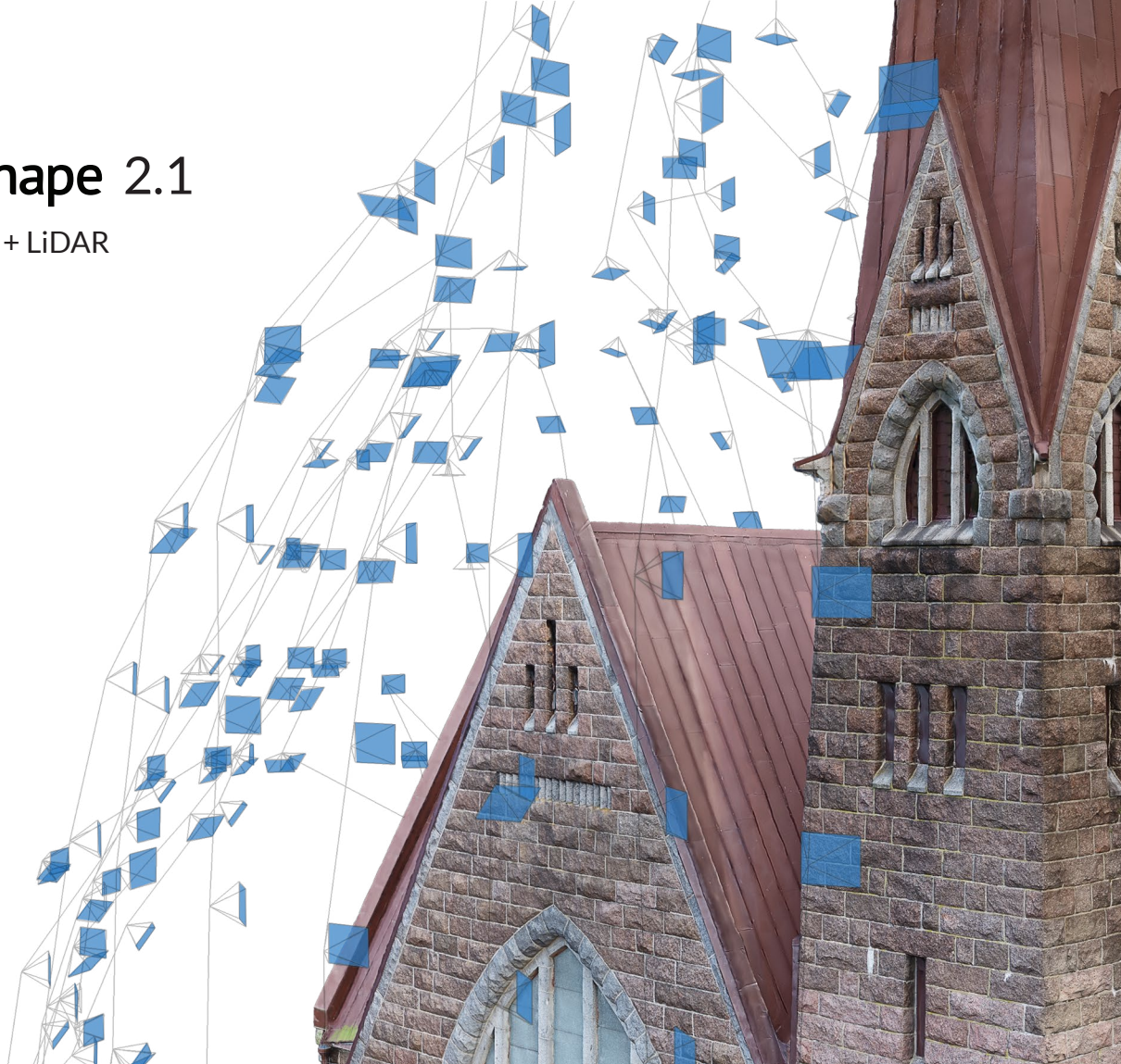


# Metashape 2.1

Photogrammetry + LiDAR

Agisoft



## Agisoft Metashape – Intelligent photogrammetry enhanced with LiDAR data processing

Agisoft Metashape is a cutting-edge software solution, with its engine being continuously developed to implement recent scientific advancements in the field of photogrammetry. The software allows to process images from RGB or multispectral cameras, including multi-camera systems, into the high-value spatial information in the form of photogrammetric point clouds, textured polygonal models, georeferenced true orthomosaics and DSMs/DTMs. Images can be co-processed with LiDAR points to exploit advantages of both data sources. Further post-processing enables to eliminate shadows and texture artifacts from the models, calculate vegetation indices and extract information for farming equipment action maps, automatically classify dense point clouds, etc.



Runs on Windows,  
macOS and Linux

- **Very fast & highly accurate**

Based on the state-of-the-art technology developed by Agisoft, Metashape allows for very fast processing, providing at the same time consistent and highly accurate results both for aerial and close-range photography (up to 3cm for aerial, and up to 1mm for close-range photography), as well as for LiDAR data based surface reconstruction.

- **Local or cloud processing**

Agisoft Metashape is capable of processing of 50 000+ photos across a local cluster, thanks to distributed processing functionality. Alternatively, the project can be easily sent to the cloud to minimize hardware investment, with all the processing options being still available.

