Metashape Python Reference

Release 1.8.5

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CHAPTER

ONE

OVERVIEW

1.1 Introduction to Python scripting in Metashape Professional

This API is in development and will be extended in the future Metashape releases.

Note: Python scripting is supported only in Metashape Professional edition.

Metashape Professional uses Python 3.8 as a scripting engine.

Python commands and scripts can be executed in Metashape in one of the following ways:

- From Metashape "Console" pane using it as standard Python console.
- From the "Tools" menu using "Run script…" command.
- From command line using "-r" argument and passing the path to the script as an argument.

The following Metashape funtionality can be accessed from Python scripts:

- Open/save/create Metashape projects.
- Add/remove chunks, cameras, markers.
- Add/modify camera calibrations, ground control data, assign geographic projections and coordinates.
- Perform processing steps (align photos, build dense cloud, build mesh, texture, decimate model, etc…).
- Export processing results (models, textures, orthophotos, DEMs).
- Access data of generated models, point clouds, images.
- Start and control network processing tasks.

CHAPTER

TWO

APPLICATION MODULES

Metashape module provides access to the core processing functionality, including support for inspection and manipulation with project data.

The main component of the module is a Document class, which represents a Metashape project. Multiple Document instances can be created simultaneously if needed. Besides that a currently opened project in the application can be accessed using Metashape.app.document property.

The following example performs main processing steps on existing project and saves back the results:

```
>>> import Metashape
>>> doc = Metashape.app.document
>>> doc.open("project.psz")
>>> chunk = doc.chunk
>>> chunk.matchPhotos(downscale=1, generic_preselection=True, reference_
↪preselection=False)
>>> chunk.alignCameras()
>>> chunk.buildDepthMaps(downscale=4, filter_mode=Metashape.AggressiveFiltering)
>>> chunk.buildDenseCloud()
>>> chunk.buildModel(surface_type=Metashape.Arbitrary, interpolation=Metashape.
↪EnabledInterpolation)
>>> chunk.buildUV(mapping_mode=Metashape.GenericMapping)
>>> chunk.buildTexture(blending_mode=Metashape.MosaicBlending, texture_size=4096)
>>> doc.save()
```

class Metashape.**Antenna**

GPS antenna position relative to camera.

copy()

Return a copy of the object.

Returns A copy of the object.

Return type *Antenna*

fixed

Fix antenna flag.

Type bool

location

Antenna coordinates.

Type *Vector*

location_acc

Antenna location accuracy.

Type *Vector*

location_covariance
Antenna location covariance.

Type *Matrix*

location_ref
Antenna location reference.

Type *Vector*

rotation
Antenna rotation angles.

Type *Vector*

rotation_acc
Antenna rotation accuracy.

Type *Vector*

rotation_covariance
Antenna rotation covariance.

Type *Matrix*

rotation_ref
Antenna rotation reference.

Type *Vector*

class Metashape.**Application**
Application class provides access to several global application attributes, such as document currently loaded in the user interface, software version and GPU device configuration. It also contains helper routines to prompt the user to input various types of parameters, like displaying a file selection dialog or coordinate system selection dialog among others.

An instance of Application object can be accessed using Metashape.app attribute, so there is usually no need to create additional instances in the user code.

The following example prompts the user to select a new coordinate system, applies it to the ative chunk and saves the project under the user selected file name:

```
>>> import Metashape
>>> doc = Metashape.app.document
>>> crs = Metashape.app.getCoordinateSystem("Select Coordinate System", doc.chunk.
↪crs)
>>> doc.chunk.crs = crs
>>> path = Metashape.app.getSaveFileName("Save Project As")
>>> try:
...     doc.save(path)
... except RuntimeError:
...     Metashape.app.messageBox("Can't save project")
```

class ConsolePane
ConsolePane class provides access to the console pane

clear()
Clear console pane.

contents
Console pane contents.

Type string

class ModelView

ModelView class provides access to the model view

class DenseCloudViewMode

Dense cloud view mode in [DenseCloudViewColor, DenseCloudViewClasses, DenseCloudViewConfidence]

class ModelViewMode

Model view mode in [ModelViewShaded, ModelViewSolid, ModelViewWireframe, ModelViewConfidence, ModelViewTextured]

class PointCloudViewMode

Point cloud view mode in [PointCloudViewColor, PointCloudViewVariance]

class TiledModelViewMode

Tiled model view mode in [TiledModelViewTextured, TiledModelViewSolid, TiledModelViewWireframe]

captureView([*width*][, *height*][, *transparent*][, *hide_items*])

Capture image from model view.

Parameters

- **width** (*int*) – Image width.
- **height** (*int*) – Image height.
- **transparent** (*bool*) – Sets transparent background.
- **hide_items** (*bool*) – Hides all items.

Returns Captured image.

Return type *Image*

dense_cloud_view_mode

Dense cloud view mode.

Type *DenseCloudViewMode*

model_view_mode

Model view mode.

Type *ModelViewMode*

point_cloud_view_mode

Point cloud view mode.

Type *PointCloudViewMode*

texture_view_mode

Texture view mode.

Type TextureViewMode

tiled_model_view_mode

Tiled model view mode.

Type *TiledModelViewMode*

view_mode

View mode.

Type *DataSource*

viewpoint

Viewpoint in the model view.

Type *Viewpoint*

class OrthoView

OrthoView class provides access to the ortho view

captureView([*width*][, *height*][, *transparent*][, *hide_items*])
Capture image from ortho view.
Parameters
- **width** (*int*) – Image width.
- **height** (*int*) – Image height.
- **transparent** (*bool*) – Sets transparent background.
- **hide_items** (*bool*) – Hides all items.

Returns Captured image.
Return type *Image*

view_mode
View mode.
Type *DataSource*

class PhotosPane
PhotosPane class provides access to the photos pane

resetFilter()
Reset photos pane filter.

setFilter(*items*)
Set photos pane filter.
Parameters **items** (list of *Camera* or *Marker*) – filter to apply.

class Settings
PySettings()

Application settings

language
User interface language.
Type string

load()
Load settings from disk.

log_enable
Enable writing log to file.
Type bool

log_path
Log file path.
Type string

network_enable
Network processing enabled flag.
Type bool

network_host
Network server host name.
Type string

network_path
Network data root path.
Type string

network_port
Network server control port.
Type int

project_absolute_paths
Store absolute image paths in project files.
Type bool

project_compression
Project compression level.
Type int

save()
Save settings on disk.

setValue(*key*, *value*)
Set settings value. :arg key: Key. :type key: string :arg value: Value. :type value: object

value(*key*)
Return settings value. :arg key: Key. :type key: string :return: Settings value. :rtype: object

activated
Metashape activation status.

Type bool

addMenuItem(*label*, *func*[, *shortcut*][, *icon*])
Create a new menu entry.

Parameters

- **label** (*string*) – Menu item label.
- **func** (*function*) – Function to be called.
- **shortcut** (*string*) – Keyboard shortcut.
- **icon** (*string*) – Icon.

addMenuSeparator(*label*)
Add menu separator.

Parameters **label** (*string*) – Menu label.

console_pane
Console pane.

Type *ConsolePane*

cpu_enable
Use CPU when GPU is active.

Type bool

document
Main application document object.

Type *Document*

enumGPUDevices()
Enumerate installed GPU devices.

Returns A list of devices.

Return type list

getBool(*label=''*)
Prompt user for the boolean value.

Parameters **label** (*string*) – Optional text label for the dialog.

Returns Boolean value selected by the user.

Return type bool

getCoordinateSystem([*label*][, *value*])
Prompt user for coordinate system.

Parameters

- **label** (*string*) – Optional text label for the dialog.
- **value** (*CoordinateSystem*) – Default value.

Returns Selected coordinate system. If the dialog was cancelled, None is returned.

Return type *CoordinateSystem*

getExistingDirectory([*hint*][, *dir*])
Prompt user for the existing folder.

Parameters

- **hint** (*string*) – Optional text label for the dialog.
- **dir** (*string*) – Optional default folder.

Returns Path to the folder selected. If the input was cancelled, empty string is returned.

Return type string

getFloat(*label=''*, *value=0*)
Prompt user for the floating point value.

Parameters

- **label** (*string*) – Optional text label for the dialog.
- **value** (*float*) – Default value.

Returns Floating point value entered by the user.

Return type float

getInt(*label=''*, *value=0*)
Prompt user for the integer value.

Parameters

- **label** (*string*) – Optional text label for the dialog.
- **value** (*int*) – Default value.

Returns Integer value entered by the user.

Return type int

getOpenFileName([*hint*][, *dir*][, *filter*])
Prompt user for the existing file.

Parameters

- **hint** (*string*) – Optional text label for the dialog.
- **dir** (*string*) – Optional default folder.
- **filter** (*string*) – Optional file filter, e.g. "Text file (*.txt)" or ".txt". Multiple filters are separated with ";;".

Returns Path to the file selected. If the input was cancelled, empty string is returned.

Return type string

getOpenFileNames([*hint*][, *dir*][, *filter*])
Prompt user for one or more existing files.

Parameters

- **hint** (*string*) – Optional text label for the dialog.
- **dir** (*string*) – Optional default folder.
- **filter** (*string*) – Optional file filter, e.g. "Text file (*.txt)" or ".txt". Multiple filters are separated with ";;".

Returns List of file paths selected by the user. If the input was cancelled, empty list is returned.

Return type list

getSaveFileName([*hint*][, *dir*][, *filter*])
Prompt user for the file. The file does not have to exist.

Parameters

- **hint** (*string*) – Optional text label for the dialog.
- **dir** (*string*) – Optional default folder.
- **filter** (*string*) – Optional file filter, e.g. "Text file (*.txt)" or ".txt". Multiple filters are separated with ";;".

Returns Path to the file selected. If the input was cancelled, empty string is returned.

Return type string

getString(*label=''*, *value=''*)
Prompt user for the string value.

Parameters

- **label** (*string*) – Optional text label for the dialog.
- **value** (*string*) – Default value.

Returns String entered by the user.

Return type string

gpu_mask
GPU device bit mask: 1 - use device, 0 - do not use (i.e. value 5 enables device number 0 and 2).

Type int

messageBox(*message*)
Display message box to the user.

Parameters **message** (*string*) – Text message to be displayed.

model_view
Model view.

Type *ModelView*

ortho_view
Ortho view.

Type *OrthoView*

photos_pane
Photos pane.

Type *PhotosPane*

quit()
Exit application.

releaseFreeMemory()
Call malloc_trim on Linux (does nothing on other OS).

removeMenuItem(*label*)
Remove menu entry with given label (if exists). If there are multiple entries with given label - all of them will be removed.

Parameters **label** (*string*) – Menu item label.

settings
Application settings.

Type *Settings*

title
Application name.

Type string

update()
Update user interface during long operations.

version
Metashape version.

Type string

class Metashape.**AttachedGeometry**
Attached geometry data.

GeometryCollection(*geometries*)
Create a GeometryCollection geometry.

Parameters **geometries** (list of *Geometry*) – Child geometries.

Returns A GeometryCollection geometry.

Return type *Geometry*

LineString(*coordinates*)
Create a LineString geometry.

Parameters **coordinates** (*list of int*) – List of vertex coordinates.

Returns A LineString geometry.

Return type *Geometry*

MultiLineString(*geometries*)
Create a MultiLineString geometry.

Parameters **geometries** (list of *Geometry*) – Child line strings.

Returns A point geometry.

Return type *Geometry*

MultiPoint(*geometries*)
Create a MultiPoint geometry.

Parameters **geometries** (list of *Geometry*) – Child points.

Returns A point geometry.

Return type *Geometry*

MultiPolygon(*geometries*)
Create a MultiPolygon geometry.

Parameters **geometries** (list of *Geometry*) – Child polygons.

Returns A point geometry.

Return type *Geometry*

Point(*key*)
Create a Point geometry.

Parameters **key** (*int*) – Point marker key.

Returns A point geometry.

Return type *Geometry*

Polygon(*exterior_ring*[, *interior_rings*])
Create a Polygon geometry.

Parameters

- **exterior_ring** (*list of int*) – Point coordinates.
- **interior_rings** (*list of int*`) – Point coordinates.

Returns A Polygon geometry.

Return type *Geometry*

coordinates
List of vertex keys.

Type int

geometries
List of child geometries.

Type *Geometry*

type
Geometry type.

Type *Geometry.Type*

class Metashape.**BBox**
Axis aligned bounding box

copy()
Return a copy of the object.

Returns A copy of the object.

Return type *BBox*

max
Maximum bounding box extent.

Type *Vector*

min
Minimum bounding box extent.

Type *Vector*

size
Bounding box dimension.

Type int

class Metashape.**BlendingMode**
Blending mode in [AverageBlending, MosaicBlending, MinBlending, MaxBlending, DisabledBlending]

class Metashape.**Calibration**
Calibration object contains camera calibration information including image size, focal length, principal point coordinates and distortion coefficients.

b1
Affinity.

Type float

b2
Non-orthogonality.

Type float

copy()
Return a copy of the object.

Returns A copy of the object.

Return type *Calibration*

covariance_matrix
Covariance matrix.

Type *Matrix*

covariance_params
Covariance matrix parameters.

Type list of string

cx
Principal point X coordinate.

Type float

cy
Principal point Y coordinate.

Type float

error(*point*, *proj*)
Return projection error.

Parameters

- **point** (*Vector*) – Coordinates of the point to be projected.
- **proj** (*Vector*) – Pixel coordinates of the point.

Returns 2D projection error.

Return type *Vector*

f
Focal length.

Type float

height
Image height.

Type int

k1
Radial distortion coefficient K1.

Type float

k2
Radial distortion coefficient K2.

Type float

k3
Radial distortion coefficient K3.

Type float

k4
Radial distortion coefficient K4.

Type float

load(*path*, *format=CalibrationFormatXML*)
Loads calibration from file.

Parameters

- **path** (*string*) – path to calibration file
- **format** (*CalibrationFormat*) – Calibration format.

p1
Decentering distortion coefficient P1.

Type float

p2
Decentering distortion coefficiant P2.

Type float

p3
Decentering distortion coefficient P3.

Type float

p4
Decentering distortion coefficiant P4.

Type float

project(*point*)
Return projected pixel coordinates of the point.

Parameters **point** (*Vector*) – Coordinates of the point to be projected.

Returns 2D projected point coordinates.

Return type *Vector*

rpc
RPC model.

Type *RPCModel*

save(*path*, *format=CalibrationFormatXML*[, *label*][, *pixel_size*][, *focal_length*], *cx = 0*, *cy = 0*)
Saves calibration to file.

Parameters

- **path** (*string*) – path to calibration file
- **format** (*CalibrationFormat*) – Calibration format.
- **label** (*string*) – Calibration label used in Australis, CalibCam and CalCam formats.
- **pixel_size** (*Vector*) – Pixel size in mm used to convert normalized calibration coefficients to Australis and CalibCam coefficients.
- **focal_length** (*float*) – Focal length (Grid calibration format only).
- **cx** (*float*) – X principal point coordinate (Grid calibration format only).
- **cy** (*float*) – Y principal point coordinate (Grid calibration format only).

type
Camera model.

Type *Sensor.Type*

unproject(*point*)
Return direction corresponding to the image point.

Parameters **point** (*Vector*) – Pixel coordinates of the point.

Returns 3D vector in the camera coordinate system.

Return type *Vector*

width
Image width.

Type int

class Metashape.**CalibrationFormat**
Calibration format in [CalibrationFormatXML, CalibrationFormatAustralis, CalibrationFormatAustralisV7, CalibrationFormatPhotoModeler, CalibrationFormatCalibCam, CalibrationFormatCalCam, CalibrationFormatInpho, CalibrationFormatUSGS, CalibrationFormatPix4D, CalibrationFormatOpenCV, CalibrationFormatPhotomod, CalibrationFormatGrid, CalibrationFormatSTMap]

class Metashape.**Camera**
Camera instance

```
>>> import Metashape
>>> chunk = Metashape.app.document.addChunk()
>>> chunk.addPhotos(["IMG_0001.jpg", "IMG_0002.jpg"])
>>> camera = chunk.cameras[0]
>>> camera.photo.meta["Exif/FocalLength"]
'18'
```

The following example describes how to create multispectal camera layout:

```
>>> import Metashape
>>> doc = Metashape.app.document
>>> chunk = doc.chunk
>>> rgb = ["RGB_0001.JPG", "RGB_0002.JPG", "RGB_0003.JPG"]
>>> nir = ["NIR_0001.JPG", "NIR_0002.JPG", "NIR_0003.JPG"]
>>> images = [[rgb[0], nir[0]], [rgb[1], nir[1]], [[rgb[2], nir[2]]
>>> chunk.addPhotos(images, Metashape.MultiplaneLayout)
```

class Reference

Camera reference data.

accuracy

Camera location accuracy.

Type *Vector*

enabled

Location enabled flag.

Type bool

location

Camera coordinates.

Type *Vector*

location_accuracy

Camera location accuracy.

Type *Vector*

location_enabled

Location enabled flag.

Type bool

rotation

Camera rotation angles.

Type *Vector*

rotation_accuracy

Camera rotation accuracy.

Type *Vector*

rotation_enabled

Rotation enabled flag.

Type bool

class Type

Camera type in [Regular, Keyframe]

calibration

Adjusted camera calibration including photo-invariant parameters.

Type *Calibration*

center

Camera station coordinates for the photo in the chunk coordinate system.

Type *Vector*

chunk

Chunk the camera belongs to.

Type *Chunk*

enabled
Enables/disables the photo.

Type bool

error(*point*, *proj*)
Returns projection error.

Parameters

- **point** (*Vector*) – Coordinates of the point to be projected.
- **proj** (*Vector*) – Pixel coordinates of the point.

Returns 2D projection error.

Return type *Vector*

frames
Camera frames.

Type list of *Camera*

group
Camera group.

Type *CameraGroup*

image()
Returns image data.

Returns Image data.

Return type *Image*

key
Camera identifier.

Type int

label
Camera label.

Type string

layer_index
Camera layer index.

Type int

location_covariance
Camera location covariance.

Type *Matrix*

mask
Camera mask.

Type *Mask*

master
Master camera.

Type *Camera*

meta
Camera meta data.

Type *MetaData*

open(*path*[, *layer*])
Loads specified image file.

Parameters

- **path** (*string*) – Path to the image file to be loaded.
- **layer** (*int*) – Optional layer index in case of multipage files.

orientation
Image orientation (1 - normal, 6 - 90 degree, 3 - 180 degree, 8 - 270 degree).

Type int

photo
Camera photo.

Type *Photo*

planes
Camera planes.

Type list of *Camera*

project(*point*)
Returns coordinates of the point projection on the photo.

Parameters **point** (*Vector*) – Coordinates of the point to be projected.

Returns 2D point coordinates.

Return type *Vector*

reference
Camera reference data.

Type CameraReference

rotation_covariance
Camera rotation covariance.

Type *Matrix*

selected
Selects/deselects the photo.

Type bool

sensor
Camera sensor.

Type *Sensor*

shutter
Camera shutter.

Type *Shutter*

thumbnail
Camera thumbnail.

Type *Thumbnail*

transform
4x4 matrix describing photo location in the chunk coordinate system.

Type *Matrix*

type
Camera type.

Type *Camera.Type*

unproject(*point*)
Returns coordinates of the point which will have specified projected coordinates.

Parameters **point** (*Vector*) – Projection coordinates.

Returns 3D point coordinates.

Return type *Vector*

vignetting
Vignetting for each band.

Type list of *Vignetting*

class Metashape.**CameraGroup**
CameraGroup objects define groups of multiple cameras. The grouping is established by assignment of a CameraGroup instance to the Camera.group attribute of participating cameras.

The type attribute of CameraGroup instances defines the effect of such grouping on processing results and can be set to Folder (no effect) or Station (coincident projection centers).

class Type
Camera group type in [Folder, Station]

label
Camera group label.

Type string

selected
Current selection state.

Type bool

type
Camera group type.

Type *CameraGroup.Type*

class Metashape.**CameraTrack**
Camera track.

chunk
Chunk the camera track belongs to.

Type *Chunk*

duration
Animation duration.

Type float

field_of_view
Vertical field of view in degrees.

Type float

interpolate(*time*)
Get animation camera transform matrix. :arg time: Animation time point. :type time: float :return: Interpolated camera transformation matrix in chunk coordinate system. :rtype: *Matrix*

keyframes
Camera track keyframes.

Type list of *Camera*

label
Animation label.

Type string

load(*path*[, *projection*])
Load camera track from file.

Parameters

- **path** (*string*) – Path to camera track file
- **projection** (*CoordinateSystem*) – Camera track coordinate system.

meta
Camera track meta data.

Type *MetaData*

save(*path*[, *file_format*, *max_waypoints*, *projection*])
Save camera track to file.

Parameters

- **path** (*string*) – Path to camera track file
- **file_format** (*string*) – File format. “deduce”: - Deduce from extension, “path”: Path, “earth”: Google Earth KML, “pilot”: DJI Pilot KML, “trinity”: Asctec Trinity CSV, “autopilot”: Asctec Autopilot CSV, “litchi”: Litchi CSV
- **max_waypoints** (*int*) – Max waypoints per flight
- **projection** (*CoordinateSystem*) – Camera track coordinate system.

class Metashape.**CamerasFormat**
Camera orientation format in [CamerasFormatXML, CamerasFormatCHAN, CamerasFormatBoujou, CamerasFormatBundler, CamerasFormatOPK, CamerasFormatPATB, CamerasFormatBINGO, CamerasFormatORIMA, CamerasFormatAeroSys, CamerasFormatInpho, CamerasFormatSummit, CamerasFormatBlocksExchange, CamerasFormatRZML, CamerasFormatVisionMap, CamerasFormatABC, CamerasFormatFBX, CamerasFormatNVM, CamerasFormatMA]

class Metashape.**Chunk**
A Chunk object:

- provides access to all chunk components (sensors, cameras, camera groups, markers, scale bars)
- contains data inherent to individual frames (point cloud, model, etc)
- implements processing methods (matchPhotos, alignCameras, buildDenseCloud, buildModel, etc)
- provides access to other chunk attributes (transformation matrix, coordinate system, meta-data, etc..)

New components can be created using corresponding addXXX methods (addSensor, addCamera, addCameraGroup, addMarker, addScalebar, addFrame). Removal of components is supported by a single remove method, which can accept lists of various component types.

