new location



## AT/Reconstruction Area Buffer

New options make it easier to set the appropriate area for aerotriangulation, especially in close-range projects. The area of the project on which PhotoMesh should perform aerotriangulation can now be calculated automatically by PhotoMesh based on all the project's photos plus a buffer in meters that is either based on the collections' maximum effective range or a set value that you define.



## AWS Improvements – Fuser Throttling and Tagging

- **Throttling** – New Launch Rate setting lets you control the maximum number of fuser instances launched per minute, e.g., if Maximum Instances was set to 200, and the Launch Rate to 50, the Build Manager will spread the launch of the fusers over 4 minutes. This prevents a potential bottleneck that could be caused by a large number of fusers attempting to read the build data at the same time.
- **Tagging** – New user-defined tags added to fuser properties to help you easily identify a fuser instance in the Amazon EC2 console after it is launched.

## Bug Fixes and Stability Improvements

- Resolved issue causing Lidar bounding box to float above point cloud data
- Resolved issue causing orthophoto generation to fail when tile size exceeded 50,000 pixels.
- Resolved issue causing build to fail in projects with more than 4,000 Lidars
- Fixed bug that caused Lidars to disappear from project after changing their coordinate system and then reopening the project
- Fixed bug that resulted in control point editor sometimes opening showing an “Overflow error”
- Corrected issue that caused a build to fail when generating orthophoto output with 'Mesh Vertical Bias' preset
- Failed photos are now included in the calculated lists of the Control Point Editor, with their name marked in red and a tooltip to inform the user that they were not calculated in the AT process.
- Resolved bug relating to control point sampling error variance
- Fixed bug affecting display of table in CSV/TXT Importer
- Fixed bug affecting display of orthophoto on white background
- Corrected bug causing white dots to display on PhotoMesh window when using the shortcut keyboard combination to open a tile's folder

# Requirements

Operating System	Windows® 8 / 10 / 11, Windows® Server 2012 R2 / 2016 / 2019 – 64-bit required. Ubuntu 18.04 and Debian 10.0 – 64-bit required (Only for PhotoMesh fusers)
System Memory	16 GB RAM (32 GB recommended)
Video Card	1GB of video memory (2GB or more recommended). Pixel and vertex shader v3.0.
Processor	4 cores (8 cores recommended). PhotoMesh works best in a multi-core environment and can utilize multiple CPU's and hyper-threaded processors
Additional Software	.Net Framework 4.6.1 required

[For additional information, check out our TerraExplorer knowledge base](#)



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