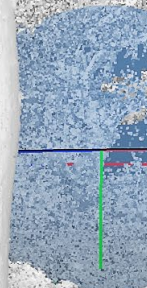
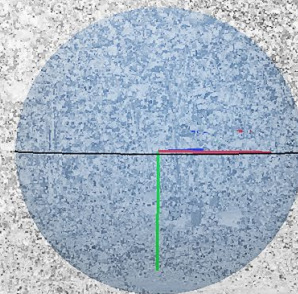
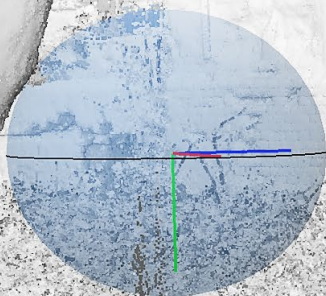
- **Intuitive UI & stereo mode**

The software package has a linear project-based workflow that is intuitive and can be easily mastered even by a non-specialist, while professional photogrammetrists can benefit from advanced features like stereo mode and have complete control over the results accuracy, with detailed report being generated at the end of processing.

NEW FEATURES

## Terrestrial laser scanner data registration

Metashape 2.1 allows to automatically register LiDAR point clouds based on local geometry features without using color information that can be missing or inaccurate. LiDAR point clouds can also be aligned with images using combination of 3D and 2D tie points in the adjustment process, provided that color information is present. In case external registration data is available, initial point cloud positions can be fixed and preserved during alignment.

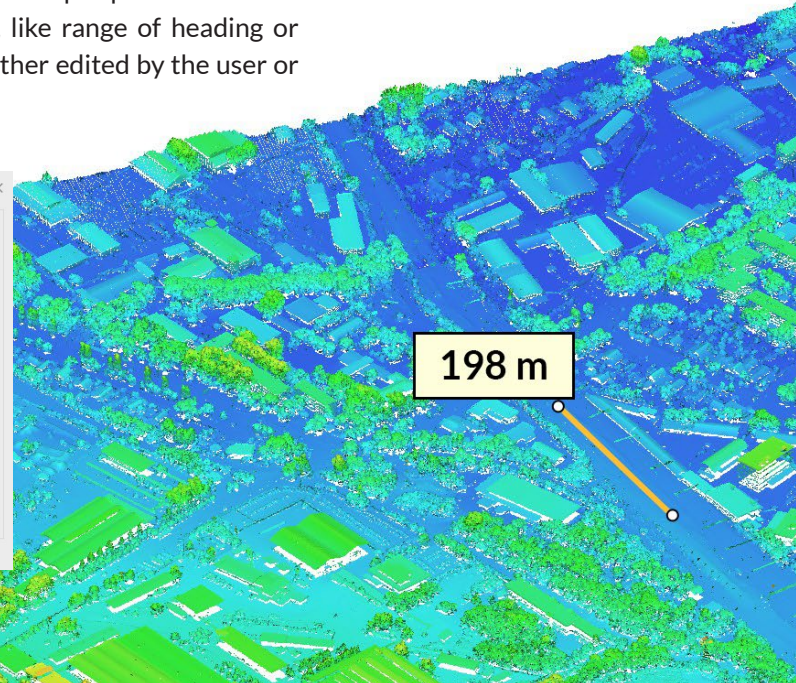
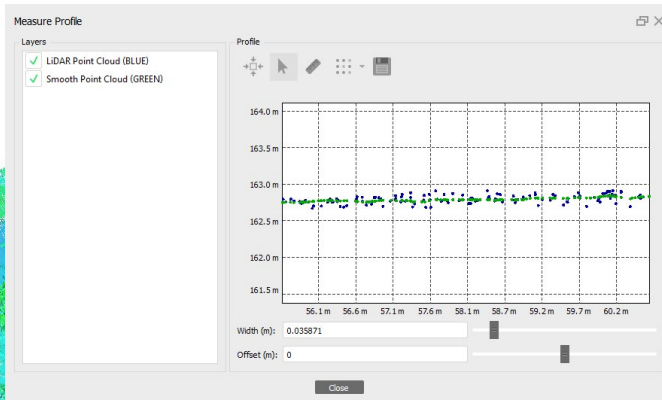


NEW FEATURES

## Aerial LiDAR data denoising and splitting

Metashape 2.1 includes a new point cloud smoothing tool that allows to automatically reduce noise in the LiDAR data collected using low-cost LiDAR systems. Point cloud smoothing tool can be applied to selected area of the LiDAR point cloud or to specific point classes.

When trajectory data is available, Metashape 2.1 allows to split point cloud into adjacent strips according to the user specified criteria, like range of heading or altitude change. Selected trajectory segments can be further edited by the user or filtered out if necessary.