In case of multi-frame chunks the Chunk object contains an additional reference to the particular chunk frame, initialized to the current frame by default. Various methods that work on a per frame basis (matchPhotos, buildModel, etc) are applied to this particular frame. A frames attribute can be used to obtain a list of Chunk objects that reference all available frames.

The following example performs image matching and alignment for the active chunk:

```
>>> import Metashape
>>> chunk = Metashape.app.document.chunk
>>> for frame in chunk.frames:
...     frame.matchPhotos(downscale=1)
>>> chunk.alignCameras()
```

addCamera([*sensor*])
Add new camera to the chunk.

Parameters **sensor** (*Sensor*) – Sensor to be assigned to this camera.

Returns Created camera.

Return type *Camera*

addCameraGroup()
Add new camera group to the chunk.

Returns Created camera group.

Return type *CameraGroup*

addCameraTrack()
Add new camera track to the chunk.

Returns Created camera track.

Return type *CameraTrack*

addDenseCloud()
Add new dense cloud to the chunk.

Returns Created dense cloud.

Return type *DenseCloud*

addDepthMaps()
Add new depth maps set to the chunk.

Returns Created depth maps set.

Return type *DepthMaps*

addElevation()
Add new elevation model to the chunk.

Returns Created elevation model.

Return type *Elevation*

addFrame()
Add new frame to the chunk.

Returns Created frame.

Return type Frame

addFrames([*chunk*][, *frames*], *copy_depth_maps=True*, *copy_dense_cloud=True*, *copy_model=True*, *copy_tiled_model=True*, *copy_elevation=True*, *copy_orthomosaic=True*[, *progress*])
Add frames from specified chunk.

Parameters

- **chunk** (*int*) – Chunk to copy frames from.
- **frames** (*list of int*) – List of frame keys to copy.
- **copy_depth_maps** (*bool*) – Copy depth maps.
- **copy_dense_cloud** (*bool*) – Copy dense cloud.
- **copy_model** (*bool*) – Copy model.
- **copy_tiled_model** (*bool*) – Copy tiled model.
- **copy_elevation** (*bool*) – Copy DEM.
- **copy_orthomosaic** (*bool*) – Copy orthomosaic.
- **progress** (*Callable[[float], None]*) – Progress callback.

addMarker([*point*], *visibility=False*)
Add new marker to the chunk.

Parameters

- **point** (*Vector*) – Point to initialize marker projections.
- **visibility** (*bool*) – Enables visibility check during projection assignment.

Returns Created marker.

Return type *Marker*

addMarkerGroup()
Add new marker group to the chunk.

Returns Created marker group.

Return type *MarkerGroup*

addModel()
Add new model to the chunk.

Returns Created model.

Return type *Model*

addOrthomosaic()
Add new orthomosaic to the chunk.

Returns Created orthomosaic.

Return type *Orthomosaic*

addPhotos([*filenames*][, *filegroups*], *layout=UndefinedLayout*[, *group*], *strip_extensions=True*, *load_reference=True*, *load_xmp_calibration=True*, *load_xmp_orientation=True*, *load_xmp_accuracy=False*, *load_xmp_antenna=True*, *load_rpc_txt=False*[, *progress*])
Add a list of photos to the chunk.

Parameters

- **filenames** (*list of string*) – List of files to add.
- **filegroups** (*list of int*) – List of file groups.

- **layout** (*ImageLayout*) – Image layout.
- **group** (*int*) – Camera group key.
- **strip_extensions** (*bool*) – Strip file extensions from camera labels.
- **load_reference** (*bool*) – Load reference coordinates.
- **load_xmp_calibration** (*bool*) – Load calibration from XMP meta data.
- **load_xmp_orientation** (*bool*) – Load orientation from XMP meta data.
- **load_xmp_accuracy** (*bool*) – Load accuracy from XMP meta data.
- **load_xmp_antenna** (*bool*) – Load GPS/INS offset from XMP meta data.
- **load_rpc_txt** (*bool*) – Load satellite RPC data from auxiliary TXT files.
- **progress** (*Callable[[float], None]*) – Progress callback.

addScalebar(*point1*, *point2*)
Add new scale bar to the chunk.

Parameters

- **point1** (*Marker* or *Camera*) – First endpoint.
- **point1** – Second endpoint.

Returns Created scale bar.

Return type *Scalebar*

addScalebarGroup()
Add new scale bar group to the chunk.

Returns Created scale bar group.

Return type *ScalebarGroup*

addSensor([*source*])
Add new sensor to the chunk.

Parameters **source** (*Sensor*) – Sensor to copy parameters from.

Returns Created sensor.

Return type *Sensor*

addTiledModel()
Add new tiled model to the chunk.

Returns Created tiled model.

Return type *TiledModel*

alignCameras([*cameras*], *min_image=2*, *adaptive_fitting=False*, *reset_alignment=False*, *subdivide_task=True*[, *progress*])
Perform photo alignment for the chunk.

Parameters

- **cameras** (*list of int*) – List of cameras to align.
- **min_image** (*int*) – Minimum number of point projections.
- **adaptive_fitting** (*bool*) – Enable adaptive fitting of distortion coefficients.
- **reset_alignment** (*bool*) – Reset current alignment.

- **subdivide_task** (*bool*) – Enable fine-level task subdivision.
- **progress** (*Callable[[float], None]*) – Progress callback.

analyzePhotos([*cameras*], *filter_mask=False*[, *progress*])

Estimate image quality.

Parameters

- **cameras** (*list of int*) – List of cameras to be analyzed.
- **filter_mask** (*bool*) – Constrain analyzed image region by mask.
- **progress** (*Callable[[float], None]*) – Progress callback.

buildContours(*source_data=ElevationData*, *interval=1*, *min_value=-1e+10*, *max_value=1e+10*, *prevent_intersections=True*[, *progress*])

Build contours for the chunk.

Parameters

- **source_data** (*DataSource*) – Source data for contour generation.
- **interval** (*float*) – Contour interval.
- **min_value** (*float*) – Minimum value of contour range.
- **max_value** (*float*) – Maximum value of contour range.
- **prevent_intersections** (*bool*) – Prevent contour intersections.
- **progress** (*Callable[[float], None]*) – Progress callback.

buildDem(*source_data=DenseCloudData*, *interpolation=EnabledInterpolation*[, *projection*][, *region*][, *classes*], *flip_x=False*, *flip_y=False*, *flip_z=False*, *resolution=0*, *subdivide_task=True*, *workitem_size_tiles=10*, *max_workgroup_size=100*[, *progress*])

Build elevation model for the chunk.

Parameters

- **source_data** (*DataSource*) – Selects between dense point cloud and tie points.
- **interpolation** (*Interpolation*) – Interpolation mode.
- **projection** (*OrthoProjection*) – Output projection.
- **region** (*BBox*) – Region to be processed.
- **classes** (*list of int*) – List of dense point classes to be used for surface extraction.
- **flip_x** (*bool*) – Flip X axis direction.
- **flip_y** (*bool*) – Flip Y axis direction.
- **flip_z** (*bool*) – Flip Z axis direction.
- **resolution** (*float*) – Output resolution in meters.
- **subdivide_task** (*bool*) – Enable fine-level task subdivision.
- **workitem_size_tiles** (*int*) – Number of tiles in a workitem.
- **max_workgroup_size** (*int*) – Maximum workgroup size.
- **progress** (*Callable[[float], None]*) – Progress callback.

buildDenseCloud(*point_colors=True*, *point_confidence=False*, *keep_depth=True*, *max_neighbors=100*, *subdivide_task=True*, *workitem_size_cameras=20*, *max_workgroup_size=100*[, *progress*])

Generate dense cloud for the chunk.

Parameters

- **point_colors** (*bool*) – Enable point colors calculation.
- **point_confidence** (*bool*) – Enable point confidence calculation.
- **keep_depth** (*bool*) – Enable store depth maps option.
- **max_neighbors** (*int*) – Maximum number of neighbor images to use for depth map filtering.
- **subdivide_task** (*bool*) – Enable fine-level task subdivision.
- **workitem_size_cameras** (*int*) – Number of cameras in a workitem.
- **max_workgroup_size** (*int*) – Maximum workgroup size.
- **progress** (*Callable[[float], None]*) – Progress callback.

buildDepthMaps(*downscale=4*, *filter_mode=MildFiltering*[, *cameras*], *reuse_depth=False*, *max_neighbors=16*, *subdivide_task=True*, *workitem_size_cameras=20*, *max_workgroup_size=100*[, *progress*])

Generate depth maps for the chunk.

Parameters

- **downscale** (*int*) – Depth map quality.
- **filter_mode** (*FilterMode*) – Depth map filtering mode.
- **cameras** (*list of int*) – List of cameras to process.
- **reuse_depth** (*bool*) – Enable reuse depth maps option.
- **max_neighbors** (*int*) – Maximum number of neighbor images to use for depth map generation.
- **subdivide_task** (*bool*) – Enable fine-level task subdivision.
- **workitem_size_cameras** (*int*) – Number of cameras in a workitem.
- **max_workgroup_size** (*int*) – Maximum workgroup size.
- **progress** (*Callable[[float], None]*) – Progress callback.

buildModel(*surface_type=Arbitrary*, *interpolation=EnabledInterpolation*, *face_count=HighFaceCount*, *face_count_custom=200000*, *source_data=DenseCloudData*, *vertex_colors=True*, *vertex_confidence=True*, *volumetric_masks=False*, *keep_depth=True*, *trimming_radius=10*[, *cameras*][, *classes*], *subdivide_task=True*, *workitem_size_cameras=20*, *max_workgroup_size=100*[, *progress*])

Generate model for the chunk frame.

Parameters

- **surface_type** (*SurfaceType*) – Type of object to be reconstructed.
- **interpolation** (*Interpolation*) – Interpolation mode.
- **face_count** (*FaceCount*) – Target face count.
- **face_count_custom** (*int*) – Custom face count.

- **source_data** (*DataSource*) – Selects between dense point cloud, tie points and depth maps.
- **vertex_colors** (*bool*) – Enable vertex colors calculation.
- **vertex_confidence** (*bool*) – Enable vertex confidence calculation.
- **volumetric_masks** (*bool*) – Enable strict volumetric masking.
- **keep_depth** (*bool*) – Enable store depth maps option.
- **trimming_radius** (*int*) – Trimming radius (no trimming if zero).
- **cameras** (*list of int*) – List of cameras to process.
- **classes** (*list of int*) – List of dense point classes to be used for surface extraction.
- **subdivide_task** (*bool*) – Enable fine-level task subdivision.
- **workitem_size_cameras** (*int*) – Number of cameras in a workitem.
- **max_workgroup_size** (*int*) – Maximum workgroup size.
- **progress** (*Callable[[float], None]*) – Progress callback.

buildOrthomosaic(*surface_data=ModelData*, *blending_mode=MosaicBlending*, *fill_holes=True*, *ghosting_filter=False*, *cull_faces=False*, *refine_seamlines=False*[, *projection*][, *region*], *resolution=0*, *resolution_x=0*, *resolution_y=0*, *flip_x=False*, *flip_y=False*, *flip_z=False*, *subdivide_task=True*, *workitem_size_cameras=20*, *workitem_size_tiles=10*, *max_workgroup_size=100*[, *progress*])

Build orthomosaic for the chunk.

Parameters

- **surface_data** (*DataSource*) – Orthorectification surface.
- **blending_mode** (*BlendingMode*) – Orthophoto blending mode.
- **fill_holes** (*bool*) – Enable hole filling.
- **ghosting_filter** (*bool*) – Enable ghosting filter.
- **cull_faces** (*bool*) – Enable back-face culling.
- **refine_seamlines** (*bool*) – Refine seamlines based on image content.
- **projection** (*OrthoProjection*) – Output projection.
- **region** (*BBox*) – Region to be processed.
- **resolution** (*float*) – Pixel size in meters.
- **resolution_x** (*float*) – Pixel size in the X dimension in projected units.
- **resolution_y** (*float*) – Pixel size in the Y dimension in projected units.
- **flip_x** (*bool*) – Flip X axis direction.
- **flip_y** (*bool*) – Flip Y axis direction.
- **flip_z** (*bool*) – Flip Z axis direction.
- **subdivide_task** (*bool*) – Enable fine-level task subdivision.
- **workitem_size_cameras** (*int*) – Number of cameras in a workitem.
- **workitem_size_tiles** (*int*) – Number of tiles in a workitem.
- **max_workgroup_size** (*int*) – Maximum workgroup size.

- **progress** (*Callable[[float], None]*) – Progress callback.

buildPanorama(*blending_mode=MosaicBlending*, *ghosting_filter=False*[, *rotation*][, *region*], *width=0*, *height=0*[, *camera_groups*][, *frames*][, *progress*])

Generate spherical panoramas from camera stations.

Parameters

- **blending_mode** (*BlendingMode*) – Panorama blending mode.
- **ghosting_filter** (*bool*) – Enable ghosting filter.
- **rotation** (*Matrix*) – Panorama 3x3 orientation matrix.
- **region** (*BBox*) – Region to be generated.
- **width** (*int*) – Width of output panorama.
- **height** (*int*) – Height of output panorama.
- **camera_groups** (*list of int*) – List of camera groups to process.
- **frames** (*list of int*) – List of frames to process.
- **progress** (*Callable[[float], None]*) – Progress callback.

buildSeamlines(*epsilon=1.5*[, *progress*])

Generate shapes for orthomosaic seamlines.

Parameters

- **epsilon** (*float*) – Contour simplificaion threshold.
- **progress** (*Callable[[float], None]*) – Progress callback.

buildTexture(*blending_mode=MosaicBlending*, *texture_size=8192*, *fill_holes=True*, *ghosting_filter=True*[, *cameras*], *texture_type=DiffuseMap*[, *source_model*], *transfer_texture=True*[, *progress*])

Generate texture for the chunk.

Parameters

- **blending_mode** (*BlendingMode*) – Texture blending mode.
- **texture_size** (*int*) – Texture page size.
- **fill_holes** (*bool*) – Enable hole filling.
- **ghosting_filter** (*bool*) – Enable ghosting filter.
- **cameras** (*list of int*) – A list of cameras to be used for texturing.
- **texture_type** (*Model.TextureType*) – Texture type.
- **source_model** (*int*) – Source model.
- **transfer_texture** (*bool*) – Transfer texture.
- **progress** (*Callable[[float], None]*) – Progress callback.

buildTiledModel(*pixel_size=0*, *tile_size=256*, *source_data=DenseCloudData*, *face_count=20000*, *ghosting_filter=False*, *transfer_texture=False*, *keep_depth=True*, *merge=False*[, *operand_chunk*][, *operand_frame*][, *operand_asset*][, *classes*], *subdivide_task=True*, *workitem_size_cameras=20*, *max_workgroup_size=100*[, *progress*])

Build tiled model for the chunk.

Parameters

- **pixel_size** (*float*) – Target model resolution in meters.

- **tile_size** (*int*) – Size of tiles in pixels.
- **source_data** (*DataSource*) – Selects between dense point cloud and mesh.
- **face_count** (*int*) – Number of faces per megapixel of texture resolution.
- **ghosting_filter** (*bool*) – Enable ghosting filter.
- **transfer_texture** (*bool*) – Transfer source model texture to tiled model.
- **keep_depth** (*bool*) – Enable store depth maps option.
- **merge** (*bool*) – Merge tiled model flag.
- **operand_chunk** (*int*) – Operand chunk key.
- **operand_frame** (*int*) – Operand frame key.
- **operand_asset** (*int*) – Operand asset key.
- **classes** (*list of int*) – List of dense point classes to be used for surface extraction.
- **subdivide_task** (*bool*) – Enable fine-level task subdivision.
- **workitem_size_cameras** (*int*) – Number of cameras in a workitem.
- **max_workgroup_size** (*int*) – Maximum workgroup size.
- **progress** (*Callable[[float], None]*) – Progress callback.

buildUV(*mapping_mode=GenericMapping*, *page_count=1*, *texture_size=8192*[, *camera*][, *progress*])
Generate uv mapping for the model.

Parameters

- **mapping_mode** (*MappingMode*) – Texture mapping mode.
- **page_count** (*int*) – Number of texture pages to generate.
- **texture_size** (*int*) – Expected size of texture page at texture generation step.
- **camera** (*int*) – Camera to be used for texturing in MappingCamera mode.
- **progress** (*Callable[[float], None]*) – Progress callback.

calculatePointNormals(*point_neighbors=28*[, *progress*])
Calculate dense cloud normals.

Parameters

- **point_neighbors** (*int*) – Number of point neighbors to use for normal estimation.
- **progress** (*Callable[[float], None]*) – Progress callback.

calibrateColors(*source_data=ModelData*, *white_balance=False*[, *cameras*][, *progress*])
Perform radiometric calibration.

Parameters

- **source_data** (*DataSource*) – Source data for calibration.
- **white_balance** (*bool*) – Calibrate white balance.
- **cameras** (*list of int*) – List of cameras to process.
- **progress** (*Callable[[float], None]*) – Progress callback.

calibrateReflectance(*use_reflectance_panels=True*, *use_sun_sensor=False*[, *progress*])
Calibrate reflectance factors based on calibration panels and/or sun sensor.

Parameters

- **use_reflectance_panels** (*bool*) – Use calibrated reflectance panels.
- **use_sun_sensor** (*bool*) – Apply irradiance sensor measurements.
- **progress** (*Callable[[float], None]*) – Progress callback.

camera_crs
Coordinate system used for camera reference data.

Type *CoordinateSystem*

camera_groups
List of camera groups in the chunk.

Type list of *CameraGroup*

camera_location_accuracy
Expected accuracy of camera coordinates in meters.

Type *Vector*

camera_rotation_accuracy
Expected accuracy of camera orientation angles in degrees.

Type *Vector*

camera_track
Camera track.

Type *CameraTrack*

camera_tracks
List of camera tracks in the chunk.

Type list of *CameraTrack*

cameras
List of Regular and Keyframe cameras in the chunk.

Type list of *Camera*

cir_transform
CIR calibration matrix.

Type *CirTransform*

colorizeDenseCloud(*source_data=ImagesData*[, *progress*])
Calculate point colors for the dense cloud.

Parameters

- **source_data** (*DataSource*) – Source data to extract colors from.
- **progress** (*Callable[[float], None]*) – Progress callback.

colorizeModel(*source_data=ImagesData*[, *progress*])
Calculate vertex colors for the model.

Parameters

- **source_data** (*DataSource*) – Source data to extract colors from.
- **progress** (*Callable[[float], None]*) – Progress callback.

copy([*frames*][, *items*], *keypoints=True*[, *progress*])
Make a copy of the chunk.

Parameters

- **frames** (list of Frame) – Optional list of frames to be copied.
- **items** (list of *DataSource*) – A list of items to copy.
- **keypoints** (*bool*) – copy key points data.
- **progress** (*Callable[[float], None]*) – Progress callback.

Returns Copy of the chunk.

Return type *Chunk*

crs
Coordinate system used for reference data.

Type *CoordinateSystem*

decimateModel(*face_count=200000*[, *asset*], *apply_to_selection=False*[, *progress*])
Decimate the model to the specified face count.

Parameters

- **face_count** (*int*) – Target face count.
- **asset** (*int*) – Model to process.
- **apply_to_selection** (*bool*) – Apply to selection.
- **progress** (*Callable[[float], None]*) – Progress callback.

dense_cloud
Default dense point cloud for the current frame.

Type *DenseCloud*

dense_clouds
List of dense clouds for the current frame.

Type list of *DenseCloud*

depth_maps
Default depth maps set for the current frame.

Type *DepthMaps*

depth_maps_sets
List of depth maps sets for the current frame.

Type list of *DepthMaps*

detectFiducials(*generate_masks=False*, *generic_detector=True*, *right_angle_detector=False*, *fiducials_position_corners=True*, *fiducials_position_sides=True*[, *cameras*][, *frames*][, *progress*])
Detect fiducial marks on film cameras.

Parameters

- **generate_masks** (*bool*) – Generate background masks.
- **generic_detector** (*bool*) – Use generic detector.
- **right_angle_detector** (*bool*) – Use right angle detector.
- **fiducials_position_corners** (*bool*) – Search corners for fiducials.
- **fiducials_position_sides** (*bool*) – Search sides for fiducials.

- **cameras** (*list of int*) – List of cameras to process.
- **frames** (*list of int*) – List of frames to process.
- **progress** (*Callable[[float], None]*) – Progress callback.

detectMarkers(*target_type=CircularTarget12bit*, *tolerance=50*, *filter_mask=False*, *inverted=False*, *noparity=False*, *maximum_residual=5*, *minimum_size=0*, *minimum_dist=5*[, *cameras*][, *frames*][, *progress*])

Create markers from coded targets.

Parameters

- **target_type** (*TargetType*) – Type of targets.
- **tolerance** (*int*) – Detector tolerance (0 - 100).
- **filter_mask** (*bool*) – Ignore masked image regions.
- **inverted** (*bool*) – Detect markers on black background.
- **noparity** (*bool*) – Disable parity checking.
- **maximum_residual** (*float*) – Maximum residual for non-coded targets in pixels.
- **minimum_size** (*int*) – Minimum target radius in pixels to be detected (CrossTarget type only).
- **minimum_dist** (*int*) – Minimum distance between targets in pixels (CrossTarget type only).
- **cameras** (*list of int*) – List of cameras to process.
- **frames** (*list of int*) – List of frames to process.
- **progress** (*Callable[[float], None]*) – Progress callback.

detectPowerlines(*min_altitude=1*, *n_points_per_line=11*, *use_model=True*[, *progress*])

Detect powerlines for the chunk.

Parameters

- **min_altitude** (*float*) – Minimum altitude for reconstructed powerlines.
- **n_points_per_line** (*int*) – Number of vertices per detected line.
- **use_model** (*bool*) – Use model for visibility checks.
- **progress** (*Callable[[float], None]*) – Progress callback.

elevation

Default elevation model for the current frame.

Type *Elevation*

elevations

List of elevation models for the current frame.

Type list of *Elevation*

enabled

Enables/disables the chunk.

Type bool

euler_angles

Euler angles triplet used for rotation reference.

Type *EulerAngles*

exportCameras(*path=''*, *format=CamerasFormatXML*[, *crs*], *save_points=True*, *save_markers=False*, *save_invalid_matches=False*, *use_labels=False*, *use_initial_calibration=False*, *image_orientation=0*, *chan_rotation_order=RotationOrderXYZ*, *binary=False*, *bundler_save_list=True*, *bundler_path_list='list.txt'*, *bingo_save_image=True*, *bingo_save_itera=True*, *bingo_save_geoin=True*, *bingo_save_gps=False*, *bingo_path_itera='itera.dat'*, *bingo_path_image='image.dat'*, *bingo_path_geoin='geoin.dat'*, *bingo_path_gps='gps-imu.dat'*[, *progress*])

Export point cloud and/or camera positions.

Parameters

- **path** (*string*) – Path to output file.
- **format** (*CamerasFormat*) – Export format.
- **crs** (*CoordinateSystem*) – Output coordinate system.
- **save_points** (*bool*) – Enables/disables export of automatic tie points.
- **save_markers** (*bool*) – Enables/disables export of manual matching points.
- **save_invalid_matches** (*bool*) – Enables/disables export of invalid image matches.
- **use_labels** (*bool*) – Enables/disables label based item identifiers.
- **use_initial_calibration** (*bool*) – Transform image coordinates to initial calibration.
- **image_orientation** (*int*) – Image coordinate system (0 - X right, 1 - X up, 2 - X left, 3 - X down).
- **chan_rotation_order** (*RotationOrder*) – Rotation order (CHAN format only).
- **binary** (*bool*) – Enables/disables binary encoding for selected format (if applicable).
- **bundler_save_list** (*bool*) – Enables/disables export of Bundler image list file.
- **bundler_path_list** (*string*) – Path to Bundler image list file.
- **bingo_save_image** (*bool*) – Enables/disables export of BINGO IMAGE COORDINATE file.
- **bingo_save_itera** (*bool*) – Enables/disables export of BINGO ITERA file.
- **bingo_save_geoin** (*bool*) – Enables/disables export of BINGO GEO INPUT file.
- **bingo_save_gps** (*bool*) – Enables/disables export of BINGO GPS/IMU data.
- **bingo_path_itera** (*string*) – Path to BINGO ITERA file.
- **bingo_path_image** (*string*) – Path to BINGO IMAGE COORDINATE file.
- **bingo_path_geoin** (*string*) – Path to BINGO GEO INPUT file.
- **bingo_path_gps** (*string*) – Path to BINGO GPS/IMU file.
- **progress** (*Callable[[float], None]*) – Progress callback.

exportMarkers(*path=''*[, *crs*], *binary=False*[, *progress*])

Export markers.

Parameters

- **path** (*string*) – Path to output file.
- **crs** (*CoordinateSystem*) – Output coordinate system.

- **binary** (*bool*) – Enables/disables binary encoding for selected format (if applicable).
- **progress** (*Callable[[float], None]*) – Progress callback.

exportModel(*path=''*, *binary=True*, *precision=6*, *texture_format=ImageFormatJPEG*, *save_texture=True*, *save_uv=True*, *save_normals=True*, *save_colors=True*, *save_confidence=False*, *save_cameras=True*, *save_markers=True*, *save_udim=False*, *save_alpha=False*, *embed_texture=False*, *strip_extensions=False*, *raster_transform=RasterTransformNone*, *colors_rgb_8bit=True*, *comment=''*, *save_comment=True*, *format=ModelFormatNone*[, *crs*][, *shift*], *clip_to_boundary=True*[, *viewpoint*][, *progress*])

Export generated model for the chunk.

Parameters

- **path** (*string*) – Path to output model.
- **binary** (*bool*) – Enables/disables binary encoding (if supported by format).
- **precision** (*int*) – Number of digits after the decimal point (for text formats).
- **texture_format** (*ImageFormat*) – Texture format.
- **save_texture** (*bool*) – Enables/disables texture export.
- **save_uv** (*bool*) – Enables/disables uv coordinates export.
- **save_normals** (*bool*) – Enables/disables export of vertex normals.
- **save_colors** (*bool*) – Enables/disables export of vertex colors.
- **save_confidence** (*bool*) – Enables/disables export of vertex confidence.
- **save_cameras** (*bool*) – Enables/disables camera export.
- **save_markers** (*bool*) – Enables/disables marker export.
- **save_udim** (*bool*) – Enables/disables UDIM texture layout.
- **save_alpha** (*bool*) – Enables/disables alpha channel export.
- **embed_texture** (*bool*) – Embeds texture inside the model file (if supported by format).
- **strip_extensions** (*bool*) – Strips camera label extensions during export.
- **raster_transform** (*RasterTransformType*) – Raster band transformation.
- **colors_rgb_8bit** (*bool*) – Convert colors to 8 bit RGB.
- **comment** (*string*) – Optional comment (if supported by selected format).
- **save_comment** (*bool*) – Enables/disables comment export.
- **format** (*ModelFormat*) – Export format.
- **crs** (*CoordinateSystem*) – Output coordinate system.
- **shift** (*Vector*) – Optional shift to be applied to vertex coordinates.
- **clip_to_boundary** (*bool*) – Clip model to boundary shapes.
- **viewpoint** (*Viewpoint*) – Default view.
- **progress** (*Callable[[float], None]*) – Progress callback.

exportOrthophotos(*path='{filename}.tif'*[, *cameras*], *raster_transform=RasterTransformNone*[, *projection*][, *region*], *resolution=0*, *resolution_x=0*, *resolution_y=0*, *save_kml=False*, *save_world=False*, *save_alpha=True*[, *image_compression*], *white_background=True*, *north_up=True*[, *progress*])

Export orthophotos for the chunk.

Parameters

- **path** (*string*) – Path to output orthophoto.
- **cameras** (*list of int*) – List of cameras to process.
- **raster_transform** (*RasterTransformType*) – Raster band transformation.
- **projection** (*OrthoProjection*) – Output projection.
- **region** (*BBox*) – Region to be exported.
- **resolution** (*float*) – Output resolution in meters.
- **resolution_x** (*float*) – Pixel size in the X dimension in projected units.
- **resolution_y** (*float*) – Pixel size in the Y dimension in projected units.
- **save_kml** (*bool*) – Enable kml file generation.
- **save_world** (*bool*) – Enable world file generation.
- **save_alpha** (*bool*) – Enable alpha channel generation.
- **image_compression** (*ImageCompression*) – Image compression parameters.
- **white_background** (*bool*) – Enable white background.
- **north_up** (*bool*) – Use north-up orientation for export.
- **progress** (*Callable[[float], None]*) – Progress callback.

exportPoints(*path=''*, *source_data=DenseCloudData*, *binary=True*, *save_normals=True*, *save_colors=True*, *save_classes=True*, *save_confidence=True*, *raster_transform=RasterTransformNone*, *colors_rgb_8bit=True*, *comment=''*, *save_comment=True*, *format=PointsFormatNone*, *image_format=ImageFormatJPEG*[, *crs*][, *shift*][, *region*], *clip_to_boundary=True*, *block_width=1000*, *block_height=1000*, *split_in_blocks=False*[, *classes*], *save_images=False*, *compression=True*, *screen_space_error=16*, *folder_depth=5*[, *viewpoint*], *subdivide_task=True*[, *progress*])

Export point cloud.

Parameters

- **path** (*string*) – Path to output file.
- **source_data** (*DataSource*) – Selects between dense point cloud and tie points. If not specified, uses dense cloud if available.
- **binary** (*bool*) – Enables/disables binary encoding for selected format (if applicable).
- **save_normals** (*bool*) – Enables/disables export of point normals.
- **save_colors** (*bool*) – Enables/disables export of point colors.
- **save_classes** (*bool*) – Enables/disables export of point classes.
- **save_confidence** (*bool*) – Enables/disables export of point confidence.
- **raster_transform** (*RasterTransformType*) – Raster band transformation.
- **colors_rgb_8bit** (*bool*) – Convert colors to 8 bit RGB.

- **comment** (*string*) – Optional comment (if supported by selected format).
- **save_comment** (*bool*) – Enable comment export.
- **format** (*PointsFormat*) – Export format.
- **image_format** (*ImageFormat*) – Image data format.
- **crs** (*CoordinateSystem*) – Output coordinate system.
- **shift** (*Vector*) – Optional shift to be applied to point coordinates.
- **region** (*BBox*) – Region to be exported.
- **clip_to_boundary** (*bool*) – Clip point cloud to boundary shapes.
- **block_width** (*float*) – Block width in meters.
- **block_height** (*float*) – Block height in meters.
- **split_in_blocks** (*bool*) – Enable tiled export.
- **classes** (*list of int*) – List of dense point classes to be exported.
- **save_images** (*bool*) – Enable image export.
- **compression** (*bool*) – Enable compression (Cesium format only).
- **screen_space_error** (*float*) – Target screen space error (Cesium format only).
- **folder_depth** (*int*) – Tileset subdivision depth (Cesium format only).
- **viewpoint** (*Viewpoint*) – Default view.
- **subdivide_task** (*bool*) – Enable fine-level task subdivision.
- **progress** (*Callable[[float], None]*) – Progress callback.

exportRaster(*path=''*, *format=RasterFormatTiles*, *image_format=ImageFormatNone*, *raster_transform=RasterTransformNone*[, *projection*][, *region*], *resolution=0*, *resolution_x=0*, *resolution_y=0*, *block_width=10000*, *block_height=10000*, *split_in_blocks=False*, *width=0*, *height=0*[, *world_transform*], *nodata_value=-32767*, *save_kml=False*, *save_world=False*, *save_scheme=False*, *save_alpha=True*, *image_description=''*[, *image_compression*], *network_links=True*, *global_profile=False*, *min_zoom_level=-1*, *max_zoom_level=-1*, *white_background=True*, *clip_to_boundary=True*, *title='Orthomosaic'*, *description='Generated by Agisoft Metashape'*, *source_data=OrthomosaicData*, *north_up=True*, *tile_width=256*, *tile_height=256*[, *progress*])

Export DEM or orthomosaic to file.

Parameters

- **path** (*string*) – Path to output orthomosaic.
- **format** (*RasterFormat*) – Export format.
- **image_format** (*ImageFormat*) – Tile format.
- **raster_transform** (*RasterTransformType*) – Raster band transformation.
- **projection** (*OrthoProjection*) – Output projection.
- **region** (*BBox*) – Region to be exported.
- **resolution** (*float*) – Output resolution in meters.
- **resolution_x** (*float*) – Pixel size in the X dimension in projected units.

- **resolution_y** (*float*) – Pixel size in the Y dimension in projected units.
- **block_width** (*int*) – Raster block width in pixels.
- **block_height** (*int*) – Raster block height in pixels.
- **split_in_blocks** (*bool*) – Split raster in blocks.
- **width** (*int*) – Raster width.
- **height** (*int*) – Raster height.
- **world_transform** (*Matrix*) – 2x3 raster-to-world transformation matrix.
- **nodata_value** (*float*) – No-data value (DEM export only).
- **save_kml** (*bool*) – Enable kml file generation.
- **save_world** (*bool*) – Enable world file generation.
- **save_scheme** (*bool*) – Enable tile scheme files generation.
- **save_alpha** (*bool*) – Enable alpha channel generation.
- **image_description** (*string*) – Optional description to be added to image files.
- **image_compression** (*ImageCompression*) – Image compression parameters.
- **network_links** (*bool*) – Enable network links generation for KMZ format.
- **global_profile** (*bool*) – Use global profile (GeoPackage format only).
- **min_zoom_level** (*int*) – Minimum zoom level (GeoPackage, Google Map Tiles, MBTiles and World Wind Tiles formats only).
- **max_zoom_level** (*int*) – Maximum zoom level (GeoPackage, Google Map Tiles, MBTiles and World Wind Tiles formats only).
- **white_background** (*bool*) – Enable white background.
- **clip_to_boundary** (*bool*) – Clip raster to boundary shapes.
- **title** (*string*) – Export title.
- **description** (*string*) – Export description.
- **source_data** (*DataSource*) – Selects between DEM and orthomosaic.
- **north_up** (*bool*) – Use north-up orientation for export.
- **tile_width** (*int*) – Tile width in pixels.
- **tile_height** (*int*) – Tile height in pixels.
- **progress** (*Callable[[float], None]*) – Progress callback.

exportReference(*path=''*, *format=ReferenceFormatNone*, *items=ReferenceItemsCameras*, *columns=''*, *delimiter=' '*, *precision=6*[, *progress*])

Export reference data to the specified file.

Parameters

- **path** (*string*) – Path to the output file.
- **format** (*ReferenceFormat*) – Export format.
- **items** (*ReferenceItems*) – Items to export in CSV format.

- **columns** (*string*) – Column order in csv format (n - label, o - enabled flag, x/y/z - coordinates, X/Y/Z - coordinate accuracy, a/b/c - rotation angles, A/B/C - rotation angle accuracy, u/v/w - estimated coordinates, U/V/W - coordinate errors, d/e/f - estimated orientation angles, D/E/F - orientation errors, p/q/r - estimated coordinates variance, i/j/k - estimated orientation angles variance, [] - group of multiple values, | - column separator within group).
- **delimiter** (*string*) – Column delimiter in csv format.
- **precision** (*int*) – Number of digits after the decimal point (for CSV format).
- **progress** (*Callable[[float], None]*) – Progress callback.

exportReport(*path=''*, *title=''*, *description=''*, *font_size=12*, *page_numbers=True*, *include_system_info=True*[, *user_settings*][, *progress*])

Export processing report in PDF format.

Parameters

- **path** (*string*) – Path to output report.
- **title** (*string*) – Report title.
- **description** (*string*) – Report description.
- **font_size** (*int*) – Font size (pt).
- **page_numbers** (*bool*) – Enable page numbers.
- **include_system_info** (*bool*) – Include system information.
- **user_settings** (*list of (string, string) tuples*) – A list of user defined settings to include on the Processing Parameters page.
- **progress** (*Callable[[float], None]*) – Progress callback.

exportShapes(*path=''*, *save_points=False*, *save_polylines=False*, *save_polygons=False*[, *groups*], *format=ShapesFormatNone*[, *crs*][, *shift*], *polygons_as_polylines=False*, *save_labels=True*, *save_attributes=True*[, *progress*])

Export shapes layer to file.

Parameters

- **path** (*string*) – Path to shape file.
- **save_points** (*bool*) – Export points.
- **save_polylines** (*bool*) – Export polylines.
- **save_polygons** (*bool*) – Export polygons.
- **groups** (*list of int*) – A list of shape groups to export.
- **format** (*ShapesFormat*) – Export format.
- **crs** (*CoordinateSystem*) – Output coordinate system.
- **shift** (*Vector*) – Optional shift to be applied to vertex coordinates.
- **polygons_as_polylines** (*bool*) – Save polygons as polylines.
- **save_labels** (*bool*) – Export labels.
- **save_attributes** (*bool*) – Export attributes.
- **progress** (*Callable[[float], None]*) – Progress callback.

exportTexture(*path=''*, *texture_type=DiffuseMap*, *save_alpha=False*[, *progress*])

Export model texture to file.

Parameters

- **path** (*string*) – Path to output file.
- **texture_type** (*Model.TextureType*) – Texture type.
- **save_alpha** (*bool*) – Enable alpha channel export.
- **progress** (*Callable[[float], None]*) – Progress callback.

exportTiledModel(*path=''*, *format=TiledModelFormatNone*, *model_format=ModelFormatCOLLADA*, *texture_format=ImageFormatJPEG*, *raster_transform=RasterTransformNone*[, *image_compression*][, *crs*], *clip_to_boundary=True*, *model_compression=True*, *screen_space_error=16*, *folder_depth=5*[, *progress*])

Export generated tiled model for the chunk.

Parameters

- **path** (*string*) – Path to output model.
- **format** (*TiledModelFormat*) – Export format.
- **model_format** (*ModelFormat*) – Model format for zip export.
- **texture_format** (*ImageFormat*) – Texture format.
- **raster_transform** (*RasterTransformType*) – Raster band transformation.
- **image_compression** (*ImageCompression*) – Image compression parameters.
- **crs** (*CoordinateSystem*) – Output coordinate system.
- **clip_to_boundary** (*bool*) – Clip tiled model to boundary shapes.
- **model_compression** (*bool*) – Enable mesh compression (Cesium format only).
- **screen_space_error** (*float*) – Target screen space error (Cesium format only).
- **folder_depth** (*int*) – Tileset subdivision depth (Cesium format only).
- **progress** (*Callable[[float], None]*) – Progress callback.

filterDenseCloud(*point_spacing=0*[, *asset*][, *progress*])

Reduce dense cloud points number.

Parameters

- **point_spacing** (*float*) – Desired point spacing (m).
- **asset** (*int*) – Dense cloud key to filter.
- **progress** (*Callable[[float], None]*) – Progress callback.

findCamera(*key*)

Find camera by its key.

Returns Found camera.

Return type *Camera*

findCameraGroup(*key*)

Find camera group by its key.

Returns Found camera group.

Return type *CameraGroup*

findCameraTrack(*key*)

Find camera track by its key.

Returns Found camera track.

Return type *CameraTrack*

findDenseCloud(*key*)
Find dense cloud by its key.

Returns Found dense cloud.

Return type *DenseCloud*

findDepthMaps(*key*)
Find depth maps by its key.

Returns Found depth maps.

Return type *DepthMaps*

findElevation(*key*)
Find elevation model by its key.

Returns Found elevation model.

Return type *Elevation*

findFrame(*key*)
Find frame by its key.

Returns Found frame.

Return type *Chunk*

findMarker(*key*)
Find marker by its key.

Returns Found marker.

Return type *Marker*

findMarkerGroup(*key*)
Find marker group by its key.

Returns Found marker group.

Return type *MarkerGroup*

findModel(*key*)
Find model by its key.

Returns Found model.

Return type *Model*

findOrthomosaic(*key*)
Find orthomosaic by its key.

Returns Found orthomosaic.

Return type *Orthomosaic*

findScalebar(*key*)
Find scalebar by its key.

Returns Found scalebar.

Return type *Scalebar*

findScalebarGroup(*key*)
Find scalebar group by its key.

Returns Found scalebar group.

Return type *ScalebarGroup*

findSensor(*key*)
Find sensor by its key.

Returns Found sensor.

Return type *Sensor*

findTiledModel(*key*)
Find tiled model by its key.

Returns Found tiled model.

Return type *TiledModel*

frame
Current frame index.

Type int

frames
List of frames in the chunk.

Type list of Frame

generateMasks(*path='{filename}_mask.png'*, *masking_mode=MaskingModeAlpha*, *mask_operation=MaskOperationReplacement*, *tolerance=10*[, *cameras*], *mask_defocus=False*, *fix_coverage=True*, *blur_threshold=3*, *depth_threshold=3.40282e+38*[, *progress*])
Generate masks for multiple cameras.

Parameters

- **path** (*string*) – Mask file name template.
- **masking_mode** (*MaskingMode*) – Mask generation mode.
- **mask_operation** (*MaskOperation*) – Mask operation.
- **tolerance** (*int*) – Background masking tolerance.
- **cameras** (*list of int*) – Optional list of cameras to be processed.
- **mask_defocus** (*bool*) – Mask defocus areas.
- **fix_coverage** (*bool*) – Extend masks to cover whole mesh (only if mask_defocus=True).
- **blur_threshold** (*float*) – Allowed blur radius on a photo in pix (only if mask_defocus=True).
- **depth_threshold** (*float*) – Maximum depth of masked areas in meters (only if mask_defocus=False).
- **progress** (*Callable[[float], None]*) – Progress callback.

generatePrescriptionMap(*class_count=4*, *cell_size=1*, *classification_method=JenksNaturalBreaksClassification*[, *boundary_shape_group*][, *breakpoints*][, *rates*][, *progress*])
Generate prescription map for orthomosaic.

Parameters

- **class_count** (*int*) – Number of classes.
- **cell_size** (*float*) – Step of prescription grid, meters.
- **classification_method** (*ClassificationMethod*) – Index values classification method.
- **boundary_shape_group** (*int*) – Boundary shape group.
- **breakpoints** (*list of float*) – Classification breakpoints.
- **rates** (*list of float*) – Fertilizer rate for each class.
- **progress** (*Callable[[float], None]*) – Progress callback.

image_brightness
Image brightness as percentage.

Type float

image_contrast
Image contrast as percentage.

Type float

importCameras(*path=''*, *format=CamerasFormatXML*[, *crs*], *image_orientation=0*, *image_list='list.txt'*, *load_image_list=False*[, *progress*])
Import camera positions.

Parameters

- **path** (*string*) – Path to the file.
- **format** (*CamerasFormat*) – File format.
- **crs** (*CoordinateSystem*) – Ground coordinate system.
- **image_orientation** (*int*) – Image coordinate system (0 - X right, 1 - X up, 2 - X left, 3 - X down).
- **image_list** (*string*) – Path to image list file (Bundler format only).
- **load_image_list** (*bool*) – Enable Bundler image list import.
- **progress** (*Callable[[float], None]*) – Progress callback.

importLaserScans(*format=PointsFormatNone*[, *filenames*], *image_path=''*, *multiplane=False*[, *progress*])
Import cameras with depth data.

Parameters

- **format** (*PointsFormat*) – Point cloud format.
- **filenames** (*list of string*) – List of files to import.
- **image_path** (*string*) – Path template to output files.
- **multiplane** (*bool*) – Import as a multi-camera system
- **progress** (*Callable[[float], None]*) – Progress callback.

importMarkers(*path=''*[, *progress*])
Import markers.

Parameters

- **path** (*string*) – Path to the file.
- **progress** (*Callable[[float], None]*) – Progress callback.

importModel(*path=''*, *format=ModelFormatNone*[, *crs*][, *shift*], *decode_udim=True*[, *progress*])
Import model from file.

Parameters

- **path** (*string*) – Path to model.
- **format** (*ModelFormat*) – Model format.
- **crs** (*CoordinateSystem*) – Model coordinate system.
- **shift** (*Vector*) – Optional shift to be applied to vertex coordinates.
- **decode_udim** (*bool*) – Load UDIM texture layout.
- **progress** (*Callable[[float], None]*) – Progress callback.

importPoints(*path=''*, *format=PointsFormatNone*, *calculate_normals=True*[, *crs*][, *shift*], *point_neighbors=28*, *use_trajectory=False*, *traj_path=''*, *traj_columns='txyz'*, *traj_delimiter=' '*, *traj_skip_rows=0*[, *progress*])
Import point cloud from file.