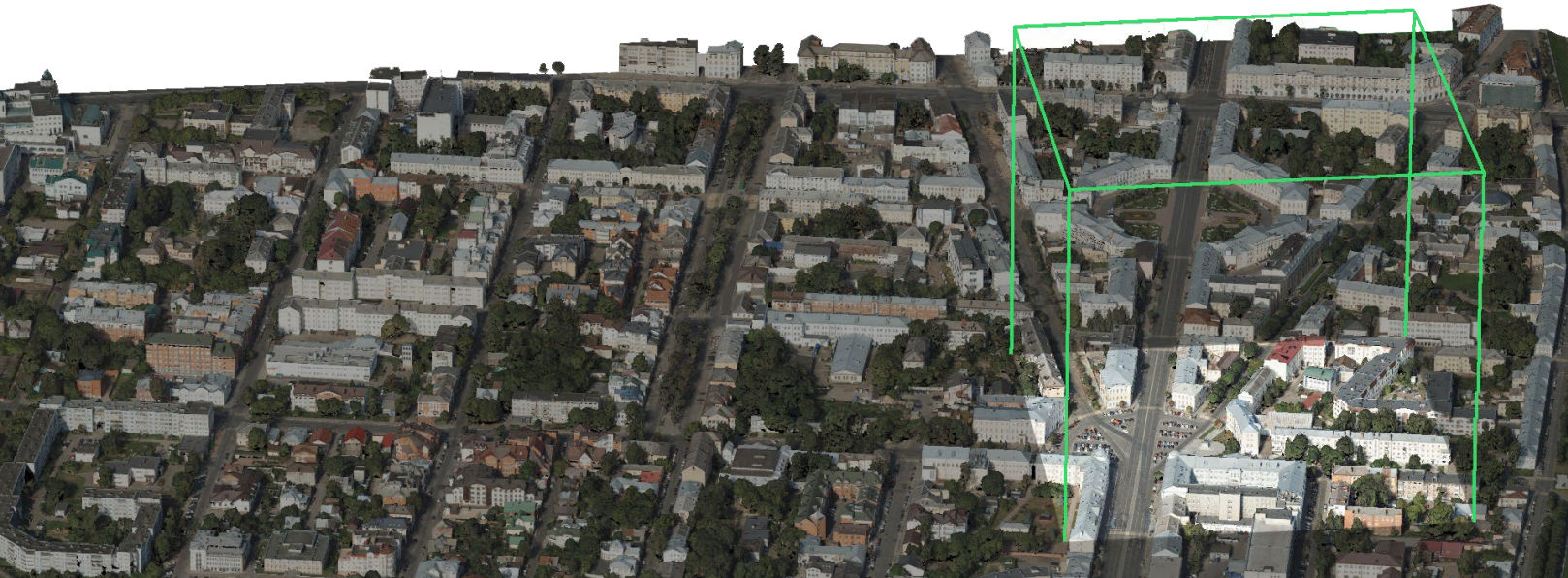


NEW FEATURES

## Block models for city-scale projects

Metashape 2.1 introduces *block models* concept. This approach to 3D model generation allows to create polygonal model of a large area in parts. Individual model blocks can be easily edited in Metashape or external software thanks to their moderate size. Metashape enables to re-texture edited blocks taking into account geometry changes.

Blocks can be cut according to user-defined grid, which allows to easily merge multiple overlapping datasets into one seamless model. Metashape supports export of edited block models in Cesium 3D Tiles or Esri SLPK formats that can be published online or within enterprise infrastructure.

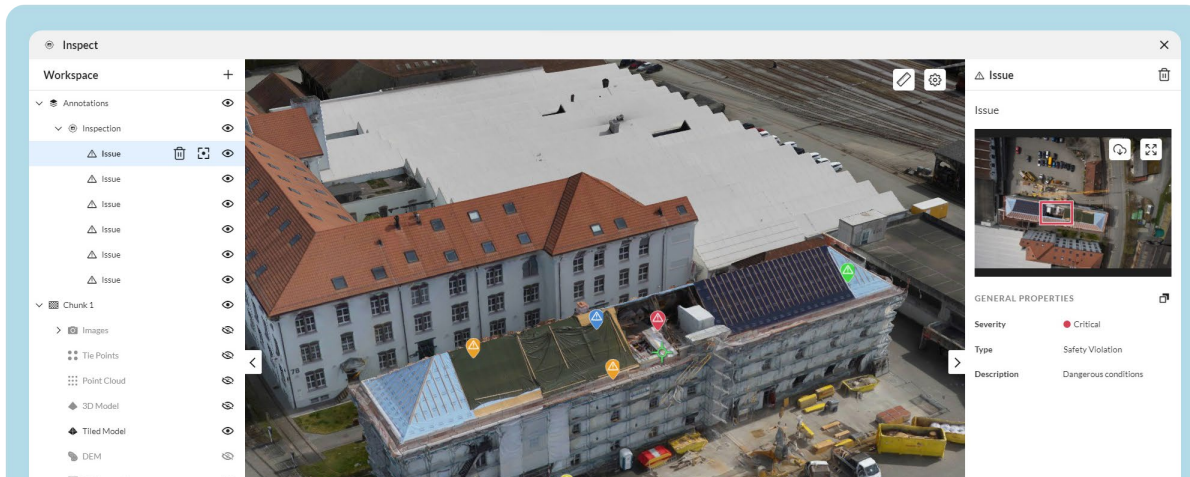


NEW FEATURES

## Advanced tools for inspection, annotation and measurement in Agisoft Cloud

Agisoft Cloud platform has expanded its capabilities for visual inspection and change monitoring. Users can now utilize a dedicated tool to navigate images within the 3D scene, annotate points of interest, and generate inspection reports. Newly-released version of the platform introduces tools to compare elevation profiles and measure surface volumes with improved efficiency.

Agisoft Cloud now supports upload of vector maps in various common formats and offers enhanced annotation styling options for better customization.