Parameters

- **path** (*string*) – Path to point cloud.
- **format** (*PointsFormat*) – Point cloud format.
- **calculate_normals** (*bool*) – Calculate point normals.
- **crs** (*CoordinateSystem*) – Point cloud coordinate system.
- **shift** (*Vector*) – Optional shift to be applied to point coordinates.
- **point_neighbors** (*int*) – Number of point neighbors to use for normal estimation.
- **use_trajectory** (*bool*) – Use trajectory file or origin.
- **traj_path** (*string*) – Trajectory file path.
- **traj_columns** (*string*) – Trajectory file column order (t - time, x/y/z - coordinates, 0 - skip column).
- **traj_delimiter** (*string*) – Trajectory file delimiter.
- **traj_skip_rows** (*int*) – Trajectory file number of rows to skip.
- **progress** (*Callable[[float], None]*) – Progress callback.

importRaster(*path=''*[, *crs*], *raster_type=ElevationData*, *nodata_value=-32767*, *has_nodata_value=False*[, *progress*])
Import DEM or orthomosaic from file.

Parameters

- **path** (*string*) – Path to elevation model in GeoTIFF format.
- **crs** (*CoordinateSystem*) – Default coordinate system if not specified in GeoTIFF file.
- **raster_type** (*DataSource*) – Type of raster layer to import.
- **nodata_value** (*float*) – No-data value.
- **has_nodata_value** (*bool*) – No-data value valid flag.
- **progress** (*Callable[[float], None]*) – Progress callback.

importReference(*path=''*, *format=ReferenceFormatCSV*, *columns=''*, *delimiter=''*, *group_delimiters=False*, *skip_rows=0*[, *items*][, *crs*], *ignore_labels=False*, *create_markers=False*, *threshold=0.1*, *shutter_lag=0*[, *progress*])

Import reference data from the specified file.

Parameters

- **path** (*string*) – Path to the file with reference data.
- **format** (*ReferenceFormat*) – File format.
- **columns** (*string*) – Column order in csv format (n - label, o - enabled flag, x/y/z - coordinates, X/Y/Z - coordinate accuracy, a/b/c - rotation angles, A/B/C - rotation angle accuracy, [] - group of multiple values, | - column separator within group).
- **delimiter** (*string*) – Column delimiter in csv format.
- **group_delimiters** (*bool*) – Combine consequitive delimiters in csv format.
- **skip_rows** (*int*) – Number of rows to skip in (csv format only).
- **items** (*ReferenceItems*) – List of items to load reference for (csv format only).
- **crs** (*CoordinateSystem*) – Reference data coordinate system (csv format only).
- **ignore_labels** (*bool*) – Matches reference data based on coordinates alone (csv format only).
- **create_markers** (*bool*) – Create markers for missing entries (csv format only).
- **threshold** (*float*) – Error threshold in meters used when ignore_labels is set (csv format only).
- **shutter_lag** (*float*) – Shutter lag in seconds (APM format only).
- **progress** (*Callable[[float], None]*) – Progress callback.

importShapes(*path=''*, *replace=False*, *boundary_type=NoBoundary*, *format=ShapesFormatNone*, *columns='nxyzd'*, *delimiter=','*, *group_delimiters=False*, *skip_rows=0*[, *crs*][, *progress*])

Import shapes layer from file.

Parameters

- **path** (*string*) – Path to shape file.
- **replace** (*bool*) – Replace current shapes with new data.
- **boundary_type** (*Shape.BoundaryType*) – Boundary type to be applied to imported shapes.
- **format** (*ShapesFormat*) – Shapes format.
- **columns** (*string*) – Column order in csv format (n - label, x/y/z - coordinates, d - description, [] - group of multiple values, | - column separator within group).
- **delimiter** (*string*) – Column delimiter in csv format.
- **group_delimiters** (*bool*) – Combine consequitive delimiters in csv format.
- **skip_rows** (*int*) – Number of rows to skip in (csv format only).
- **crs** (*CoordinateSystem*) – Reference data coordinate system (csv format only).
- **progress** (*Callable[[float], None]*) – Progress callback.

importTiledModel(*path=''*[, *progress*])

Import tiled model from file.

Parameters

- **path** (*string*) – Path to tiled model.
- **progress** (*Callable[[float], None]*) – Progress callback.

importVideo(*path*, *image_path*, *frame_step=CustomFrameStep*, *custom_frame_step=1*, *time_start=0*, *time_end=- 1*)

Imports video to active chunk.

Parameters

- **path** (*string*) – Path to source video.
- **image_path** (*string*) – Path to directory where to save frames with filename template. For example: /path/to/dir/frame{filenum}.png.
- **frame_step** (*FrameStep*) – Frame step type.
- **custom_frame_step** (*int*) – Every custom_frame_step'th frame will be saved. Used for frame_step=CustomFrameStep.
- **time_start** (*int*) – The starting point for importing video, in milliseconds.
- **time_end** (*int*) – The endpoint for importing video, in milliseconds.

key

Chunk identifier.

Type int

label

Chunk label.

Type string

loadReferenceExif(*load_rotation=False*, *load_accuracy=False*)

Import camera locations from EXIF meta data.

Parameters

- **load_rotation** (*bool*) – load yaw, pitch and roll orientation angles.
- **load_accuracy** (*bool*) – load camera location accuracy.

loadReflectancePanelCalibration(*path*[, *cameras*])

Load reflectance panel calibration from CSV file.

Parameters

- **path** (*string*) – Path to calibration file.
- **cameras** (list of *Camera*) – List of cameras to process.

locateReflectancePanels([*progress*])

Locate reflectance panels based on QR-codes.

Parameters **progress** (*Callable[[float], None]*) – Progress callback.

marker_crs

Coordinate system used for marker reference data.

Type *CoordinateSystem*

marker_groups

List of marker groups in the chunk.

Type list of *MarkerGroup*

marker_location_accuracy
Expected accuracy of marker coordinates in meters.

Type *Vector*

marker_projection_accuracy
Expected accuracy of marker projections in pixels.

Type float

markers
List of Regular, Vertex and Fiducial markers in the chunk.

Type list of *Marker*

masks
Image masks.

Type *Masks*

matchPhotos(*downscale=1*, *generic_preselection=True*, *reference_preselection=True*, *reference_preselection_mode=ReferencePreselectionSource*, *filter_mask=False*, *mask_tiepoints=True*, *filter_stationary_points=True*, *keypoint_limit=40000*, *keypoint_limit_per_mpx=1000*, *tiepoint_limit=4000*, *keep_keypoints=False*[, *pairs*][, *cameras*], *guided_matching=False*, *reset_matches=False*, *subdivide_task=True*, *workitem_size_cameras=20*, *workitem_size_pairs=80*, *max_workgroup_size=100*[, *progress*])
Perform image matching for the chunk frame.

Parameters

- **downscale** (*int*) – Image alignment accuracy.
- **generic_preselection** (*bool*) – Enable generic preselection.
- **reference_preselection** (*bool*) – Enable reference preselection.
- **reference_preselection_mode** (*ReferencePreselectionMode*) – Reference preselection mode.
- **filter_mask** (*bool*) – Filter points by mask.
- **mask_tiepoints** (*bool*) – Apply mask filter to tie points.
- **filter_stationary_points** (*bool*) – Exclude tie points which are stationary across images.
- **keypoint_limit** (*int*) – Key point limit.
- **keypoint_limit_per_mpx** (*int*) – Key point limit per megapixel.
- **tiepoint_limit** (*int*) – Tie point limit.
- **keep_keypoints** (*bool*) – Store keypoints in the project.
- **pairs** (*list of (int, int) tuples*) – User defined list of camera pairs to match.
- **cameras** (*list of int*) – List of cameras to match.
- **guided_matching** (*bool*) – Enable guided image matching.
- **reset_matches** (*bool*) – Reset current matches.
- **subdivide_task** (*bool*) – Enable fine-level task subdivision.
- **workitem_size_cameras** (*int*) – Number of cameras in a workitem.

- **workitem_size_pairs** (*int*) – Number of image pairs in a workitem.
- **max_workgroup_size** (*int*) – Maximum workgroup size.
- **progress** (*Callable[[float], None]*) – Progress callback.

meta
Chunk meta data.

Type *MetaData*

model
Default model for the current frame.

Type *Model*

models
List of models for the current frame.

Type list of *Model*

modified
Modified flag.

Type bool

optimizeCameras(*fit_f=True*, *fit_cx=True*, *fit_cy=True*, *fit_b1=False*, *fit_b2=False*, *fit_k1=True*, *fit_k2=True*, *fit_k3=True*, *fit_k4=False*, *fit_p1=True*, *fit_p2=True*, *fit_corrections=False*, *adaptive_fitting=False*, *tiepoint_covariance=False*[, *progress*])
Perform optimization of point cloud / camera parameters.

Parameters

- **fit_f** (*bool*) – Enable optimization of focal length coefficient.
- **fit_cx** (*bool*) – Enable optimization of X principal point coordinates.
- **fit_cy** (*bool*) – Enable optimization of Y principal point coordinates.
- **fit_b1** (*bool*) – Enable optimization of aspect ratio.
- **fit_b2** (*bool*) – Enable optimization of skew coefficient.
- **fit_k1** (*bool*) – Enable optimization of k1 radial distortion coefficient.
- **fit_k2** (*bool*) – Enable optimization of k2 radial distortion coefficient.
- **fit_k3** (*bool*) – Enable optimization of k3 radial distortion coefficient.
- **fit_k4** (*bool*) – Enable optimization of k3 radial distortion coefficient.
- **fit_p1** (*bool*) – Enable optimization of p1 tangential distortion coefficient.
- **fit_p2** (*bool*) – Enable optimization of p2 tangential distortion coefficient.
- **fit_corrections** (*bool*) – Enable optimization of additional corrections.
- **adaptive_fitting** (*bool*) – Enable adaptive fitting of distortion coefficients.
- **tiepoint_covariance** (*bool*) – Estimate tie point covariance matrices.
- **progress** (*Callable[[float], None]*) – Progress callback.

orthomosaic
Default orthomosaic for the current frame.

Type *Orthomosaic*

orthomosaics
List of orthomosaics for the current frame.

Type list of *Orthomosaic*

point_cloud
Generated tie point cloud.

Type *PointCloud*

primary_channel
Primary channel index (-1 for default).

Type int

publishData(*service=ServiceSketchfab*, *source_data=PointCloudData*, *raster_transform=RasterTransformNone*, *save_point_colors=True*, *save_camera_track=True*, *title=''*, *description=''*, *tags=''*, *owner=''*, *token=''*, *username=''*, *password=''*, *account=''*, *hostname=''*, *is_draft=False*, *is_private=False*, *is_protected=False*, *tile_size=256*, *min_zoom_level=-1*, *max_zoom_level=-1*[, *projection*], *resolution=0*[, *point_classes*][, *image_compression*][, *progress*])
Publish generated data online.

Parameters

- **service** (*ServiceType*) – Service to upload on.
- **source_data** (*DataSource*) – Asset type to upload.
- **raster_transform** (*RasterTransformType*) – Raster band transformation.
- **save_point_colors** (*bool*) – Enables/disables export of point colors.
- **save_camera_track** (*bool*) – Enables/disables export of camera track.
- **title** (*string*) – Dataset title.
- **description** (*string*) – Dataset description.
- **tags** (*string*) – Dataset tags.
- **owner** (*string*) – Account owner (Cesium and Mapbox services).
- **token** (*string*) – Account token (Cesium, Mapbox, Picterra, Pointbox and Sketchfab services).
- **username** (*string*) – Account username (4DMapper, Melown and Pointscene services).
- **password** (*string*) – Account password (4DMapper, Melown, Pointscene and Sketchfab services).
- **account** (*string*) – Account name (Melown service).
- **hostname** (*string*) – Service hostname (4DMapper service).
- **is_draft** (*bool*) – Mark dataset as draft (Sketchfab service).
- **is_private** (*bool*) – Set dataset access to private (Pointbox and Sketchfab services).
- **is_protected** (*bool*) – Set dataset access to protected (Pointbox service).
- **tile_size** (*int*) – Tile size in pixels.
- **min_zoom_level** (*int*) – Minimum zoom level.
- **max_zoom_level** (*int*) – Maximum zoom level.
- **projection** (*CoordinateSystem*) – Output projection.

- **resolution** (*float*) – Output resolution in meters.
- **point_classes** (*list of int*) – List of dense point classes to be exported.
- **image_compression** (*ImageCompression*) – Image compression parameters.
- **progress** (*Callable[[float], None]*) – Progress callback.

raster_transform
Raster transform.

Type *RasterTransform*

reduceOverlap(*overlap=3*, *use_selection=False*[, *progress*])
Disable redundant cameras.

Parameters

- **overlap** (*int*) – Target number of cameras observing each point of the surface.
- **use_selection** (*bool*) – Focus on model selection.
- **progress** (*Callable[[float], None]*) – Progress callback.

refineMarkers([*markers*][, *progress*])
Refine markers based on images content.

Parameters

- **markers** (*list of int*) – Optional list of markers to be processed.
- **progress** (*Callable[[float], None]*) – Progress callback.

refineMesh(*downscale=4*, *iterations=10*, *smoothness=0.5*[, *cameras*][, *progress*])
Generate model for the chunk frame.

Parameters

- **downscale** (*int*) – Refinement quality.
- **iterations** (*int*) – Number of refinement iterations.
- **smoothness** (*float*) – Smoothing strength. Should be in range [0, 1].
- **cameras** (*list of int*) – List of cameras to process.
- **progress** (*Callable[[float], None]*) – Progress callback.

region
Reconstruction volume selection.

Type *Region*

remove(*items*)
Remove items from the chunk.

Parameters **items** (list of Frame, *Sensor*, *CameraGroup*, *MarkerGroup*, *ScalebarGroup*, *Camera*, *Marker*, *Scalebar* or *CameraTrack*) – A list of items to be removed.

removeLighting(*color_mode=False*, *internal_blur=1.5*, *mesh_noise_suppression=1*, *ambient_occlusion_path=''*, *ambient_occlusion_multiplier=1.5*[, *progress*])
Generate model for the chunk frame.

Parameters

- **color_mode** (*bool*) – Enable multi-color processing mode.
- **internal_blur** (*float*) – Internal blur. Should be in range [0, 4].

- **mesh_noise_suppression** (*float*) – Mesh normals noise suppression strength. Should be in range [0, 4].
- **ambient_occlusion_path** (*string*) – Path to ambient occlusion texture atlas. Can be empty.
- **ambient_occlusion_multiplier** (*float*) – Ambient occlusion multiplier. Should be in range [0.25, 4].
- **progress** (*Callable[[float], None]*) – Progress callback.

renderPreview(*width = 2048*, *height = 2048*[, *transform*], *point_size=1*[, *progress*])
Generate preview image for the chunk.

Parameters

- **width** (*int*) – Preview image width.
- **height** (*int*) – Preview image height.
- **transform** (*Matrix*) – 4x4 viewpoint transformation matrix.
- **point_size** (*int*) – Point size.
- **progress** (*Callable[[float], None]*) – Progress callback.

Returns Preview image.

Return type *Image*

resetRegion()
Reset reconstruction volume selector to default position.

samplePoints(*source_data=ModelData*, *uniform_sampling=True*, *points_spacing=0.1*[, *asset*][, *progress*])
Sample point cloud from the model.

Parameters

- **source_data** (*DataSource*) – Source data to extract points from.
- **uniform_sampling** (*bool*) – Sampling method
- **points_spacing** (*float*) – Desired point spacing (m).
- **asset** (*int*) – Model to process.
- **progress** (*Callable[[float], None]*) – Progress callback.

scalebar_accuracy
Expected scale bar accuracy in meters.

Type float

scalebar_groups
List of scale bar groups in the chunk.

Type list of *ScalebarGroup*

scalebars
List of scale bars in the chunk.

Type list of *Scalebar*

selected
Selects/deselects the chunk.

Type bool

sensors
List of sensors in the chunk.

Type list of *Sensor*

shapes
Shapes for the current frame.

Type *Shapes*

smoothModel(*strength=3*, *apply_to_selection=False*, *fix_borders=True*, *preserve_edges=False*[, *progress*])
Smooth mesh using Laplacian smoothing algorithm.

Parameters

- **strength** (*float*) – Smoothing strength.
- **apply_to_selection** (*bool*) – Apply to selected faces.
- **fix_borders** (*bool*) – Fix borders.
- **preserve_edges** (*bool*) – Preserve edges.
- **progress** (*Callable[[float], None]*) – Progress callback.

sortCameras()
Sorts cameras by their labels.

sortMarkers()
Sorts markers by their labels.

sortScalebars()
Sorts scalebars by their labels.

thinPointCloud(*point_limit=1000*)
Remove excessive tracks from the point cloud.

Parameters **point_limit** (*int*) – Maximum number of points for each photo.

thumbnails
Image thumbnails.

Type *Thumbnails*

tiepoint_accuracy
Expected tie point accuracy in pixels.

Type float

tiled_model
Default tiled model for the current frame.

Type *TiledModel*

tiled_models
List of tiled models for the current frame.

Type list of *TiledModel*

trackMarkers(*first_frame=0*, *last_frame=0*[, *progress*])
Track marker projections through the frame sequence.

Parameters

- **first_frame** (*int*) – Starting frame index.
- **last_frame** (*int*) – Ending frame index.

- **progress** (*Callable[[float], None]*) – Progress callback.

transform
4x4 matrix specifying chunk location in the world coordinate system.

Type *ChunkTransform*

transformRaster(*data_source=ElevationData*[, *asset*], *subtract=False*[, *operand_chunk*][, *operand_frame*][, *operand_asset*], *width=0*, *height=0*[, *world_transform*], *resolution=0*, *resolution_x=0*, *resolution_y=0*, *nodata_value=-32767*, *north_up=True*[, *region*][, *projection*][, *progress*])
Transform DEM or orthomosaic.

Parameters

- **data_source** (*DataSource*) – Selects between DEM and orthomosaic.
- **asset** (*int*) – Asset key to transform.
- **subtract** (*bool*) – Subtraction flag.
- **operand_chunk** (*int*) – Operand chunk key.
- **operand_frame** (*int*) – Operand frame key.
- **operand_asset** (*int*) – Operand asset key.
- **width** (*int*) – Raster width.
- **height** (*int*) – Raster height.
- **world_transform** (*Matrix*) – 2x3 raster-to-world transformation matrix.
- **resolution** (*float*) – Output resolution in meters.
- **resolution_x** (*float*) – Pixel size in the X dimension in projected units.
- **resolution_y** (*float*) – Pixel size in the Y dimension in projected units.
- **nodata_value** (*float*) – No-data value (DEM export only).
- **north_up** (*bool*) – Use north-up orientation for export.
- **region** (*BBox*) – Region to be processed.
- **projection** (*OrthoProjection*) – Output projection.
- **progress** (*Callable[[float], None]*) – Progress callback.

triangulatePoints(*max_error=10*, *min_image=2*[, *progress*])
Rebuild point cloud for the chunk.

Parameters

- **max_error** (*float*) – Reprojection error threshold.
- **min_image** (*int*) – Minimum number of point projections.
- **progress** (*Callable[[float], None]*) – Progress callback.

updateTransform()
Update chunk transformation based on reference data.

world_crs
Coordinate system used as world coordinate system.

Type *CoordinateSystem*

class Metashape.**ChunkTransform**
Transformation between chunk and world coordinates systems.

copy()
Return a copy of the object.

Returns A copy of the object.

Return type *ChunkTransform*

matrix
Transformation matrix.

Type *Matrix*

rotation
Rotation component.

Type *Matrix*

scale
Scale component.

Type float

translation
Translation component.

Type *Vector*

class Metashape.**CirTransform**
CIR calibration matrix.

calibrate()
Calibrate CIR matrix based on orthomosaic histogram.

coeffs
Color matrix.

Type *Matrix*

copy()
Return a copy of the object.

Returns A copy of the object.

Return type *CirTransform*

reset()
Reset CIR calibration matrix.

class Metashape.**ClassificationMethod**
Index values classification method in [EqualIntervalsClassification, JenksNaturalBreaksClassification]

class Metashape.**CloudClient**
CloudClient class provides access to the Agisoft Cloud processing service and allows to create and manage cloud projects.

The following example connects to the service and lists available projects:

```
>>> import Metashape
>>> client = Metashape.CloudClient()
>>> client.username = 'user'
>>> client.password = 'password'
>>> client.projectList()
```

abortProcessing(*document*)
Cancel processing.

Parameters **document** (*Document*) – Project to cancel.

client_id
Client software id (optional).

Type string

client_secret
Client softrwae secret (optional).

Type string

downloadProject(*document*[, *progress*])
Download project from the cloud.

Parameters

- **document** (*Document*) – Project to download.
- **progress** (*Callable[[float], None]*) – Progress callback.

getProcessingStatus(*document*)
Get processing status.

Parameters **document** (*Document*) – Project being processed.

Returns Processing status.

Return type dict

getProjectList()
Get list of projects in the cloud.

Returns List of projects.

Return type list

password
Cloud account password.

Type string

processProject(*document*, *tasks*)
Start processing in the cloud.

Parameters

- **document** (*Document*) – Project to process.
- **tasks** (list of *NetworkTask*) – List of processing tasks to execute.

uploadProject(*document*[, *progress*])
Upload project to the cloud.

Parameters

- **document** (*Document*) – Project to upload.
- **progress** (*Callable[[float], None]*) – Progress callback.

username
Cloud account username.

Type string

class Metashape.**CoordinateSystem**

Coordinate reference system (local, geographic or projected).

The following example changes chunk coordinate system to WGS 84 / UTM zone 41N and loads reference data from file:

```
>>> import Metashape
>>> chunk = Metashape.app.document.chunk
>>> chunk.crs = Metashape.CoordinateSystem("EPSG::32641")
>>> chunk.importReference("gcp.txt", Metashape.ReferenceFormatCSV)
>>> chunk.updateTransform()
```

addGeoid(*path*)

Register geoid model.

Parameters **path** (*string*) – Path to geoid file.

authority

Authority identifier of the coordinate system.

Type string

copy()

Return a copy of the object.

Returns A copy of the object.

Return type *CoordinateSystem*

datumTransform(*source*, *target*)

Coordinate transformation from source to target coordinate system datum.

Parameters

- **source** (*CoordinateSystem*) – Source coordinate system.
- **target** (*CoordinateSystem*) – Target coordinate system.

Returns 4x4 transformation matrix.

Return type *Matrix*

geoccs

Base geocentric coordinate system.

Type *CoordinateSystem*

geogcs

Base geographic coordinate system.

Type *CoordinateSystem*

geoid_height

Fixed geoid height to be used instead of interpolated values.

Type float

init(*crs*)

Initialize projection based on specified WKT definition or authority identifier.

Parameters **crs** (*string*) – WKT definition of coordinate system or authority identifier.

listBuiltinCRS()

Returns a list of builtin coordinate systems.

localframe(*point*)
Returns 4x4 transformation matrix to LSE coordinates at the given point.

Parameters **point** (*Vector*) – Coordinates of the origin in the geocentric coordinates.

Returns Transformation from geocentric coordinates to local coordinates.

Return type *Matrix*

name
Name of the coordinate system.

Type string

proj4
Coordinate system definition in PROJ.4 format.

Type string

project(*point*)
Projects point from geocentric coordinates to projected geographic coordinate system.

Parameters **point** (*Vector*) – 3D point in geocentric coordinates.

Returns 3D point in projected coordinates.

Return type *Vector*

towgs84
TOWGS84 transformation parameters (dx, dy, dz, rx, ry, rz, scale).

Type list of float

transform(*point*, *source*, *target*)
Transform point coordinates between coordinate systems.

Parameters

- **point** (2 or 3 component *Vector*) – Point coordinates.
- **source** (*CoordinateSystem*) – Source coordinate system.
- **target** (*CoordinateSystem*) – Target coordinate system.

Returns Transformed point coordinates.

Return type *Vector*

transformationMatrix(*point*, *source*, *target*)
Local approximation of coordinate transformation from source to target coordinate system at the given point.

Parameters

- **point** (3 component *Vector*) – Point coordinates.
- **source** (*CoordinateSystem*) – Source coordinate system.
- **target** (*CoordinateSystem*) – Target coordinate system.

Returns 4x4 transformation matrix.

Return type *Matrix*

unproject(*point*)
Unprojects point from projected coordinates to geocentric coordinates.

Parameters **point** (*Vector*) – 3D point in projected coordinate system.

Returns 3D point in geocentric coordinates.

Return type *Vector*

wkt
Coordinate system definition in WKT format.

Type string

wkt2
Coordinate system definition in WKT format, version 2.

Type string

class Metashape.**DataSource**
Data source in [PointCloudData, DenseCloudData, DepthMapsData, ModelData, TiledModelData, ElevationData, OrthomosaicData, ImagesData]

class Metashape.**DataType**
Data type in [DataTypeUndefined, DataType8i, DataType8u, DataType16i, DataType16u, DataType16f, DataType32i, DataType32u, DataType32f, DataType64i, DataType64u, DataType64f]

class Metashape.**DenseCloud**
Dense point cloud data.

assignClass(*target=0*[, *source*][, *progress*])
Assign class to points.

Parameters

- **target** (*PointClass*) – Target class.
- **source** (*PointClass* or list of *PointClass*) – Classes of points to be replaced.
- **progress** (*Callable[[float], None]*) – Progress callback.

assignClassToSelection(*target=0*[, *source*][, *progress*])
Assign class to selected points.

Parameters

- **target** (*PointClass*) – Target class.
- **source** (*PointClass* or list of *PointClass*) – Classes of points to be replaced.
- **progress** (*Callable[[float], None]*) – Progress callback.

bands
List of color bands.

Type list of string

classifyGroundPoints(*max_angle=15.0*, *max_distance=1.0*, *cell_size=50.0*, *erosion_radius=0.0*[, *source*][, *progress*])
Classify points into ground and non ground classes.

Parameters

- **max_angle** (*float*) – Maximum angle (degrees).
- **max_distance** (*float*) – Maximum distance (meters).
- **cell_size** (*float*) – Cell size (meters).
- **erosion_radius** (*float*) – Erosion radius (meters).
- **source** (*PointClass*) – Class of points to be re-classified.

- **progress** (*Callable[[float], None]*) – Progress callback.

classifyPoints([*source*][, *target*], *confidence=0.0*[, *progress*])
Multiclass classification of points.

Parameters

- **source** (*PointClass*) – Class of points to be re-classified.
- **target** (list of *PointClass*) – Target point classes for classification.
- **confidence** (*float*) – Required confidence level from 0.0 to 1.0.
- **progress** (*Callable[[float], None]*) – Progress callback.

clear()
Clears dense cloud data.

compactPoints([*progress*])
Permanently removes deleted points from dense cloud.

Parameters **progress** (*Callable[[float], None]*) – Progress callback.

copy()
Create a copy of the dense cloud.

Returns Copy of the dense cloud.

Return type *DenseCloud*

cropSelectedPoints([*point_classes*][, *progress*])
Crop selected points.

Parameters

- **point_classes** (*PointClass* or list of *PointClass*) – Classes of points to be removed.
- **progress** (*Callable[[float], None]*) – Progress callback.

crs
Reference coordinate system.

Type *CoordinateSystem* or None

data_type
Data type used to store color values.

Type *DataType*

key
Dense cloud identifier.

Type int

label
Dense cloud label.

Type string

meta
Dense cloud meta data.

Type *MetaData*

modified
Modified flag.

Type bool

pickPoint(*origin*, *target*, *endpoints=1*)
Returns ray intersection with the point cloud (point on the ray nearest to some point).

Parameters

- **origin** (*Vector*) – Ray origin.
- **target** (*Vector*) – Point on the ray.
- **endpoints** (*int*) – Number of endpoints to check for (0 - line, 1 - ray, 2 - segment).

Returns Coordinates of the intersection point.

Return type *Vector*

point_count
Number of points in dense cloud.

Type int

removePoints(*point_classes*[, *progress*])
Remove points.

Parameters

- **point_classes** (*PointClass* or list of *PointClass*) – Classes of points to be removed.
- **progress** (*Callable[[float], None]*) – Progress callback.

removeSelectedPoints([*point_classes*][, *progress*])
Remove selected points.

Parameters

- **point_classes** (*PointClass* or list of *PointClass*) – Classes of points to be removed.
- **progress** (*Callable[[float], None]*) – Progress callback.

renderDepth(*transform*, *calibration*, *point_size=1*, *resolution=1*, *cull_points=False*, *add_alpha=True*)
Render dense cloud depth image for specified viewpoint.

Parameters

- **transform** (*Matrix*) – Camera location.
- **calibration** (*Calibration*) – Camera calibration.
- **point_size** (*int*) – Point size.
- **resolution** (*float*) – Level of detail resolution in screen pixels.
- **cull_points** (*bool*) – Enable normal based culling.
- **add_alpha** (*bool*) – Generate image with alpha channel.

Returns Rendered image.

Return type *Image*

renderImage(*transform*, *calibration*, *point_size=1*, *resolution=1*, *cull_points=False*, *add_alpha=True*, *raster_transform=RasterTransformNone*)
Render dense cloud image for specified viewpoint.

Parameters

- **transform** (*Matrix*) – Camera location.
- **calibration** (*Calibration*) – Camera calibration.

- **point_size** (*int*) – Point size.
- **resolution** (*float*) – Level of detail resolution in screen pixels.
- **cull_points** (*bool*) – Enable normal based culling.
- **add_alpha** (*bool*) – Generate image with alpha channel.
- **raster_transform** (*RasterTransformType*) – Raster band transformation.

Returns Rendered image.

Return type *Image*

renderMask(*transform*, *calibration*, *point_size=1*, *resolution=1*, *cull_points=False*)

Render dense cloud mask image for specified viewpoint.

Parameters

- **transform** (*Matrix*) – Camera location.
- **calibration** (*Calibration*) – Camera calibration.
- **point_size** (*int*) – Point size.
- **resolution** (*float*) – Level of detail resolution in screen pixels.
- **cull_points** (*bool*) – Enable normal based culling.

Returns Rendered image.

Return type *Image*

renderNormalMap(*transform*, *calibration*, *point_size=1*, *resolution=1*, *cull_points=False*, *add_alpha=True*)

Render image with dense cloud normals for specified viewpoint.

Parameters

- **transform** (*Matrix*) – Camera location.
- **calibration** (*Calibration*) – Camera calibration.
- **point_size** (*int*) – Point size.
- **resolution** (*float*) – Level of detail resolution in screen pixels.
- **cull_points** (*bool*) – Enable normal based culling.
- **add_alpha** (*bool*) – Generate image with alpha channel.

Returns Rendered image.

Return type *Image*

renderPreview(*width = 2048*, *height = 2048*[, *transform*], *point_size=1*[, *progress*])

Generate dense cloud preview image.

Parameters

- **width** (*int*) – Preview image width.
- **height** (*int*) – Preview image height.
- **transform** (*Matrix*) – 4x4 viewpoint transformation matrix.
- **point_size** (*int*) – Point size.
- **progress** (*Callable[[float], None]*) – Progress callback.

Returns Preview image.

Return type *Image*

resetFilters()
Reset filters.

restorePoints([*point_classes*][, *progress*])
Restore deleted points.

Parameters

- **point_classes** (*PointClass* or list of *PointClass*) – Classes of points to be restored.
- **progress** (*Callable[[float], None]*) – Progress callback.

selectMaskedPoints(*cameras*, *softness=4*[, *progress*])
Select dense points based on image masks.

Parameters

- **cameras** (list of *Camera*) – A list of cameras to use for selection.
- **softness** (*float*) – Mask edge softness.
- **progress** (*Callable[[float], None]*) – Progress callback.

selectPointsByColor(*color*, *tolerance=10*, *channels='RGB'*[, *progress*])
Select dense points based on point colors.

Parameters

- **color** (*list of int*) – Color to select.
- **tolerance** (*int*) – Color tolerance.
- **channels** (*string*) – Combination of color channels to compare in ['R', 'G', 'B', 'H', 'S', 'V'].
- **progress** (*Callable[[float], None]*) – Progress callback.

selectPointsByShapes([*shapes*][, *progress*])
Select dense points based on shapes.

Parameters

- **shapes** (list of *Shape*) – A list of shapes to use for selection (selected shapes if not specified).
- **progress** (*Callable[[float], None]*) – Progress callback.

setClassesFilter(*point_classes*)
Set filter by point classes.

Parameters **point_classes** (*PointClass* or list of *PointClass*) – List of point classes.

setConfidenceFilter(*min_confidence*, *max_confidence*)
Set filter by confidence.

Parameters

- **min_confidence** (*int*) – Minimum confidence value.
- **max_confidence** (*int*) – Maximum confidence value.

setSelectionFilter()
Set filter by selection.

transform
4x4 dense cloud transformation matrix.

Type *Matrix*

updateStatistics([*progress*])
Updates dense cloud statistics.

Parameters **progress** (*Callable[[float], None]*) – Progress callback.

class Metashape.**DepthMap**
Depth map data.

calibration
Depth map calibration.

Type *Calibration*

copy()
Returns a copy of the depth map.

Returns Copy of the depth map.

Return type *DepthMap*

getCalibration(*level=0*)
Returns calibration data.

Parameters **level** (*int*) – Level index.

Returns Calibration data.

Return type *Calibration*

image([*level*])
Returns image data.

Parameters **level** (*int*) – Level index.

Returns Image data.

Return type *Image*

setCalibration(*calibration*, *level=0*)

Parameters

- **calibration** (*Calibration*) – Calibration data.
- **level** (*int*) – Level index.

setImage(*image*, *level=0*)

Parameters

- **image** (*Image*) – Image object with depth map data.
- **level** (*int*) – Level index.

class Metashape.**DepthMaps**
A set of depth maps generated for a chunk frame.

clear()
Clears depth maps data.

copy()
Create a copy of the depth maps.

Returns Copy of the depth maps.

Return type *DepthMaps*

items()
List of items.

key
Depth maps identifier.

Type int

keys()
List of item keys.

label
Depth maps label.

Type string

meta
Depth maps meta data.

Type *MetaData*

modified
Modified flag.

Type bool

values()
List of item values.

class Metashape.**Document**
Metashape project.

Contains list of chunks available in the project. Implements processing operations that work with multiple chunks. Supports saving/loading project files.

The project currently opened in Metashape window can be accessed using Metashape.app.document attribute. Additional Document objects can be created as needed.

The following example saves active chunk from the opened project in a separate project:

```
>>> import Metashape
>>> doc = Metashape.app.document
>>> doc.save(path = "project.psz", chunks = [doc.chunk])
```

addChunk()
Add new chunk to the document.

Returns Created chunk.

Return type *Chunk*

alignChunks([*chunks*][, *reference*], *method=0*, *fit_scale=True*, *downscale=1*, *generic_preselection=False*, *filter_mask=False*, *mask_tiepoints=False*, *keypoint_limit=40000*[, *markers*][, *progress*])
Align specified set of chunks.

Parameters

- **chunks** (*list of int*) – List of chunks to be aligned.
- **reference** (*int*) – Chunk to be used as a reference.
- **method** (*int*) – Alignment method (0 - point based, 1 - marker based, 2 - camera based).
- **fit_scale** (*bool*) – Fit chunk scale during alignment.

- **downscale** (*int*) – Alignment accuracy.
- **generic_preselection** (*bool*) – Enables image pair preselection.
- **filter_mask** (*bool*) – Filter points by mask.
- **mask_tiepoints** (*bool*) – Apply mask filter to tie points.
- **keypoint_limit** (*int*) – Maximum number of points for each photo.
- **markers** (*list of int*) – List of markers to be used for marker based alignment.
- **progress** (*Callable[[float], None]*) – Progress callback.

append(*document*[, *chunks*][, *progress*])
Append the specified Document object to the current document.

Parameters

- **document** (*Document*) – Document object to be appended.
- **chunks** (list of *Chunk*) – List of chunks to append.
- **progress** (*Callable[[float], None]*) – Progress callback.

chunk
Active chunk.

Type *Chunk*

chunks
List of chunks in the document.

Type Chunks

clear()
Clear the contents of the Document object.

copy()
Return a copy of the document.

Returns A copy of the document.

Return type *Document*

findChunk(*key*)
Find chunk by its key.

Returns Found chunk.

Return type *Chunk*

mergeChunks(*merge_markers=False*, *merge_tiepoints=False*, *merge_depth_maps=False*, *merge_dense_clouds=True*, *merge_models=False*, *merge_elevations=False*, *merge_orthomosaics=False*[, *chunks*][, *progress*])
Merge specified set of chunks.

Parameters

- **merge_markers** (*bool*) – Merge markers.
- **merge_tiepoints** (*bool*) – Merge tie points.
- **merge_depth_maps** (*bool*) – Merge depth maps.
- **merge_dense_clouds** (*bool*) – Merge dense clouds.
- **merge_models** (*bool*) – Merge models.

- **merge_elevations** (*bool*) – Merge DEMs.
- **merge_orthomosaics** (*bool*) – Merge orthomosaics.
- **chunks** (*list of int*) – List of chunks to process.
- **progress** (*Callable[[float], None]*) – Progress callback.

meta
Document meta data.

Type *MetaData*

modified
Modified flag.

Type bool

open(*path*, *read_only=False*, *ignore_lock=False*, *archive=True*)
Load document from the specified file.

Parameters

- **path** (*string*) – Path to the file.
- **read_only** (*bool*) – Open document in read-only mode.
- **ignore_lock** (*bool*) – Ignore lock state for project modifications.
- **archive** (*bool*) – Override project format when using non-standard file extension.

path
Path to the document file.

Type string

read_only
Read only status.

Type bool

remove(*items*)
Remove a set of items from the document.

Parameters **items** (list of *Chunk*) – A list of items to be removed.

save([*path*][, *chunks*][, *version*], *archive=True*)
Save document to the specified file.

Parameters

- **path** (*string*) – Optional path to the file.
- **chunks** (list of *Chunk*) – List of chunks to be saved.
- **version** (*string*) – Project version to save.
- **archive** (*bool*) – Override project format when using non-standard file extension.

class Metashape.**Elevation**
Digital elevation model.

altitude(*point*)
Return elevation value at the specified point.

Parameters **point** (*Vector*) – Point coordinates in the elevation coordinate system.

Returns Elevation value.

Return type float

bottom
Y coordinate of the bottom side.

Type float

clear()
Clears elevation model data.

copy()
Create a copy of the elevation model.

Returns Copy of the elevation model.

Return type *Elevation*

crs
Coordinate system of elevation model.

Type *CoordinateSystem*

height
Elevation model height.

Type int

key
Elevation model identifier.

Type int

label
Elevation model label.

Type string

left
X coordinate of the left side.

Type float

max
Maximum elevation value.

Type float

meta
Elevation model meta data.

Type *MetaData*

min
Minimum elevation value.

Type float

modified
Modified flag.

Type bool

palette
Color palette.

Type dict

projection
Projection of elevation model.

Type *OrthoProjection*

resolution
DEM resolution in meters.

Type float

right
X coordinate of the right side.

Type float

top
Y coordinate of the top side.

Type float

width
Elevation model width.

Type int

class Metashape.**EulerAngles**
Euler angles in [EulerAnglesYPR, EulerAnglesOPK, EulerAnglesPOK, EulerAnglesANK]

class Metashape.**FaceCount**
Face count in [LowFaceCount, MediumFaceCount, HighFaceCount, CustomFaceCount]

class Metashape.**FilterMode**
Depth filtering mode in [NoFiltering, MildFiltering, ModerateFiltering, AggressiveFiltering]

class Metashape.**FrameStep**
Frame step size for video import in [CustomFrameStep, SmallFrameStep, MediumFrameStep, LargeFrameStep]

class Metashape.**Geometry**
Geometry data.

GeometryCollection(*geometries*)
Create a GeometryCollection geometry.

Parameters **geometries** (list of *Geometry*) – Child geometries.

Returns A GeometryCollection geometry.

Return type *Geometry*

LineString(*coordinates*)
Create a LineString geometry.

Parameters **coordinates** (list of *Vector*) – List of vertex coordinates.

Returns A LineString geometry.

Return type *Geometry*

MultiLineString(*geometries*)
Create a MultiLineString geometry.

Parameters **geometries** (list of *Geometry*) – Child line strings.

Returns A point geometry.

Return type *Geometry*

MultiPoint(*geometries*)
Create a MultiPoint geometry.

Parameters **geometries** (list of *Geometry*) – Child points.

Returns A point geometry.

Return type *Geometry*

MultiPolygon(*geometries*)
Create a MultiPolygon geometry.

Parameters **geometries** (list of *Geometry*) – Child polygons.

Returns A point geometry.

Return type *Geometry*

Point(*vector*)
Create a Point geometry.

Parameters **vector** (*Vector* or list of floats) – Point coordinates.

Returns A point geometry.

Return type *Geometry*

Polygon(*exterior_ring*[, *interior_rings*])
Create a Polygon geometry.

Parameters

- **exterior_ring** (list of *Vector*) – Point coordinates.
- **interior_rings** (list of *Vector*) – Point coordinates.

Returns A Polygon geometry.

Return type *Geometry*

class Type
Geometry type in [PointType, LineStringType, PolygonType, MultiPointType, MultiLineStringType, MultiPolygonType, GeometryCollectionType]

coordinates
List of vertex coordinates.

Type *Vector*

geometries
List of child geometries.

Type *Geometry*

is_3d
Is 3D flag.

Type bool

type
Geometry type.

Type *Geometry.Type*

class Metashape.**Image**(*width*, *height*, *channels*, *datatype='U8'*)
n-channel image

Parameters

- **width** (*int*) – image width
- **height** (*int*) – image height
- **channels** (*string*) – color channel layout, e.g. 'RGB', 'RGBA', etc.
- **datatype** (*string*) – pixel data type in ['U8', 'U16', 'U32', 'F16', 'F32', 'F64']

channels
Channel mapping for the image.

Type string

cn
Number of color channels.

Type int

convert(*channels*[, *datatype*])
Convert image to specified data type and channel layout.

Parameters

- **channels** (*string*) – color channels to be loaded, e.g. 'RGB', 'RGBA', etc.
- **datatype** (*string*) – pixel data type in ['U8', 'U16', 'U32', 'F16', 'F32', 'F64']

Returns Converted image.

Return type *Image*

copy()
Return a copy of the image.

Returns copy of the image

Return type *Image*

data_type
Data type used to store pixel values.

Type string

fromstring(*data*, *width*, *height*, *channels*, *datatype='U8'*)
Create image from byte array.

Parameters

- **data** (*string*) – raw image data
- **width** (*int*) – image width
- **height** (*int*) – image height
- **channels** (*string*) – color channel layout, e.g. 'RGB', 'RGBA', etc.
- **datatype** (*string*) – pixel data type in ['U8', 'U16', 'U32', 'F16', 'F32', 'F64']

Returns Created image.

Return type *Image*

gaussianBlur(*radius*)
Smooth image with a gaussian filter.

Parameters **radius** (*float*) – smoothing radius.

Returns Smoothed image.

Return type *Image*

height
Image height.

Type int

open(*path*, *layer=0*, *datatype='U8'*[, *channels*][, *x*][, *y*][, *w*][, *h*])
Load image from file.

Parameters

- **path** (*string*) – path to the image file
- **layer** (*int*) – image layer in case of multipage file
- **datatype** (*string*) – pixel data type in ['U8', 'U16', 'U32', 'F16', 'F32', 'F64']
- **channels** (*string*) – color channels to be loaded, e.g. 'RGB', 'RGBA', etc.
- **x** (*int*) – x offset of image region.
- **y** (*int*) – y offset of image region.
- **w** (*int*) – width of image region.
- **h** (*int*) – height of image region.

Returns Loaded image.

Return type *Image*

resize(*width*, *height*)
Resize image to specified dimensions.

Parameters

- **width** (*int*) – new image width
- **height** (*int*) – new image height

Returns resized image

Return type *Image*

save(*path*[, *compression*])
Save image to the file.

Parameters

- **path** (*string*) – path to the image file
- **compression** (*ImageCompression*) – compression options

tostring()
Convert image to byte array.

Returns Raw image data.

Return type string

undistort(*calib*, *center_principal_point=True*, *square_pixels=True*)
Undistort image using provided calibration.

Parameters

- **calib** (*Calibration*) – lens calibration
- **center_principal_point** (*bool*) – moves principal point to the image center

- **square_pixels** (*bool*) – create image with square pixels

Returns undistorted image

Return type *Image*

uniformNoise(*amplitude*)
Add uniform noise with specified amplitude.

Parameters **amplitude** (*float*) – noise amplitude.

Returns Image with added noise.

Return type *Image*

warp(*calib0*, *trans0*, *calib1*, *trans1*)
Warp image by rotating virtual viewpoint.