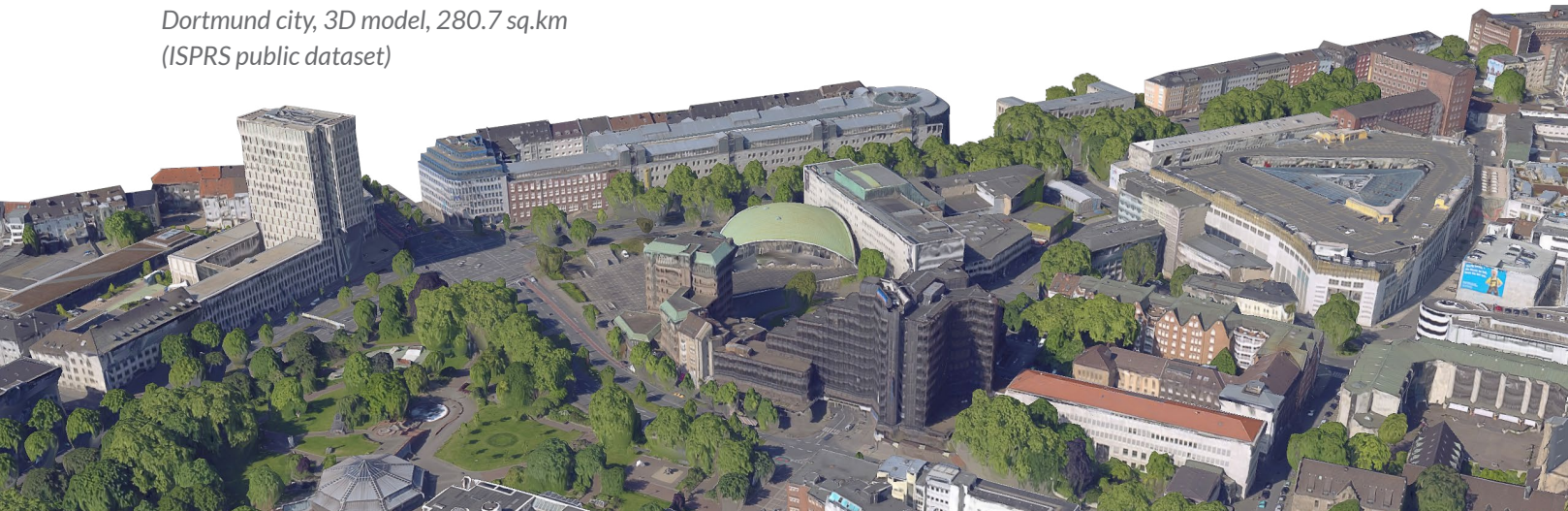


FIELDS OF APPLICATION


## Surveying

Metashape enables to create 3D models from aerial imagery. The functionality of the program is being constantly developed according to the tasks set by rapidly emerging UAS industry. Starting from version 2.0 Metashape works with aerial LiDAR data and allows to generate 3D surface model based both on images and LiDAR point clouds. Thanks to LiDAR trajectory and metadata support, combined data approach proves to add quality to the reconstruction results when the project works with narrow passages or forestry areas, for example. These functionality plus possibility to run distributed processing as well as support for tiled model generation and export makes Metashape a practical tool for city scale projects.

*Dortmund city, 3D model, 280.7 sq.km  
(ISPRS public dataset)*







FIELDS OF APPLICATION

## Mapping

Metashape is a perfect tool for maps creation workflows. It creates seamless orthomosaics both from images and from LiDAR points clouds meeting the resources of the project. Breaklines instrument helps to improve quality of true orthomosaics for urban areas. DEM editing with Fill tool allows to eliminate artifacts on the roads and close holes in water areas, for example, to result as well in more accurate orthomosaics. Point cloud classification instrument in Metashape provides for opportunity to generate digital terrain model based on ground point class data.

For projects relying on satellite data analysis Metashape offers functionality to reconstruct mesh, point cloud, DEM or orthomosaic from satellite imagery with RPC coefficients.

For advanced GIS workflows Metashape offers possibility to vectorize objects based on 3D model or orthomosaic data.

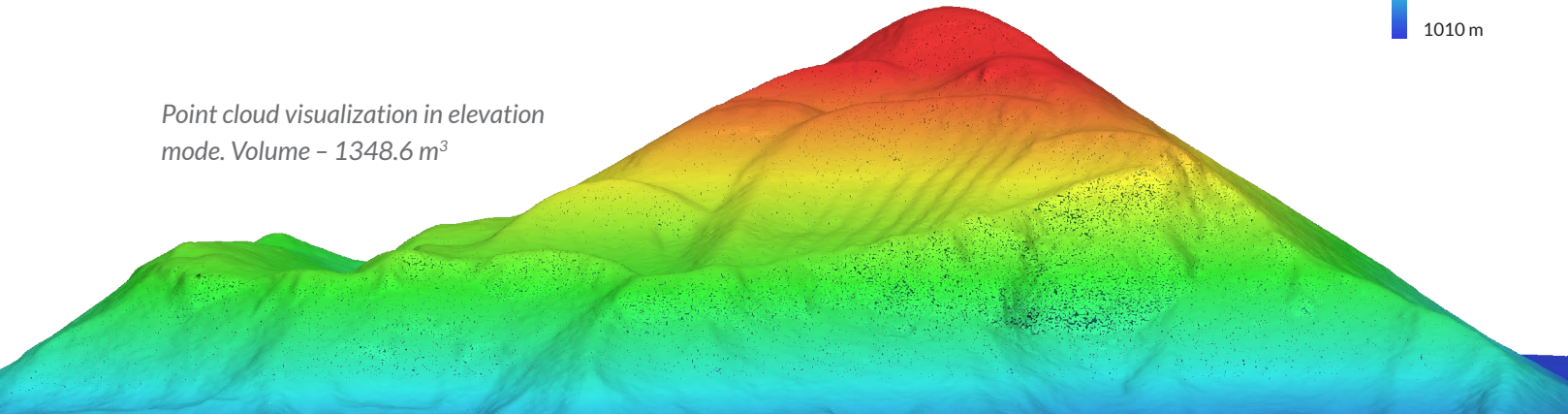
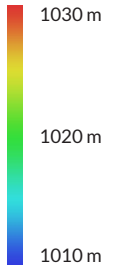
*Satellite images with RPC data  
from IKONOS*

## FIELDS OF APPLICATION

# Mining

Highly accurate DEMs produced by Metashape lay the grounds for precise area and volume measurements, both for natural hills and man-made piles. DEM editing tool, namely Fill tool, helps to perform measurements for DTM when some data about the terrain is missing due to forestry exclusion from the model, for example. Profiles – both for DEM, mesh, point cloud – and Contour lines generation are further instruments to employ Metashape in mining industry analysis workflows. Metashape pro-cessing statistics and measurements results can be exported as a PDF report.