Parameters

- **calib0** (*Calibration*) – initial calibration
- **trans0** (*Matrix*) – initial camera orientation as 4x4 matrix
- **calib1** (*Calibration*) – final calibration
- **trans1** (*Matrix*) – final camera orientation as 4x4 matrix

Returns warped image

Return type *Image*

width
Image width.

Type int

class Metashape.**ImageCompression**
Image compression parameters

class TiffCompression
Tiff compression in [TiffCompressionNone, TiffCompressionLZW, TiffCompressionJPEG, TiffCompressionPackbits, TiffCompressionDeflate]

copy()
Return a copy of the object.

Returns A copy of the object.

Return type *Viewpoint*

jpeg_quality
JPEG quality.

Type int

tiff_big
Enable BigTIFF compression for TIFF files.

Type bool

tiff_compression
Tiff compression.

Type int

tiff_overviews
Enable image pyramid deneration for TIFF files.

Type bool

tiff_tiled
Export tiled TIFF.

Type bool

class Metashape.**ImageFormat**
Image format in [ImageFormatNone, ImageFormatJPEG, ImageFormatTIFF, ImageFormatPNG, ImageFormatBMP, ImageFormatEXR, ImageFormatPNM, ImageFormatSGI, ImageFormatCR2, ImageFormatBZ2, ImageFormatSEQ, ImageFormatBIL, ImageFormatASCII, ImageFormatXYZ, ImageFormatARA, ImageFormatTGA, ImageFormatDDS, ImageFormatJP2, ImageFormatWebP, ImageFormatJXL, ImageFormatKTX]

class Metashape.**ImageLayout**
Image layout in [UndefinedLayout, FlatLayout, MultiframeLayout, MultiplaneLayout]

class Metashape.**Interpolation**
Interpolation mode in [DisabledInterpolation, EnabledInterpolation, Extrapolated]

class Metashape.**License**
License information.

activate(*license_key*)
Activate software online using a license key.

Parameters **key** (*string*) – Activation key.

activateOffline(*license_key*)
Create a request for offline activation.

Parameters **key** (*string*) – Activation key.

Returns Activation request.

Return type string

deactivate()
Deactivate software online.

deactivateOffline()
Create a request for offline deactivation.

Returns Deactivation request.

Return type string

valid
Metashape activation status.

Type bool

class Metashape.**MappingMode**
UV mapping mode in [GenericMapping, OrthophotoMapping, AdaptiveOrthophotoMapping, SphericalMapping, CameraMapping]

class Metashape.**Marker**
Marker instance

class **Projection**
Marker data().

coord
Point coordinates in pixels.
Type *Vector*

pinned
Pinned flag.
Type bool

valid
Valid flag.
Type bool

class Projections
Collection of projections specified for the marker

items()
List of items.

keys()
List of item keys.

values()
List of item values.

class Reference
Marker reference data.

accuracy
Marker location accuracy.
Type *Vector*

enabled
Enabled flag.
Type bool

location
Marker coordinates.
Type *Vector*

class Type
Marker type in [Regular, Vertex, Fiducial]

chunk
Chunk the marker belongs to.

Type *Chunk*

enabled
Enables/disables the marker.

Type bool

frames
Marker frames.

Type list of *Marker*

group
Marker group.

Type *MarkerGroup*

key
Marker identifier.

Type int

label
Marker label.

Type string

meta
Marker meta data.

Type *MetaData*

position
Marker position in the current frame.

Type *Vector*

position_covariance
Marker position covariance.

Type *Matrix*

projections
List of marker projections.

Type MarkerProjections

reference
Marker reference data.

Type MarkerReference

selected
Selects/deselects the marker.

Type bool

sensor
Fiducial mark sensor.

Type *Sensor*

type
Marker type.

Type *Marker.Type*

class Metashape.**MarkerGroup**
MarkerGroup objects define groups of multiple markers. The grouping is established by assignment of a MarkerGroup instance to the Marker.group attribute of participating markers.

label
Marker group label.

Type string

selected
Current selection state.

Type bool

class Metashape.**Mask**
Mask instance

copy()
Returns a copy of the mask.

Returns Copy of the mask.

Return type *Mask*

image()
Returns image data.

Returns Image data.

Return type *Image*

invert()
Create inverted copy of the mask.

Returns Inverted copy of the mask.

Return type *Mask*

load(*path*[, *layer*])
Loads mask from file.

Parameters

- **path** (*string*) – Path to the image file to be loaded.
- **layer** (*int*) – Optional layer index in case of multipage files.

setImage(*image*)

Parameters **image** (*Image*) – Image object with mask data.

class Metashape.**MaskOperation**
Mask operation in [MaskOperationReplacement, MaskOperationUnion, MaskOperationIntersection, MaskOperationDifference]

class Metashape.**MaskingMode**
Masking mode in [MaskingModeAlpha, MaskingModeFile, MaskingModeBackground, MaskingModeModel]

class Metashape.**Masks**
A set of masks for a chunk frame.

items()
List of items.

keys()
List of item keys.

meta
Thumbnails meta data.

Type *MetaData*

modified
Modified flag.

Type bool

values()
List of item values.

class Metashape.**Matrix**
m-by-n matrix

```
>>> import Metashape
>>> m1 = Metashape.Matrix.Diag( (1,2,3,4) )
>>> m3 = Metashape.Matrix( [[1,2,3,4], [1,2,3,4], [1,2,3,4], [1,2,3,4]] )
```

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```
>>> m2 = m1.inv()
>>> m3 = m1 * m2
>>> x = m3.det()
>>> if x == 1:
...     Metashape.app.messageBox("Diagonal matrix dimensions: " + str(m3.size))
```

Diag(*vector*)
Create a diagonal matrix.

Parameters **vector** (*Vector* or list of floats) – The vector of diagonal entries.

Returns A diagonal matrix.

Return type *Matrix*

Rotation(*matrix*)
Create a rotation matrix.

Parameters **matrix** (*Matrix*) – The 3x3 rotation matrix.

Returns 4x4 matrix representing rotation.

Return type *Matrix*

Scale(*scale*)
Create a scale matrix.

Parameters **scale** (*Vector*) – The scale vector.

Returns A matrix representing scale.

Return type *Matrix*

Translation(*vector*)
Create a translation matrix.

Parameters **vector** (*Vector*) – The translation vector.

Returns A matrix representing translation.

Return type *Matrix*

col(*index*)
Returns column of the matrix.

Returns matrix column.

Return type *Vector*

copy()
Returns a copy of this matrix.

Returns an instance of itself

Return type *Matrix*

det()
Return the determinant of a matrix.

Returns Return a the determinant of a matrix.

Return type float

inv()
Returns an inverted copy of the matrix.

Returns inverted matrix.

Return type *Matrix*

mulp(*point*)
Transforms a point in homogeneous coordinates.

Parameters **point** (*Vector*) – The point to be transformed.

Returns transformed point.

Return type *Vector*

mulv(*vector*)
Transforms vector in homogeneous coordinates.

Parameters **vector** (*Vector*) – The vector to be transformed.

Returns transformed vector.

Return type *Vector*

rotation()
Returns rotation component of the 4x4 matrix.

Returns rotation component

Return type *Matrix*

row(*index*)
Returns row of the matrix.

Returns matrix row.

Return type *Vector*

scale()
Returns scale component of the 4x4 matrix.

Returns scale component

Return type float

size
Matrix dimensions.

Type tuple

svd()
Returns singular value decomposition of the matrix.

Returns u, s, v tuple where a = u * diag(s) * v

Return type *Matrix* *Vector* *Matrix* tuple

t()
Return a new, transposed matrix.

Returns a transposed matrix

Return type *Matrix*

translation()
Returns translation component of the 4x4 matrix.

Returns translation component

Return type *Vector*

zero()
Set all matrix elements to zero.

class Metashape.MetaData(*object*)
Collection of object properties

copy()
Return a copy of the object.

Returns A copy of the object.

Return type *MetaData*

items()
List of items.

keys()
List of item keys.

values()
List of item values.

class Metashape.Model
Triangular mesh model instance

class Face
Triangular face of the model

hidden
Face visibility flag.
Type bool

selected
Face selection flag.
Type bool

tex_index
Texture page index.
Type int

tex_vertices
Texture vertex indices.
Type tuple of 3 int

vertices
Vertex indices.
Type tuple of 3 int

class Faces
Collection of model faces

resize(*count*)
Resize faces list.
Parameters **count** (*int*) – new face count

class Statistics
Mesh statistics

components
Number of connected components.
Type int

degenerate_faces
Number of degenerate faces.
Type int

duplicate_faces
Number of duplicate faces.
Type int

faces
Total number of faces.
Type int

flipped_normals
Number of edges with flipped normals.
Type int

free_vertices
Number of free vertices.
Type int

multiple_edges
Number of edges connecting more than 2 faces.
Type int

open_edges
Number of open edges.
Type int

out_of_range_indices
Number of out of range indices.
Type int

similar_vertices
Number of similar vertices.
Type int

vertices
Total number of vertices.
Type int

zero_faces
Number of zero faces.
Type int

class TexVertex
Texture vertex of the model

coord
Vertex coordinates.
Type tuple of 2 float

class TexVertices
Collection of model texture vertices

resize(*count*)
Resize vertex list.
Parameters **count** (*int*) – new vertex count

class Texture
Model texture.

image(*page=0*)
Return texture image.
Parameters **page** (*int*) – Texture index for multitextured models.
Returns Texture image.
Return type *Image*

label
Animation label.
Type string

meta
Camera track meta data.
Type *MetaData*

model
Model the texture belongs to.
Type *Model*

setImage(*image*, *page=0*)
Initialize texture from image data.
Parameters
- **image** (*Image*) – Texture image.
- **page** (*int*) – Texture index for multitextured models.

type
Texture type.
Type *Model.TextureType*

class TextureType
Texture type in [DiffuseMap, NormalMap, OcclusionMap]

class Vertex
Vertex of the model

color
Vertex color.
Type tuple of 3 int

confidence
Vertex confidence.
Type float

coord
Vertex coordinates.
Type *Vector*

class Vertices
Collection of model vertices

resize(*count*)
Resize vertex list.
Parameters **count** (*int*) – new vertex count

addTexture(*type=Model.DiffuseMap*)
Add new texture to the model.

Parameters **type** (*Model.TextureType*) – Texture type.

Returns Created texture.

Return type *Model.Texture*

area()
Return area of the model surface.

Returns Model area.

Return type float

bands
List of color bands.

Type list of string

clear()
Clears model data.

closeHoles(*level=30*, *apply_to_selection=False*)
Fill holes in the model surface.

Parameters

- **level** (*int*) – Hole size threshold in percents.
- **apply_to_selection** (*bool*) – Close holes within selection

copy()
Create a copy of the model.

Returns Copy of the model.

Return type *Model*

cropSelection()
Crop selected faces and free vertices from the mesh.

data_type
Data type used to store color values.

Type *DataType*

faces
Collection of mesh faces.

Type MeshFaces

fixTopology()
Remove polygons causing topological problems.

getActiveTexture(*type=Model.DiffuseMap*)
Return active texture.

Parameters **type** (*Model.TextureType*) – Texture type.

Returns Texture image.

Return type *Image*

key
Model identifier.

Type int

label
Model label.

Type string

loadTexture(*path*)
Load texture from the specified file.

Parameters **path** (*string*) – Path to the image file.

meta
Model meta data.

Type *MetaData*

modified
Modified flag.

Type bool

pickPoint(*origin*, *target*, *endpoints=1*)
Return ray intersection with mesh.

Parameters

- **origin** (*Vector*) – Ray origin.
- **target** (*Vector*) – Point on the ray.
- **endpoints** (*int*) – Number of endpoints to check for (0 - line, 1 - ray, 2 - segment).

Returns Coordinates of the intersection point.

Return type *Vector*

remove(*items*)
Remove textures from the model.

Parameters **items** (list of *Model.Texture*) – A list of textures to be removed.

removeComponents(*size*)
Remove small connected components.

Parameters **size** (*int*) – Threshold on the polygon count of the components to be removed.

removeSelection()
Remove selected faces and free vertices from the mesh.

renderDepth(*transform*, *calibration*, *cull_faces=True*, *add_alpha=True*)
Render model depth image for specified viewpoint.

Parameters

- **transform** (*Matrix*) – Camera location.
- **calibration** (*Calibration*) – Camera calibration.
- **cull_faces** (*bool*) – Enable back-face culling.
- **add_alpha** (*bool*) – Generate image with alpha channel.

Returns Rendered image.

Return type *Image*

renderImage(*transform*, *calibration*, *cull_faces=True*, *add_alpha=True*, *raster_transform=RasterTransformNone*)
Render model image for specified viewpoint.

Parameters

- **transform** (*Matrix*) – Camera location.

- **calibration** (*Calibration*) – Camera calibration.
- **cull_faces** (*bool*) – Enable back-face culling.
- **add_alpha** (*bool*) – Generate image with alpha channel.
- **raster_transform** (*RasterTransformType*) – Raster band transformation.

Returns Rendered image.

Return type *Image*

renderMask(*transform*, *calibration*, *cull_faces=True*)

Render model mask image for specified viewpoint.

Parameters

- **transform** (*Matrix*) – Camera location.
- **calibration** (*Calibration*) – Camera calibration.
- **cull_faces** (*bool*) – Enable back-face culling.

Returns Rendered image.

Return type *Image*

renderNormalMap(*transform*, *calibration*, *cull_faces=True*, *add_alpha=True*)

Render image with model normals for specified viewpoint.

Parameters

- **transform** (*Matrix*) – Camera location.
- **calibration** (*Calibration*) – Camera calibration.
- **cull_faces** (*bool*) – Enable back-face culling.
- **add_alpha** (*bool*) – Generate image with alpha channel.

Returns Rendered image.

Return type *Image*

renderPreview(*width = 2048*, *height = 2048*[, *transform*][, *progress*])

Generate model preview image.

Parameters

- **width** (*int*) – Preview image width.
- **height** (*int*) – Preview image height.
- **transform** (*Matrix*) – 4x4 viewpoint transformation matrix.
- **progress** (*Callable[[float], None]*) – Progress callback.

Returns Preview image.

Return type *Image*

saveTexture(*path*)

Save texture to the specified file.

Parameters **path** (*string*) – Path to the image file.

setActiveTexture(*texture*, *type=Model.DiffuseMap*)

Set active texture.

Parameters

- **texture** (*Model.Texture*) – Texture to set.
- **type** (*Model.TextureType*) – Texture type.

statistics([*progress*])
Return mesh statistics.

Parameters **progress** (*Callable[[float], None]*) – Progress callback.

Returns Mesh statistics.

Return type *Model.Statistics*

tex_vertices
Collection of mesh texture vertices.

Type MeshTexVertices

textures
List of model textures.

Type list of *Model.Texture*

transform(*transform*)
Transform vertex coordinates.

Parameters **transform** (*Matrix*) – 4x4 transformation matrix.

vertices
Collection of mesh vertices.

Type MeshVertices

volume()
Return volume of the closed model surface.

Returns Model volume.

Return type float

class Metashape.**ModelFormat**
Model format in [ModelFormatNone, ModelFormatOBJ, ModelFormat3DS, ModelFormatVRML, ModelFormatPLY, ModelFormatCOLLADA, ModelFormatU3D, ModelFormatPDF, ModelFormatDXF, ModelFormatFBX, ModelFormatKMZ, ModelFormatCTM, ModelFormatSTL, ModelFormatDXF_3DF, ModelFormatTLS, ModelFormatABC, ModelFormatOSGB, ModelFormatOSGT, ModelFormatGLTF, ModelFormatX3D, ModelFormatLandXML]

class Metashape.**NetworkClient**
NetworkClient class provides access to the network processing server and allows to create and manage tasks.

The following example connects to the server and lists active tasks:

```
>>> import Metashape
>>> client = Metashape.NetworkClient()
>>> client.connect('127.0.0.1')
>>> client.batchList()
```

abortBatch(*batch_id*)
Abort batch.

Parameters **batch_id** (*int*) – Batch id.

abortNode(*node_id*)
Abort node.

Parameters **node_id** (*int*) – Node id.

batchList(*revision=0*)
Get list of batches.

Parameters **revision** (*int*) – First revision to get.

Returns List of batches.

Return type dict

batchStatus(*batch_id*, *revision=0*)
Get batch status.

Parameters

- **batch_id** (*int*) – Batch id.
- **revision** (*int*) – First revision to get.

Returns Batch status.

Return type dict

connect(*host*, *port=5840*)
Connect to the server.

Parameters

- **host** (*string*) – Server hostname.
- **port** (*int*) – Communication port.

createBatch(*path*, *tasks*[, *meta*])
Create new batch.

Parameters

- **path** (*string*) – Project path relative to root folder.
- **tasks** (list of *NetworkTask*) – List of processing tasks to execute.
- **meta** (*MetaData*) – Batch metadata.

Returns Batch id.

Return type int

disconnect()
Disconnect from the server.

dumpBatches([*batch_ids*])
Dump current state of batches.

Parameters **batch_ids** (*list of int*) – List of batch ids to dump.

Returns Batches data.

Return type string

findBatch(*path*)
Get batch id based on project path.

Parameters **path** (*string*) – Project path relative to root folder.

Returns Batch id.

Return type int

loadBatches(*data*)
Load batches from dump.

Parameters **data** (*string*) – Batches data.

nodeList(*revision=0*)
Get list of nodes.

Parameters **revision** (*int*) – First revision to get.

Returns List of nodes.

Return type dict

nodeStatus(*node_id*, *revision=0*)
Get node status.

Parameters

- **node_id** (*int*) – Node id.
- **revision** (*int*) – First revision to get.

Returns Node status.

Return type dict

quitNode(*node_id*)
Quit node.

Parameters **node_id** (*int*) – Node id.

serverInfo()
Get server information.

Returns Server information.

Return type dict

serverStatus(*revision=0*)
Get server status.

Parameters **revision** (*int*) – First revision to get.

Returns Server status.

Return type dict

setBatchNodeLimit(*batch_id*, *node_limit*)
Set node limit of the batch.

Parameters

- **batch_id** (*int*) – Batch id.
- **node_limit** (*int*) – Node limit of the batch (0 - unlimited).

setBatchPaused(*batch_id*, *paused=True*)
Set batch paused state.

Parameters

- **batch_id** (*int*) – Batch id.
- **paused** (*bool*) – Paused state.

setBatchPriority(*batch_id*, *priority*)
Set batch priority.

Parameters

- **batch_id** (*int*) – Batch id.
- **priority** (*int*) – Batch priority (2 - Highest, 1 - High, 0 - Normal, -1 - Low, -2 - Lowest).

setMasterServer([*host*])
Set or reset master server.

Parameters **host** (*string*) – Master server hostname.

setNodeCPUEnable(*node_id*, *cpu_enable*)
Set node CPU enable flag.

Parameters

- **node_id** (*int*) – Node id.
- **cpu_enable** (*bool*) – CPU enable flag.

setNodeCapability(*node_id*, *capability*)
Set node capability.

Parameters

- **node_id** (*int*) – Node id.
- **capability** (*int*) – Node capability (1 - CPU, 2 - GPU, 3 - Any).

setNodeGPUMask(*node_id*, *gpu_mask*)
Set node GPU mask.

Parameters

- **node_id** (*int*) – Node id.
- **gpu_mask** (*int*) – GPU device mask.

setNodePaused(*node_id*, *paused=True*)
Set node paused state.

Parameters

- **node_id** (*int*) – Node id.
- **paused** (*bool*) – Paused state.

setNodePriority(*node_id*, *priority*)
Set node priority.

Parameters

- **node_id** (*int*) – Node id.
- **priority** (*int*) – Node priority (2 - Highest, 1 - High, 0 - Normal, -1 - Low, -2 - Lowest).

class Metashape.**NetworkTask**
NetworkTask class contains information about network task and its parameters.

The following example creates a new processing task and submits it to the server:

```
>>> import Metashape
>>> task = Metashape.NetworkTask()
>>> task.name = 'MatchPhotos'
>>> task.params['keypoint_limit'] = 40000
>>> client = Metashape.NetworkClient()
```

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```
>>> client.connect('127.0.0.1')
>>> batch_id = client.createBatch('processing/project.psx', [task])
>>> client.setBatchPaused(batch_id, false)
```

chunks
List of chunks.

Type list

encode()
Create a dictionary with task parameters.

frames
List of frames.

Type list

name
Task name.

Type string

params
Task parameters.

Type dict

supports_gpu
GPU support flag.

Type bool

class Metashape.**OrthoProjection**
Orthographic projection.

class Type
Projection type in [Planar, Cylindrical]

copy()
Return a copy of the object.

Returns A copy of the object.

Return type *OrthoProjection*

crs
Base coordinate system.

Type *CoordinateSystem*

matrix
Ortho transformation matrix.

Type *Matrix*

radius
Cylindrical projection radius.

Type float

transform(*point*, *source*, *target*)
Transform point coordinates between coordinate systems.

Parameters

- **point** (2 or 3 component *Vector*) – Point coordinates.
- **source** (*OrthoProjection*) – Source coordinate system.
- **target** (*OrthoProjection*) – Target coordinate system.

Returns Transformed point coordinates.

Return type *Vector*

type
Projection type.

Type *OrthoProjection.Type*

class Metashape.**Orthomosaic**
Orthomosaic data.

The following sample assigns to the first shape in the chunk the image from the first camera for the orthomosaic patch and updates the mosaic:

```
>>> import Metashape
>>> chunk = Metashape.app.document.chunk
>>> ortho = chunk.orthomosaic
>>> camera = chunk.cameras[0]
>>> shape = chunk.shapes[0]
>>> patch = Metashape.Orthomosaic.Patch()
>>> patch.image_keys = [camera.key]
>>> ortho.patches[shape] = patch
>>> ortho.update()
```

class Patch
Orthomosaic patch.

copy()
Returns a copy of the patch.
Returns Copy of the patch.
Return type *Orthomosaic.Patch*

excluded
Excluded flag.
Type bool

image_keys
Image keys.
Type list of int

class Patches
A set of orthomosaic patches.

items()
List of items.

keys()
List of item keys.

values()
List of item values.

bands
List of color bands.

Type list of string

bottom
Y coordinate of the bottom side.

Type float

clear()
Clears orthomosaic data.

copy()
Create a copy of the orthomosaic.

Returns Copy of the orthomosaic.

Return type *Orthomosaic*

crs
Coordinate system of orthomosaic.

Type *CoordinateSystem*

data_type
Data type used to store color values.

Type *DataType*

height
Orthomosaic height.

Type int

key
Orthomosaic identifier.

Type int

label
Orthomosaic label.

Type string

left
X coordinate of the left side.

Type float

meta
Orthomosaic meta data.

Type *MetaData*

modified
Modified flag.

Type bool

patches
Orthomosaic patches.

Type *Orthomosaic.Patches*

projection
Orthomosaic projection.

Type *OrthoProjection*

removeOrthophotos()
Remove orthorectified images from orthomosaic.

renderPreview(*width = 2048*, *height = 2048*[, *progress*])
Generate orthomosaic preview image. :arg width: Preview image width. :type width: int :arg height: Preview image height. :type height: int :arg progress: Progress callback. :type progress: Callable[[float], None] :return: Preview image. :rtype: *Image*

reset([*progress*])
Reset all edits to orthomosaic.

Parameters **progress** (*Callable[[float], None]*) – Progress callback.

resolution
Orthomosaic resolution in meters.

Type float

right
X coordinate of the right side.

Type float

top
Y coordinate of the top side.

Type float

update([*progress*])
Apply edits to orthomosaic.

Parameters **progress** (*Callable[[float], None]*) – Progress callback.

width
Orthomosaic width.

Type int

class Metashape.**Photo**
Photo instance

alpha()
Returns alpha channel data.

Returns Alpha channel data.

Return type *Image*

copy()
Returns a copy of the photo.

Returns Copy of the photo.

Return type *Photo*

image([*channels*][, *datatype*])
Returns image data.

Parameters

- **datatype** (*string*) – pixel data type in ['U8', 'U16', 'U32', 'F16', 'F32', 'F64']
- **channels** (*string*) – color channels to be loaded, e.g. 'RGB', 'RGBA', etc.

Returns Image data.

Return type *Image*

imageMeta()
Returns image meta data.

Returns Image meta data.

Return type *MetaData*

layer
Layer index in the image file.

Type int

meta
Frame meta data.

Type *MetaData*

open(*path*, *layer=0*)
Loads specified image file.

Parameters

- **path** (*string*) – Path to the image file to be loaded.
- **layer** (*int*) – Layer index in case of multipage files.

path
Path to the image file.

Type string

thumbnail(*width=192*, *height=192*)
Creates new thumbnail with specified dimensions.

Returns Thumbnail data.

Return type *Thumbnail*

class Metashape.**PointClass**
Point class in [Created, Unclassified, Ground, LowVegetation, MediumVegetation, HighVegetation, Building, LowPoint, ModelKeyPoint, Water, Rail, RoadSurface, OverlapPoints, WireGuard, WireConductor, TransmissionTower, WireConnector, BridgeDeck, HighNoise, Car, Manmade]

class Metashape.**PointCloud**
Tie point cloud instance

class Cameras
Collection of *PointCloud.Projections* objects indexed by corresponding cameras

class Filter
Tie point cloud filter

The following example selects all tie points from the active chunk that have reprojection error higher than defined threshold:

```
>>> chunk = Metashape.app.document.chunk # active chunk
>>> threshold = 0.5
>>> f = Metashape.PointCloud.Filter()
>>> f.init(chunk, criterion = Metashape.PointCloud.Filter.ReprojectionError)
>>> f.selectPoints(threshold)
```

class Criterion
Point filtering criterion in [ReprojectionError, ReconstructionUncertainty, ImageCount, ProjectionAccuracy]

init(*points*, *criterion*, *progress*)
Initialize point cloud filter based on specified criterion.

Parameters
- **points** (*PointCloud* or *Chunk*) – Point cloud to filter.
- **criterion** (*PointCloud.Filter.Criterion*) – Point filter criterion.
- **progress** (*Callable[[float], None]*) – Progress callback.

max_value
Maximum value.
Type int or double

min_value
Minimum value.
Type int or double

removePoints(*threshold*)
Remove points based on specified threshold.
Parameters **threshold** (*float*) – Criterion threshold.

resetSelection()
Reset previously made selection.

selectPoints(*threshold*)
Select points based on specified threshold.
Parameters **threshold** (*float*) – Criterion threshold.

values
List of values.
Type list of int or list of double

class Point
3D point in the point cloud

coord
Point coordinates.
Type *Vector*

cov
Point coordinates covariance matrix.
Type *Matrix*

selected
Point selection flag.
Type bool

track_id
Track index.
Type int

valid
Point valid flag.
Type bool

class Points
Collection of 3D points in the point cloud

copy()
Returns a copy of points buffer.
Returns Copy of points buffer.
Return type *PointCloud.Points*

resize(*count*)
Resize points list.

Parameters **count** (*int*) – new point count

class Projection
Projection of the 3D point on the photo

coord
Projection coordinates.
Type tuple of 2 float

size
Point size.
Type float

track_id
Track index.
Type int

class Projections
Collection of *PointCloud.Projection* for the camera

copy()
Returns a copy of projections buffer.
Returns Copy of projections buffer.
Return type *PointCloud.Projections*

resize(*count*)
Resize projections list.
Parameters **count** (*int*) – new projections count

class Track
Track in the point cloud

color
Track color.
Type tuple of 3 int

class Tracks
Collection of tracks in the point cloud

copy()
Returns a copy of tracks buffer.
Returns Copy of tracks buffer.
Return type *PointCloud.Tracks*

resize(*count*)
Resize track list.
Parameters **count** (*int*) – new track count

bands
List of color bands.

Type list of string

cleanup([*progress*])
Remove points with insufficient number of projections.

Parameters **progress** (*Callable[[float], None]*) – Progress callback.

copy(*keypoints=True*)
Returns a copy of the point cloud.

Parameters **keypoints** (*bool*) – copy key points data.

Returns Copy of the point cloud.

Return type *PointCloud*

cropSelectedPoints()
Crop selected points.

cropSelectedTracks()
Crop selected tie points.

data_type
Data type used to store color values.

Type *DataType*

export(*path*, *format='obj'*[, *projection*])
Export point cloud.

Parameters

- **path** (*string*) – Path to output file.
- **format** (*string*) – Export format in [‘obj’, ‘ply’].
- **projection** (*Matrix* or *CoordinateSystem*) – Sets output projection.

meta
Point cloud meta data.

Type *MetaData*

modified
Modified flag.

Type bool

pickPoint(*origin*, *target*, *endpoints=1*)
Returns ray intersection with the point cloud (point on the ray nearest to some point).

Parameters

- **origin** (*Vector*) – Ray origin.
- **target** (*Vector*) – Point on the ray.
- **endpoints** (*int*) – Number of endpoints to check for (0 - line, 1 - ray, 2 - segment).

Returns Coordinates of the intersection point.

Return type *Vector*

points
List of points.

Type *PointCloud.Points*

projections
Point projections for each photo.

Type *PointCloud.Projections*

removeKeypoints()
Remove keypoints from point cloud.

removeSelectedPoints()
Remove selected points.

removeSelectedTracks()
Remove selected tie points.

renderDepth(*transform*, *calibration*, *point_size=1*, *cull_points=False*, *add_alpha=True*)
Render point cloud depth image for specified viewpoint.

Parameters

- **transform** (*Matrix*) – Camera location.
- **calibration** (*Calibration*) – Camera calibration.
- **point_size** (*int*) – Point size.
- **cull_points** (*bool*) – Enable normal based culling.
- **add_alpha** (*bool*) – Generate image with alpha channel.

Returns Rendered image.

Return type *Image*

renderImage(*transform*, *calibration*, *point_size=1*, *cull_points=False*, *add_alpha=True*, *raster_transform=RasterTransformNone*)
Render point cloud image for specified viewpoint.

Parameters

- **transform** (*Matrix*) – Camera location.
- **calibration** (*Calibration*) – Camera calibration.
- **point_size** (*int*) – Point size.
- **cull_points** (*bool*) – Enable normal based culling.
- **add_alpha** (*bool*) – Generate image with alpha channel.
- **raster_transform** (*RasterTransformType*) – Raster band transformation.

Returns Rendered image.

Return type *Image*

renderMask(*transform*, *calibration*, *point_size=1*, *cull_points=False*)
Render point cloud mask image for specified viewpoint.

Parameters

- **transform** (*Matrix*) – Camera location.
- **calibration** (*Calibration*) – Camera calibration.
- **point_size** (*int*) – Point size.
- **cull_points** (*bool*) – Enable normal based culling.

Returns Rendered image.

Return type *Image*

renderNormalMap(*transform*, *calibration*, *point_size=1*, *cull_points=False*, *add_alpha=True*)
Render image with point cloud normals for specified viewpoint.

Parameters

- **transform** (*Matrix*) – Camera location.
- **calibration** (*Calibration*) – Camera calibration.

- **point_size** (*int*) – Point size.
- **cull_points** (*bool*) – Enable normal based culling.
- **add_alpha** (*bool*) – Generate image with alpha channel.

Returns Rendered image.

Return type *Image*

renderPreview(*width = 2048*, *height = 2048*[, *transform*], *point_size=1*[, *progress*])
Generate point cloud preview image.

Parameters

- **width** (*int*) – Preview image width.
- **height** (*int*) – Preview image height.
- **transform** (*Matrix*) – 4x4 viewpoint transformation matrix.
- **point_size** (*int*) – Point size.
- **progress** (*Callable[[float], None]*) – Progress callback.

Returns Preview image.

Return type *Image*

tracks
List of tracks.

Type *PointCloud.Tracks*

class Metashape.**PointsFormat**
Point cloud format in [PointsFormatNone, PointsFormatOBJ, PointsFormatPLY, PointsFormatXYZ, PointsFormatLAS, PointsFormatExpe, PointsFormatU3D, PointsFormatPDF, PointsFormatE57, PointsFormatOC3, PointsFormatPotree, PointsFormatLAZ, PointsFormatCL3, PointsFormatPTS, PointsFormatPTX, PointsFormatDXF, PointsFormatCesium, PointsFormatPCD, PointsFormatSLPK]

class Metashape.**Preselection**
Image pair preselection in [NoPreselection, GenericPreselection, ReferencePreselection]

class Metashape.**RPCModel**
Rational polynomial model.

copy()
Return a copy of the object.

Returns A copy of the object.

Return type *RPCModel*

error(*point*, *proj*)
Returns projection error.

Parameters

- **point** (*Vector*) – Coordinates of the point to be projected.
- **proj** (*Vector*) – Pixel coordinates of the point.

Returns 2D projection error.

Return type *Vector*

image_offset
Image coordinate offset.

Type *Vector*

image_scale
Image coordinate scale.

Type *Vector*

line_den_coeff
Line denominator.

Type *Vector*

line_num_coeff
Line numerator.

Type *Vector*

load(*path*)
Load RPC model from file.

Parameters **path** (*string*) – path to RPC model file

object_offset
Object coordinate offset.

Type *Vector*

object_scale
Object coordinate scale.

Type *Vector*

project(*point*)
Returns projected pixel coordinates of the point.

Parameters **point** (*Vector*) – Coordinates of the point to be projected.

Returns 2D projected point coordinates.

Return type *Vector*

samp_den_coeff
Sample denominator.

Type *Vector*

samp_num_coeff
Sample numerator.

Type *Vector*

save(*path*)
Save RPC model to file.

Parameters **path** (*string*) – path to RPC model file

unproject(*point*)
Returns direction corresponding to the image point.

Parameters **point** (*Vector*) – Pixel coordinates of the point.

Returns 3D vector in the camera coordinate system.

Return type *Vector*

class Metashape.**RasterFormat**
Raster format in [RasterFormatNone, RasterFormatTiles, RasterFormatKMZ, RasterFormatXYZ, RasterFormatMBTiles, RasterFormatWW, RasterFormatTMS, RasterFormatGeoPackage]

class Metashape.**RasterTransform**
Raster transform definition.

calibrateRange()
Auto detect range based on orthomosaic histogram.

copy()
Return a copy of the object.

Returns A copy of the object.

Return type *RasterTransform*

enabled
Enable flag.

Type bool

false_color
False color channels.

Type list

formula
Raster calculator expression.

Type string

interpolation
Interpolation enable flag.

Type bool

palette
Color palette.

Type dict

range
Palette mapping range.

Type tuple

reset()
Reset raster transform.

class Metashape.**RasterTransformType**
Raster transformation type in [RasterTransformNone, RasterTransformValue, RasterTransformPalette]

class Metashape.**ReferenceFormat**
Reference format in [ReferenceFormatNone, ReferenceFormatXML, ReferenceFormatTEL, ReferenceFormatCSV, ReferenceFormatMavinci, ReferenceFormatBramor, ReferenceFormatAPM]

class Metashape.**ReferenceItems**
Reference items in [ReferenceItemsCameras, ReferenceItemsMarkers, ReferenceItemsScalebars]

class Metashape.**ReferencePreselectionMode**
Reference preselection mode in [ReferencePreselectionSource, ReferencePreselectionEstimated, ReferencePreselectionSequential]

class Metashape.**Region**
Region parameters

center
Region center coordinates.

Type *Vector*

copy()
Return a copy of the object.

Returns A copy of the object.

Return type *Region*

rot
Region rotation matrix.

Type *Matrix*

size
Region size.

Type *Vector*

class Metashape.**RotationOrder**
Rotation order in [RotationOrderXYZ, RotationOrderXZY, RotationOrderYXZ, RotationOrderYZX, RotationOrderZXY, RotationOrderZYX]

class Metashape.**Scalebar**
Scale bar instance

class **Reference**
Scale bar reference data

accuracy
Scale bar length accuracy.
Type float

distance
Scale bar length.
Type float

enabled
Enabled flag.
Type bool

chunk
Chunk the scalebar belongs to.

Type *Chunk*

frames
Scale bar frames.

Type list of *Scalebar*

group
Scale bar group.

Type *ScalebarGroup*

key
Scale bar identifier.

Type int

label
Scale bar label.

Type string

meta
Scale bar meta data.

Type *MetaData*

point0
Start of the scale bar.

Type *Marker*

point1
End of the scale bar.

Type *Marker*

reference
Scale bar reference data.

Type ScalebarReference

selected
Selects/deselects the scale bar.

Type bool

class Metashape.**ScalebarGroup**
ScalebarGroup objects define groups of multiple scale bars. The grouping is established by assignment of a ScalebarGroup instance to the Scalebar.group attribute of participating scale bars.

label
Scale bar group label.

Type string

selected
Current selection state.

Type bool

class Metashape.**Sensor**
Sensor instance

class Reference
Sensor reference data.

accuracy
Sensor location accuracy.
Type *Vector*

enabled
Location enabled flag.
Type bool

location
Sensor coordinates.
Type *Vector*

location_accuracy
Sensor location accuracy.
Type *Vector*

location_enabled
Location enabled flag.
Type bool

rotation
Sensor rotation angles.
Type *Vector*

rotation_accuracy
Sensor rotation accuracy.
Type *Vector*

rotation_enabled
Rotation enabled flag.
Type bool

class Type
Sensor type in [Frame, Fisheye, Spherical, Cylindrical, RPC]

antenna
GPS antenna correction.

Type *Antenna*

bands
List of color bands.

Type list of string

black_level
Black level for each band.

Type list of float

calibrateFiducials(*resolution=0.014*)
Fit fiducial coordinates to image measurements.

Parameters **resolution** (*float*) – Scanning resolution in mm/pix.

calibration
Adjusted calibration of the photo.

Type *Calibration*

chunk
Chunk the sensor belongs to.

Type *Chunk*

data_type
Data type used to store color values.

Type *DataType*

fiducials
Fiducial marks.

Type list of *Marker*

film_camera
Film camera flag.

Type bool

fixed
Fix calibration flag.

Type bool

fixed_calibration
Fix calibration flag.

Type bool

fixed_location
Fix location flag.

Type bool

fixed_params
List of fixed calibration parameters.

Type list of string

fixed_rotation
Fix rotation flag.

Type bool

focal_length
Focal length in mm.

Type float

height
Image height.

Type int

key
Sensor identifier.

Type int

label
Sensor label.

Type string

layer_index
Sensor layer index.

Type int

location
Sensor plane location.

Type *Vector*

location_covariance
Sensor plane location covariance.

Type *Matrix*

makeMaster()
Make this sensor master in the multi-camera system.

master
Master sensor.

Type *Sensor*

meta
Sensor meta data.

Type *MetaData*

normalize_sensitivity
Enable sensitivity normalization.

Type bool

normalize_to_float
Convert pixel values to floating point after normalization.

Type bool

photo_params
List of image-variant calibration parameters.

Type list of string

pixel_height
Pixel height in mm.

Type float

pixel_size
Pixel size in mm.

Type *Vector*

pixel_width
Pixel width in mm.

Type float

planes
Sensor planes.

Type list of *Sensor*

reference
Sensor reference data.

Type SensorReference

rolling_shutter
Enable rolling shutter compensation.

Type *Shutter.Model*

rotation
Sensor plane rotation.

Type *Matrix*

rotation_covariance
Sensor plane rotation covariance.

Type *Matrix*

sensitivity
Sensitivity for each band.

Type list of float

type
Sensor projection model.

Type *Sensor.Type*

user_calib
Custom calibration used as initial calibration during photo alignment.

Type *Calibration*

vignetting
Vignetting for each band.

Type list of *Vignetting*

width
Image width.

Type int

class Metashape.**ServiceType**
Service type in [ServiceSketchfab, ServiceMapbox, Service4DMapper, ServicePointscene, ServiceMelown, ServicePointbox, ServicePicterra, ServiceCesium]

class Metashape.**Shape**
Shape data.

class BoundaryType
Shape boundary type in [NoBoundary, OuterBoundary, InnerBoundary]

class Vertices
Collection of shape vertices

area()
Return area of the shape on DEM.

Returns Shape area.

Return type float

areaFitted()
Return 2D area of the shape projected onto the best fitting plane.

Returns Shape area.

Return type float

attributes
Shape attributes.

Type *MetaData*

boundary_type
Shape boundary type.

Type *Shape.BoundaryType*

geometry
Shape geometry.

Type *Geometry* or *AttachedGeometry*

group
Shape group.

Type *ShapeGroup*

is_attached
Attached flag.

Type bool

key
Shape identifier.

Type int

label
Shape label.

Type string

perimeter2D()
Return perimeter of the shape on DEM.

Returns Shape perimeter.

Return type float

perimeter3D()
Return perimeter of the shape.

Returns Shape perimeter.

Return type float

selected
Selects/deselects the shape.

Type bool

volume(*level='bestfit'*)
Return volume of the shape measured on DEM above and below best fit, mean level or custom level plane.

Parameters **level** (*float*) – Plane level: 'bestfit', 'mean' or custom value.

Returns Shape volumes.

Return type dict

class Metashape.**ShapeGroup**
ShapeGroup objects define groups of multiple shapes. The grouping is established by assignment of a ShapeGroup instance to the Shape.group attribute of participating shapes.

color
Shape group color.

Type tuple of 4 int

enabled
Enable flag.

Type bool

key
Shape group identifier.

Type int

label
Shape group label.

Type string

meta
Shape group meta data.

Type *MetaData*

selected
Current selection state.

Type bool

show_labels
Shape labels visibility flag.

Type bool

class Metashape.**Shapes**
A set of shapes for a chunk frame.

addGroup()
Add new shape group to the set of shapes.

Returns Created shape group.

Return type *ShapeGroup*

addShape()
Add new shape to the set of shapes.

Returns Created shape.

Return type *Shape*

crs
Shapes coordinate system.

Type *CoordinateSystem*

group
Default shape group.

Type *ShapeGroup*

groups
List of shape groups.

Type list of *ShapeGroup*

items()
List of items.

meta
Shapes meta data.

Type *MetaData*

modified
Modified flag.

Type bool

projection
Shapes projection.

Type *OrthoProjection*

remove(*items*)
Remove items from the shape layer.

Parameters **items** (list of *Shape* or *ShapeGroup*) – A list of items to be removed.

shapes
List of shapes.

Type list of *Shape*

updateAltitudes(*items*[, *progress*])
Update altitudes for items.

Parameters

- **items** (list of *Shape* or *ShapeGroup*) – A list of items to be updated.
- **progress** (*Callable[[float], None]*) – Progress callback.

class Metashape.**ShapesFormat**
Shapes format in [ShapesFormatNone, ShapesFormatSHP, ShapesFormatKML, ShapesFormatDXF, ShapesFormatGeoJSON, ShapesFormatGeoPackage, ShapesFormatCSV]

class Metashape.**Shutter**
Shutter object contains estimated parameters of the rolling shutter correction model.

class Model
Rolling shutter model in [Disabled, Regularized, Full]

copy()
Return a copy of the object.

Returns A copy of the object.

Return type *Shutter*

rotation
Rotation matrix of the rolling shutter model.

Type *Matrix*

translation
Translation vector of the rolling shutter model.

Type *Vector*

class Metashape.**SurfaceType**
Surface type in [Arbitrary, HeightField]

class Metashape.**Target**
Target parameters

code
Target code.

Type int

coord
Target location.

Type *Vector*

copy()
Return a copy of the object.

Returns A copy of the object.

Return type *Target*

radius
Target radius.

Type float

class Metashape.**TargetType**
Target type in [CircularTarget12bit, CircularTarget14bit, CircularTarget16bit, CircularTarget20bit, CircularTarget, CrossTarget]

class Metashape.**Tasks**
Task classes.

class **AddFrames**
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.

Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

chunk
Chunk to copy frames from.

Type int

copy_dense_cloud
Copy dense cloud.

Type bool

copy_depth_maps
Copy depth maps.

Type bool

copy_elevation
Copy DEM.

Type bool

copy_model
Copy model.

Type bool

copy_orthomosaic
Copy orthomosaic.

Type bool

copy_tiled_model
Copy tiled model.