*Point cloud visualization in elevation mode. Volume – 1348.6 m<sup>3</sup>*

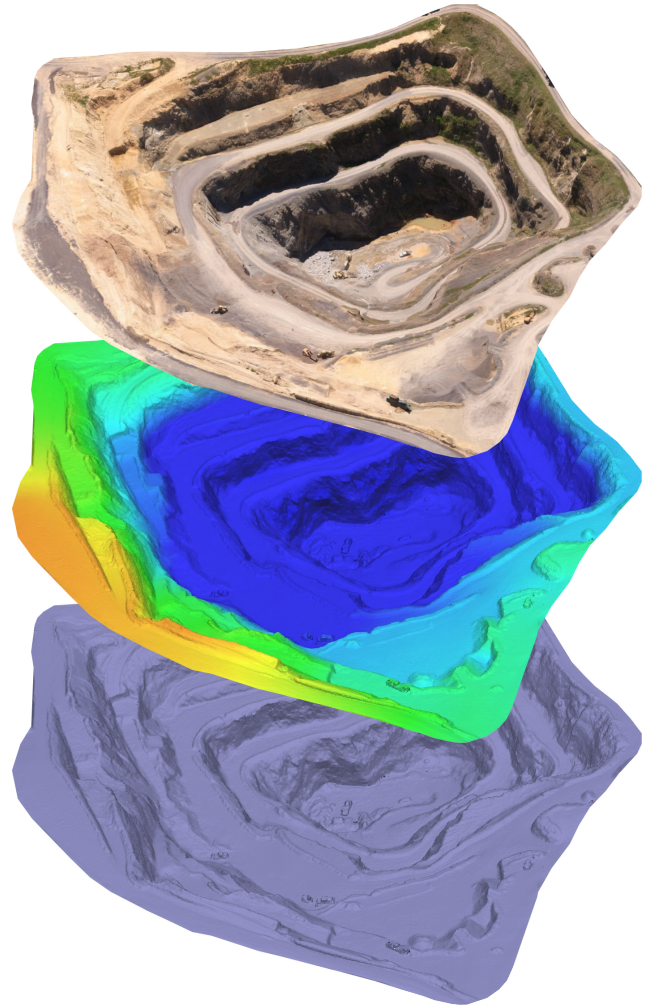


FIELDS OF APPLICATION

## Quarrying

Once multiple UAS flights performed at different time moments, Metashape allows for volume change tracking for quarrying jobs, as well as for soil erosion and glacier studies. Automatic non-coded targets detection capability saves up on manual work in inspection projects done on a regular basis. DEM visualization in Elevation, Slope and Aspect modes adds to convenience of the preliminary results analysis right in the Metashape program window.

*70 m deep quarry,  
Synergy Positioning Systems Ltd*

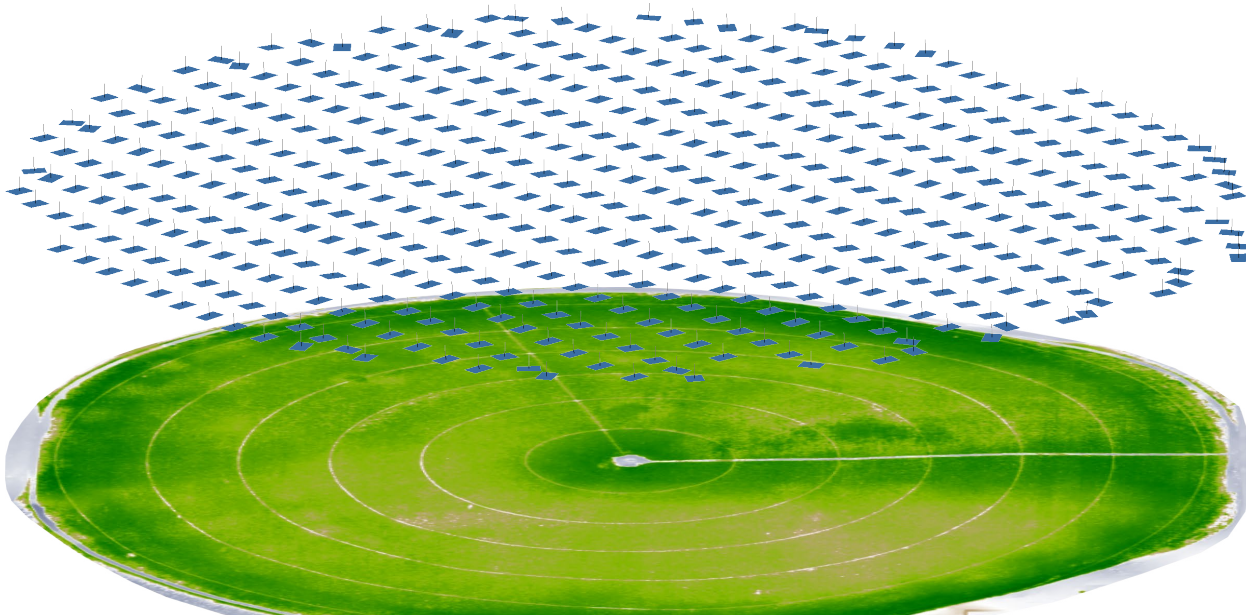


FIELDS OF APPLICATION

## Agriculture

With support for panchromatic, multispectral and thermal imagery, Metashape seamlessly integrates into workflows involving processing of data from diverse sources, like vegetation and soil analysis, fires and night studies, etc. Vegetation indices calculation according to a user-defined formula allows to analyze crop problems and generate prescriptions for variable rate farming equipment. With multiple UAS flights performed at different time moments, Metashape enables to track the changes in crop growth.

*NDVI map from multi-spectral sensor, MicaSense*



FIELDS OF APPLICATION

## Underwater

Metashape is capable of generating textured polygonal models for underwater imagery, be it a shipwreck, a coral reef, or a seabed itself. Thanks to Scale Bar tool, precise measurements can be performed for such models despite the frequently faced problem of absence of GPS data in such projects.



*60 m long, 2000 photos,  
SS Gwladmena by Simon Brown*

FIELDS OF APPLICATION

## Archaeology

Archaeology more and more often relies on photogrammetric approaches today, be it a need to model an artifact or a demand for an excavation mapping. Thanks to the capability to process imagery from any digital camera, Metashape is widely used in various archaeological projects both up in the mountains and deep under the water, including special researches like greenery pattern studies to find ancient ruins under the ground or rock art documentation and analysis projects.

*1 mm/pix resolution,  
Ancient farmhouse (IV B.C.)*

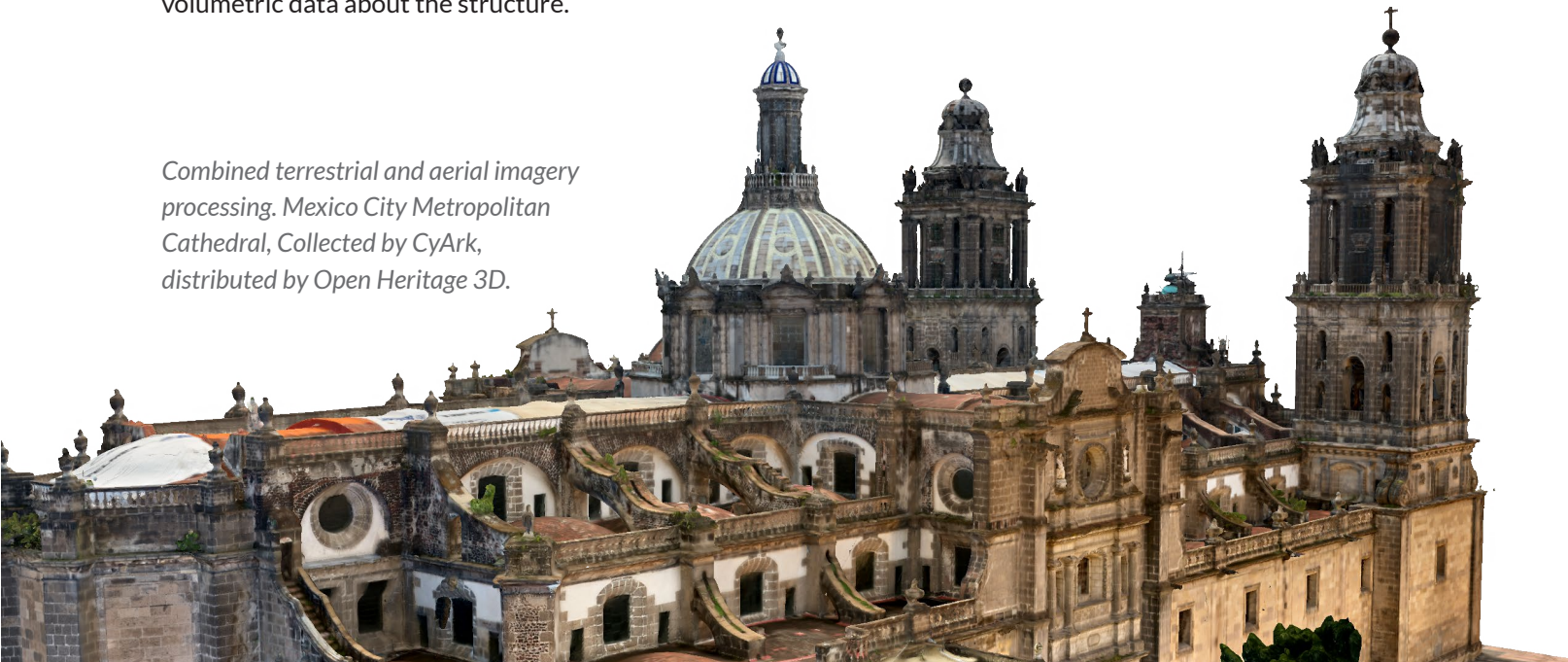


FIELDS OF APPLICATION

## Architecture

With support for combined processing of terrestrial and aerial (nadir and oblique) imagery, Metashape allows to reconstruct the whole building, which can be employed, for example, for virtual tours creation. 3D models of partially ruined facades and artifacts present reliable basis for restoration works thanks to exceptional accuracy of reconstruction results. The possibility to vectorize orthomosaic or model helps to notate all the features of the structure and serves as a basis for precise drawings creations along with calculation of dimensional and volumetric data about the structure.

*Combined terrestrial and aerial imagery processing. Mexico City Metropolitan Cathedral, Collected by CyArk, distributed by Open Heritage 3D.*



FIELDS OF APPLICATION

## UAV Inspection

Metashape includes functionality to automatically Detect Powerlines on the images and, thus, allows to perform large-scale powerlines inspection projects without need to invest in LiDAR equipment. The results in a form of a 3D polyline model for every wire can be exported for documentation and analysis in industry-specific tools or used for obstacle avoidance by mission planning algorithm within Metashape. Robustness of the results is ensured with catenary curve fitting algorithm.

UAV inspection projects can also benefit from DEMs difference calculation tool which allows to track surface changes and have them measured.

*18 km transmission powerlines,  
GeoScan Ltd.*





FIELDS OF APPLICATION

## Forensics

Metashape is widely used as a tool for documentation of traffic accidents thanks to combination of photorealistic visualization of the scene in a form of 3D model and possibility to perform precise distance measurements right on the model. Thus, photogrammetric software helps to minimize time required for the cars to be kept on the road and provides instruments for detailed analysis of the causes of the accident.

*55 stereo-images,  
Leica BLK3D Imager*

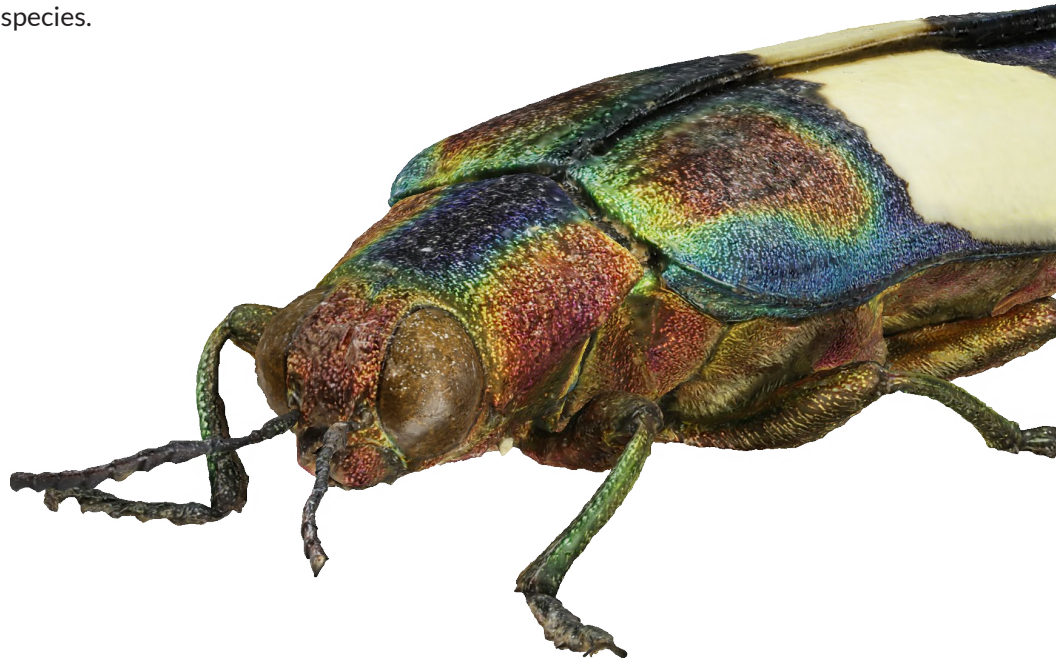


FIELDS OF APPLICATION

## Biology

Metashape processes imagery from various sensors, including cameras with macro lens. This option is used to reconstruct various insects when documenting zoological museums' collections. Photogrammetric 3D model generation is also in demand in projects dealing with monitoring fading flora, prehistoric fossils documentation and creating of digital twins of various species.

*Cockroach, 160 macro photos,  
Prof. Radosław Zajdel, Medical  
University of Lodz, Poland*



FIELDS OF APPLICATION

## Interior

Combined processing of images and terrestrial laser scans allows Metashape to generate accurate models of the interiors. The software also features a tool to create video presentations of the model right in the program window.

*Peasant house (XIX A.D.), Kizhi,  
combined processing of terrestrial  
laser scans and handheld camera  
photos*



FIELDS OF APPLICATION

## Medicine

Metashape software is applied to solve different problems in the field of medicine, like generating scaled 3D models of teeth or feet as the basis for statement analysis and planning of proper treatment. Photogrammetry provides tools for advanced approach to examination of spine curves and tracing of spine degenerative changes dynamics.

*Human skeletal system,  
Prof. Radosław Zajdel, Medical  
University of Lodz, Poland*

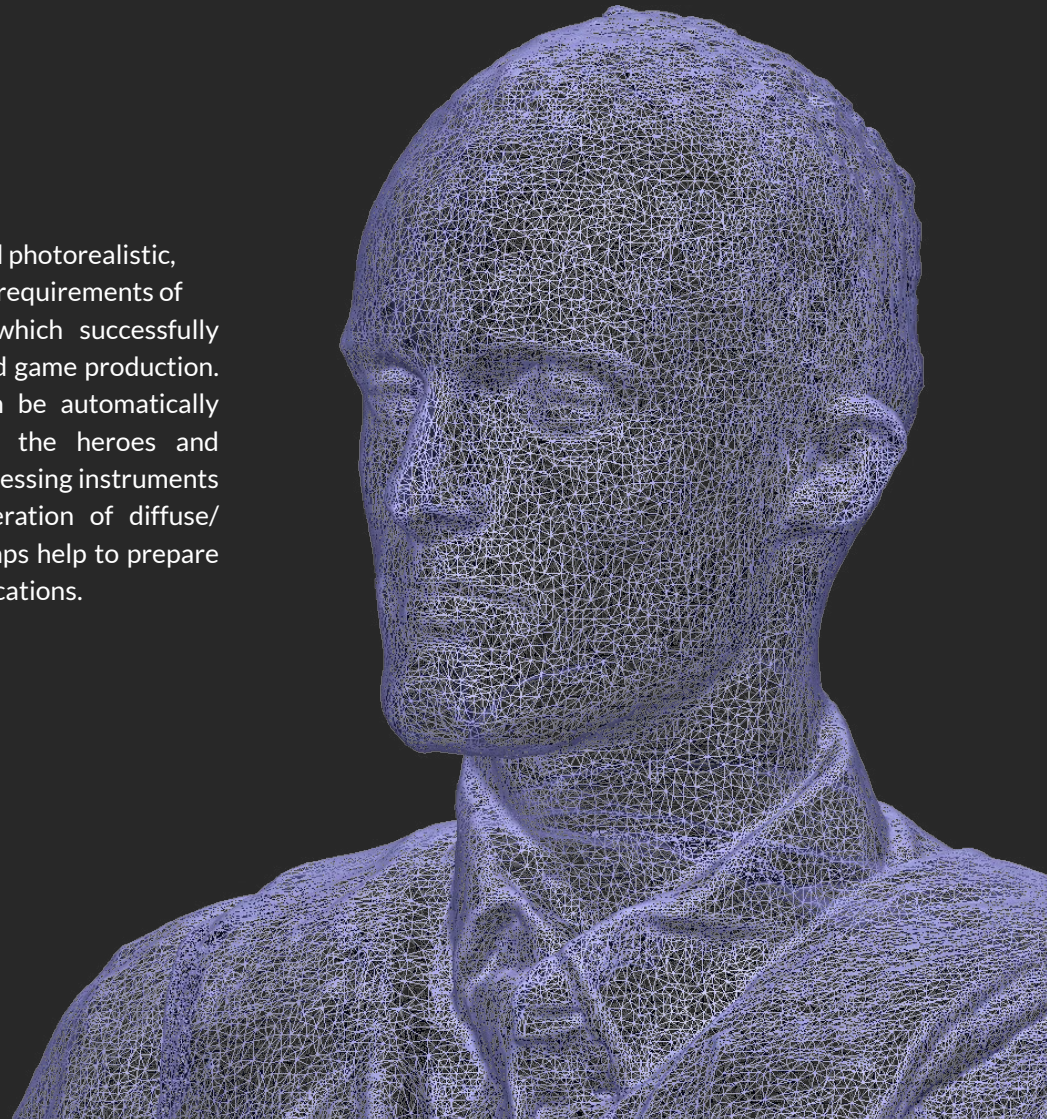


FIELDS OF APPLICATION

## Game Design

Thanks to being highly detailed and photorealistic, Metashape models meet the strict requirements of professional animation studios, which successfully employ the software for movie and game production. Face and body capture data can be automatically processed into digital twins of the heroes and realistically animated with 4D processing instruments and Remove Lighting tool. Generation of diffuse/displacement/occlusion/normal maps help to prepare texture files for visual effects applications.

*3D model in wireframe mode,  
91 images, 4 million faces, Ultra  
high quality, Hargrovecompany*



# Advantages

---

Combined processing of imagery, terrestrial laser scans and aerial LiDAR data

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Highly accurate and detailed results

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GPU acceleration for faster processing

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Agisoft Cloud for processing, visualization and sharing of the results

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Easy sharing with PDF or fly through video export and direct upload to online resources

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Block models for editing of city-scale models

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Fully automated and intuitive workflow

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Network processing for large projects

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Stereoscopic measurements for precise feature extraction

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Reasonably powerful Standard edition for art projects

# Compatibility

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Processes images from digital/film/video cameras and multi-camera systems, as well as terrestrial laser scans and aerial LiDAR data

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Supports frame/fisheye/spherical/cylindrical/RPC camera models

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Exports results in widely supported formats

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Runs on Windows, macOS and Linux

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Supports registered/non-registered terrestrial laser scans

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Works well with most UAVs (copters, fixed-wings and VTOLs)

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Supports most EPSG coordinate systems and configurable vertical datums

# Capabilities

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Satellite, aerial and close-range triangulation

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Combined alignment of imagery and terrestrial laser scanner data

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Marker-based point clouds (photogrammetric, TLS, aerial LiDAR) registration in one coordinate system

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Georeferencing using flight log and/or GCPs

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Photogrammetric point cloud generation

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DSM/DTM generation

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Incremental image alignment

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Geometric registration of TLS point clouds

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Image set redundancy analysis

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Coded and non-coded targets auto detection

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Automatic classification of photogrammetric and LiDAR point clouds

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DEM editing tools



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True orthomosaic generation in geographic and user defined projections

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Manual orthomosaic seamline editing

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Coordinate/distance/area/volume/profile measurements

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Vegetation index calculation for multispectral imagery projects

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Polygonal model reconstruction, including block models

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Deghosting filters for texture and orthomosaic

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Automatic seamline refinement for traditional DTM-based orthomosaics

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Elevation contour lines generation

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Automatic powerlines detection

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Prescription maps generation and export

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Texture generation with delighting filter

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Ambient occlusion, normal and displacement maps generation

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Hierarchical tiled model generation and visualization

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4D reconstruction for dynamic scenes

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Python scripting and Java API for job automation

---

Batch processing for multi-task pipelines automation

---

Mission planning for complex sites

---

Spherical panorama stitching

---

Headless operation support

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Free stand-alone Agisoft Viewer for responsive visualization of large models



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