Type bool

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

frames
List of frame keys to copy.
Type list of int

name
Task name.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class **AddPhotos**
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

filegroups
List of file groups.
Type list of int

filenames
List of files to add.
Type list of string

group
Camera group key.
Type int

layout
Image layout.
Type *ImageLayout*

load_reference
Load reference coordinates.
Type bool

load_rpc_txt
Load satellite RPC data from auxiliary TXT files.
Type bool

load_xmp_accuracy
Load accuracy from XMP meta data.
Type bool

load_xmp_antenna
Load GPS/INS offset from XMP meta data.
Type bool

load_xmp_calibration
Load calibration from XMP meta data.
Type bool

load_xmp_orientation
Load orientation from XMP meta data.
Type bool

name
Task name.
Type string

strip_extensions
Strip file extensions from camera labels.
Type bool

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class AlignCameras
Task class containing processing parameters.

adaptive_fitting
Enable adaptive fitting of distortion coefficients.
Type bool

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

cameras
List of cameras to align.
Type list of int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

min_image
Minimum number of point projections.
Type int

name
Task name.
Type string

reset_alignment
Reset current alignment.
Type bool

subdivide_task
Enable fine-level task subdivision.
Type bool

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class AlignChunks
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

chunks
List of chunks to be aligned.
Type list of int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

downscale
Alignment accuracy.
Type int

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

filter_mask
Filter points by mask.
Type bool

fit_scale
Fit chunk scale during alignment.
Type bool

generic_preselection
Enables image pair preselection.
Type bool

keypoint_limit
Maximum number of points for each photo.
Type int

markers
List of markers to be used for marker based alignment.
Type list of int

mask_tiepoints
Apply mask filter to tie points.
Type bool

method
Alignment method (0 - point based, 1 - marker based, 2 - camera based).
Type int

name
Task name.
Type string

reference
Chunk to be used as a reference.
Type int

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.

Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class AnalyzePhotos
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

cameras
List of cameras to be analyzed.
Type list of int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

filter_mask
Constrain analyzed image region by mask.
Type bool

name
Task name.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class BuildContours
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters

- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

interval
Contour interval.
Type float

max_value
Maximum value of contour range.
Type float

min_value
Minimum value of contour range.
Type float

name
Task name.
Type string

prevent_intersections
Prevent contour intersections.
Type bool

source_data
Source data for contour generation.
Type *DataSource*

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class BuildDem
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters

- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

classes
List of dense point classes to be used for surface extraction.
Type list of int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

flip_x
Flip X axis direction.
Type bool

flip_y
Flip Y axis direction.
Type bool

flip_z
Flip Z axis direction.
Type bool

interpolation
Interpolation mode.
Type *Interpolation*

max_workgroup_size
Maximum workgroup size.
Type int

name
Task name.
Type string

projection
Output projection.
Type *OrthoProjection*

region
Region to be processed.
Type *BBox*

resolution
Output resolution in meters.
Type float

source_data
Selects between dense point cloud and tie points.
Type *DataSource*

subdivide_task
Enable fine-level task subdivision.

Type bool

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

workitem_size_tiles
Number of tiles in a workitem.
Type int

class BuildDenseCloud
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

keep_depth
Enable store depth maps option.
Type bool

max_neighbors
Maximum number of neighbor images to use for depth map filtering.
Type int

max_workgroup_size
Maximum workgroup size.
Type int

name
Task name.
Type string

point_colors
Enable point colors calculation.

Type bool

point_confidence
Enable point confidence calculation.
Type bool

subdivide_task
Enable fine-level task subdivision.
Type bool

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

workitem_size_cameras
Number of cameras in a workitem.
Type int

class BuildDepthMaps
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

cameras
List of cameras to process.
Type list of int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

downscale
Depth map quality.
Type int

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

filter_mode
Depth map filtering mode.

Type *FilterMode*

max_neighbors
Maximum number of neighbor images to use for depth map generation.
Type int

max_workgroup_size
Maximum workgroup size.
Type int

name
Task name.
Type string

reuse_depth
Enable reuse depth maps option.
Type bool

subdivide_task
Enable fine-level task subdivision.
Type bool

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask(*objects*[, *workitem*][, *progress*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

workitem_size_cameras
Number of cameras in a workitem.
Type int

class BuildModel
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

cameras
List of cameras to process.
Type list of int

classes
List of dense point classes to be used for surface extraction.
Type list of int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

face_count
Target face count.
Type *FaceCount*

face_count_custom
Custom face count.
Type int

interpolation
Interpolation mode.
Type *Interpolation*

keep_depth
Enable store depth maps option.
Type bool

max_workgroup_size
Maximum workgroup size.
Type int

name
Task name.
Type string

source_data
Selects between dense point cloud, tie points and depth maps.
Type *DataSource*

subdivide_task
Enable fine-level task subdivision.
Type bool

supports_gpu
GPU support flag.
Type bool

surface_type
Type of object to be reconstructed.
Type *SurfaceType*

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

trimming_radius
Trimming radius (no trimming if zero).

Type int

vertex_colors
Enable vertex colors calculation.
Type bool

vertex_confidence
Enable vertex confidence calculation.
Type bool

volumetric_masks
Enable strict volumetric masking.
Type bool

workitem_count
Work item count.
Type int

workitem_size_cameras
Number of cameras in a workitem.
Type int

class BuildOrthomosaic
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

blending_mode
Orthophoto blending mode.
Type *BlendingMode*

cull_faces
Enable back-face culling.
Type bool

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

fill_holes
Enable hole filling.
Type bool

flip_x
Flip X axis direction.
Type bool

flip_y
Flip Y axis direction.

Type bool

flip_z
Flip Z axis direction.
Type bool

ghosting_filter
Enable ghosting filter.
Type bool

max_workgroup_size
Maximum workgroup size.
Type int

name
Task name.
Type string

projection
Output projection.
Type *OrthoProjection*

refine_seamlines
Refine seamlines based on image content.
Type bool

region
Region to be processed.
Type *BBox*

resolution
Pixel size in meters.
Type float

resolution_x
Pixel size in the X dimension in projected units.
Type float

resolution_y
Pixel size in the Y dimension in projected units.
Type float

subdivide_task
Enable fine-level task subdivision.
Type bool

supports_gpu
GPU support flag.
Type bool

surface_data
Orthorectification surface.
Type *DataSource*

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

workitem_size_cameras
Number of cameras in a workitem.
Type int

workitem_size_tiles
Number of tiles in a workitem.
Type int

class BuildPanorama
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

blending_mode
Panorama blending mode.
Type *BlendingMode*

camera_groups
List of camera groups to process.
Type list of int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

frames
List of frames to process.
Type list of int

ghosting_filter
Enable ghosting filter.
Type bool

height
Height of output panorama.
Type int

name
Task name.
Type string

region
Region to be generated.
Type *BBox*

rotation
Panorama 3x3 orientation matrix.
Type *Matrix*

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

width
Width of output panorama.
Type int

workitem_count
Work item count.
Type int

class BuildSeamlines
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

epsilon
Contour simplificaion threshold.
Type float

name
Task name.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class BuildTexture
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

blending_mode
Texture blending mode.
Type *BlendingMode*

cameras
A list of cameras to be used for texturing.
Type list of int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

fill_holes
Enable hole filling.
Type bool

ghosting_filter
Enable ghosting filter.
Type bool

name
Task name.
Type string

source_model
Source model.
Type int

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

texture_size
Texture page size.
Type int

texture_type
Texture type.
Type *Model.TextureType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

transfer_texture
Transfer texture.
Type bool

workitem_count
Work item count.
Type int

class BuildTiledModel
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

classes
List of dense point classes to be used for surface extraction.
Type list of int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

face_count
Number of faces per megapixel of texture resolution.
Type int

ghosting_filter
Enable ghosting filter.
Type bool

keep_depth
Enable store depth maps option.
Type bool

max_workgroup_size
Maximum workgroup size.
Type int

merge
Merge tiled model flag.
Type bool

name
Task name.
Type string

operand_asset
Operand asset key.
Type int

operand_chunk
Operand chunk key.
Type int

operand_frame
Operand frame key.
Type int

pixel_size
Target model resolution in meters.
Type float

source_data
Selects between dense point cloud and mesh.
Type *DataSource*

subdivide_task
Enable fine-level task subdivision.
Type bool

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

tile_size
Size of tiles in pixels.
Type int

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

transfer_texture
Transfer source model texture to tiled model.
Type bool

workitem_count
Work item count.
Type int

workitem_size_cameras
Number of cameras in a workitem.
Type int

class BuildUV
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

camera
Camera to be used for texturing in MappingCamera mode.
Type int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

mapping_mode
Texture mapping mode.
Type *MappingMode*

name
Task name.
Type string

page_count
Number of texture pages to generate.
Type int

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

texture_size
Expected size of texture page at texture generation step.
Type int

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class CalculatePointNormals
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

name
Task name.
Type string

point_neighbors
Number of point neighbors to use for normal estimation.
Type int

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class CalibrateColors
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

cameras
List of cameras to process.
Type list of int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

name
Task name.
Type string

source_data
Source data for calibration.
Type *DataSource*

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

white_balance
Calibrate white balance.
Type bool

workitem_count
Work item count.
Type int

class CalibrateLens
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

border
Border size to ignore.
Type int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

fit_b1
Enable optimization of aspect ratio.
Type bool

fit_b2
Enable optimization of skew coefficient.
Type bool

fit_cxcy
Enable optimization of principal point coordinates.
Type bool

fit_f
Enable optimization of focal length coefficient.
Type bool

fit_k1
Enable optimization of k1 radial distortion coefficient.
Type bool

fit_k2
Enable optimization of k2 radial distortion coefficient.
Type bool

fit_k3
Enable optimization of k3 radial distortion coefficient.
Type bool

fit_k4
Enable optimization of k4 radial distortion coefficient.
Type bool

fit_p1
Enable optimization of p1 tangential distortion coefficient.
Type bool

fit_p2
Enable optimization of p2 tangential distortion coefficient.
Type bool

name
Task name.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class CalibrateReflectance
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

name
Task name.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

use_reflectance_panels
Use calibrated reflectance panels.
Type bool

use_sun_sensor
Apply irradiance sensor measurements.
Type bool

workitem_count
Work item count.
Type int

class ClassifyGroundPoints
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

cell_size
Cell size (meters).
Type float

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

erosion_radius
Erosion radius (meters).
Type float

max_angle
Maximum angle (degrees).
Type float

max_distance
Maximum distance (meters).
Type float

name
Task name.
Type string

source_class
Class of points to be re-classified.
Type int

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask(*[objects]*)
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class ClassifyPoints
Task class containing processing parameters.

apply(*object[, workitem][, progress]*)
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

confidence
Required confidence level.
Type float

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

name
Task name.
Type string

source_class
Class of points to be re-classified.
Type int

subdivide_task
Enable fine-level task subdivision.
Type bool

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

target_classes
Target point classes for classification.
Type list of int

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class CloseHoles
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

apply_to_selection
Close holes within selection.
Type bool

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

level
Hole size threshold in percents.
Type int

name
Task name.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class ColorizeDenseCloud
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

name
Task name.
Type string

source_data
Source data to extract colors from.
Type *DataSource*

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class ColorizeModel
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

name
Task name.
Type string

source_data
Source data to extract colors from.
Type *DataSource*

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class CompactDenseCloud
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

name
Task name.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class ConvertImages
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

cameras
List of cameras to process.
Type list of int

color_correction
Apply color correction.
Type bool

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

image_compression
Image compression parameters.
Type *ImageCompression*

merge_planes
Merge multispectral images.
Type bool

name
Task name.
Type string

path
Path to output file.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

update_gps_tags
Update GPS tags.
Type bool

use_initial_calibration
Transform to initial calibration.
Type bool

workitem_count
Work item count.
Type int

class DecimateModel
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters

- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

apply_to_selection
Apply to selection.
Type bool

asset
Model to process.
Type int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

face_count
Target face count.
Type int

name
Task name.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class DetectFiducials
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

cameras
List of cameras to process.
Type list of int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

fiducials_position_corners
Search corners for fiducials.
Type bool

fiducials_position_sides
Search sides for fiducials.
Type bool

frames
List of frames to process.
Type list of int

generate_masks
Generate background masks.
Type bool

generic_detector
Use generic detector.
Type bool

name
Task name.
Type string

right_angle_detector
Use right angle detector.
Type bool

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class DetectMarkers
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters

- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

cameras
List of cameras to process.
Type list of int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

filter_mask
Ignore masked image regions.
Type bool

frames
List of frames to process.
Type list of int

inverted
Detect markers on black background.
Type bool

maximum_residual
Maximum residual for non-coded targets in pixels.
Type float

minimum_dist
Minimum distance between targets in pixels (CrossTarget type only).
Type int

minimum_size
Minimum target radius in pixels to be detected (CrossTarget type only).
Type int

name
Task name.
Type string

noparity
Disable parity checking.
Type bool

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

target_type
Type of targets.

Type *TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

tolerance
Detector tolerance (0 - 100).
Type int

workitem_count
Work item count.
Type int

class DetectPowerlines
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

min_altitude
Minimum altitude for reconstructed powerlines.
Type float

n_points_per_line
Number of vertices per detected line.
Type int

name
Task name.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

use_model
Use model for visibility checks.

Type bool

workitem_count
Work item count.
Type int

class DuplicateAsset
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

asset_key
Asset key.
Type int

asset_type
Asset type.
Type *DataSource*

clip_to_boundary
Clip to boundary shapes.
Type bool

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

name
Task name.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class DuplicateChunk
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.

Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

chunk
Chunk to copy.

Type int

copy_dense_clouds
Copy dense clouds.

Type bool

copy_depth_maps
Copy depth maps.

Type bool

copy_elevations
Copy DEMs.

Type bool

copy_keypoints
Copy keypoints.

Type bool

copy_models
Copy models.

Type bool

copy_orthomosaics
Copy orthomosaics.

Type bool

copy_tiled_models
Copy tiled models.

Type bool

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

frames
List of frame keys to copy.

Type list of int

label
New chunk label.

Type string

name
Task name.

Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class ExportCameras
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

binary
Enables/disables binary encoding for selected format (if applicable).
Type bool

bingo_path_geoin
Path to BINGO GEO INPUT file.
Type string

bingo_path_gps
Path to BINGO GPS/IMU file.
Type string

bingo_path_image
Path to BINGO IMAGE COORDINATE file.
Type string

bingo_path_itera
Path to BINGO ITERA file.
Type string

bingo_save_geoin
Enables/disables export of BINGO GEO INPUT file.
Type bool

bingo_save_gps
Enables/disables export of BINGO GPS/IMU data.
Type bool

bingo_save_image
Enables/disables export of BINGO IMAGE COORDINATE file.
Type bool

bingo_save_itera
Enables/disables export of BINGO ITERA file.
Type bool

bundler_path_list
Path to Bundler image list file.
Type string

bundler_save_list
Enables/disables export of Bundler image list file.
Type bool

chan_rotation_order
Rotation order (CHAN format only).
Type *RotationOrder*

crs
Output coordinate system.
Type *CoordinateSystem*

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

format
Export format.
Type *CamerasFormat*

image_orientation
Image coordinate system (0 - X right, 1 - X up, 2 - X left, 3 - X down).
Type int

name
Task name.
Type string

path
Path to output file.
Type string

save_invalid_matches
Enables/disables export of invalid image matches.
Type bool

save_markers
Enables/disables export of manual matching points.
Type bool

save_points
Enables/disables export of automatic tie points.
Type bool

supports_gpu
GPU support flag.

Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

use_initial_calibration
Transform image coordinates to initial calibration.
Type bool

use_labels
Enables/disables label based item identifiers.
Type bool

workitem_count
Work item count.
Type int

class ExportDepth
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

cameras
List of cameras to process.
Type list of int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

export_depth
Enable export of depth map.
Type bool

export_diffuse
Enable export of diffuse map.
Type bool

export_normals
Enable export of normal map.
Type bool

name
Task name.

Type string

path_depth
Path to depth map.
Type string

path_diffuse
Path to diffuse map.
Type string

path_normals
Path to normal map.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class ExportMarkers
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

binary
Enables/disables binary encoding for selected format (if applicable).
Type bool

crs
Output coordinate system.
Type *CoordinateSystem*

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

name
Task name.

Type string

path
Path to output file.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask(*[objects]*)
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class ExportMasks
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

cameras
List of cameras to process.
Type list of int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

name
Task name.
Type string

path
Path to output file.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.

Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class ExportModel
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

binary
Enables/disables binary encoding (if supported by format).
Type bool

clip_to_boundary
Clip model to boundary shapes.
Type bool

colors_rgb_8bit
Convert colors to 8 bit RGB.
Type bool

comment
Optional comment (if supported by selected format).
Type string

crs
Output coordinate system.
Type *CoordinateSystem*

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

embed_texture
Embeds texture inside the model file (if supported by format).
Type bool

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

format
Export format.
Type *ModelFormat*

name
Task name.

Type string

path
Path to output model.
Type string

precision
Number of digits after the decimal point (for text formats).
Type int

raster_transform
Raster band transformation.
Type *RasterTransformType*

save_alpha
Enables/disables alpha channel export.
Type bool

save_cameras
Enables/disables camera export.
Type bool

save_colors
Enables/disables export of vertex colors.
Type bool

save_comment
Enables/disables comment export.
Type bool

save_confidence
Enables/disables export of vertex confidence.
Type bool

save_markers
Enables/disables marker export.
Type bool

save_normals
Enables/disables export of vertex normals.
Type bool

save_texture
Enables/disables texture export.
Type bool

save_udim
Enables/disables UDIM texture layout.
Type bool

save_uv
Enables/disables uv coordinates export.
Type bool

shift
Optional shift to be applied to vertex coordinates.
Type *Vector*

strip_extensions
Strips camera label extensions during export.
Type bool

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type Tasks.TargetType

texture_format
Texture format.
Type ImageFormat

toNetworkTask([objects])
Convert task to NetworkTask to be applied to specified objects.
Parameters objects (Document, Chunk or list of Chunk) – Objects to be processed.

viewpoint
Default view.
Type Viewpoint

workitem_count
Work item count.
Type int

class ExportOrthophotos
Task class containing processing parameters.

apply(object[, workitem][, progress])
Apply task to specified object.
Parameters
- object (Chunk or Document) – Chunk or Document object to be processed.
- workitem (int) – Workitem index.
- progress (Callable[[float], None]) – Progress callback.

cameras
List of cameras to process.
Type list of int

decode(dict)
Initialize task parameters with a dictionary.

decodeJSON(json)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

image_compression
Image compression parameters.
Type ImageCompression

name
Task name.
Type string

north_up
Use north-up orientation for export.
Type bool

path
Path to output orthophoto.
Type string

projection
Output projection.
Type *OrthoProjection*

raster_transform
Raster band transformation.
Type *RasterTransformType*

region
Region to be exported.
Type *BBox*

resolution
Output resolution in meters.
Type float

resolution_x
Pixel size in the X dimension in projected units.
Type float

resolution_y
Pixel size in the Y dimension in projected units.
Type float

save_alpha
Enable alpha channel generation.
Type bool

save_kml
Enable kml file generation.
Type bool

save_world
Enable world file generation.
Type bool

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

white_background
Enable white background.
Type bool

workitem_count
Work item count.
Type int

class ExportPoints
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.

Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

binary
Enables/disables binary encoding for selected format (if applicable).
Type bool

block_height
Block height in meters.
Type float

block_width
Block width in meters.
Type float

classes
List of dense point classes to be exported.
Type list of int

clip_to_boundary
Clip point cloud to boundary shapes.
Type bool

colors_rgb_8bit
Convert colors to 8 bit RGB.
Type bool

comment
Optional comment (if supported by selected format).
Type string

compression
Enable compression (Cesium format only).
Type bool

crs
Output coordinate system.
Type *CoordinateSystem*

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

folder_depth
Tileset subdivision depth (Cesium format only).
Type int

format
Export format.
Type *PointsFormat*

image_format
Image data format.
Type *ImageFormat*

name
Task name.
Type string

path
Path to output file.
Type string

raster_transform
Raster band transformation.
Type *RasterTransformType*

region
Region to be exported.
Type *BBox*

save_classes
Enables/disables export of point classes.
Type bool

save_colors
Enables/disables export of point colors.
Type bool

save_comment
Enable comment export.
Type bool

save_confidence
Enables/disables export of point confidence.
Type bool

save_images
Enable image export.
Type bool

save_normals
Enables/disables export of point normals.
Type bool

screen_space_error
Target screen space error (Cesium format only).
Type float

shift
Optional shift to be applied to point coordinates.
Type *Vector*

source_data
Selects between dense point cloud and tie points. If not specified, uses dense cloud if available.
Type *DataSource*

split_in_blocks
Enable tiled export.
Type bool

subdivide_task
Enable fine-level task subdivision.
Type bool

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

viewpoint
Default view.
Type *Viewpoint*

workitem_count
Work item count.
Type int

class ExportRaster
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

block_height
Raster block height in pixels.
Type int

block_width
Raster block width in pixels.
Type int

clip_to_boundary
Clip raster to boundary shapes.
Type bool

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

description
Export description.
Type string

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

format
Export format.
Type *RasterFormat*

global_profile
Use global profile (GeoPackage format only).
Type bool

height
Raster height.
Type int

image_compression
Image compression parameters.
Type *ImageCompression*

image_description
Optional description to be added to image files.
Type string

image_format
Tile format.
Type *ImageFormat*

max_zoom_level
Maximum zoom level (GeoPackage, Google Map Tiles, MBTiles and World Wind Tiles formats only).
Type int

min_zoom_level
Minimum zoom level (GeoPackage, Google Map Tiles, MBTiles and World Wind Tiles formats only).
Type int

name
Task name.
Type string

network_links
Enable network links generation for KMZ format.
Type bool

nodata_value
No-data value (DEM export only).
Type float

north_up
Use north-up orientation for export.
Type bool

path
Path to output orthomosaic.
Type string

projection
Output projection.
Type *OrthoProjection*

raster_transform
Raster band transformation.
Type *RasterTransformType*

region
Region to be exported.
Type *BBox*

resolution
Output resolution in meters.
Type float

resolution_x
Pixel size in the X dimension in projected units.
Type float

resolution_y
Pixel size in the Y dimension in projected units.
Type float

save_alpha
Enable alpha channel generation.
Type bool

save_kml
Enable kml file generation.
Type bool

save_scheme
Enable tile scheme files generation.
Type bool

save_world
Enable world file generation.
Type bool

source_data
Selects between DEM and orthomosaic.
Type *DataSource*

split_in_blocks
Split raster in blocks.
Type bool

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

tile_height
Tile height in pixels.
Type int

tile_width
Tile width in pixels.
Type int

title
Export title.
Type string

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

white_background
Enable white background.
Type bool

width
Raster width.
Type int

workitem_count
Work item count.
Type int

world_transform
2x3 raster-to-world transformation matrix.
Type *Matrix*

class ExportReference
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

columns
Column order in csv format (n - label, o - enabled flag, x/y/z - coordinates, X/Y/Z - coordinate accuracy, a/b/c - rotation angles, A/B/C - rotation angle accuracy, u/v/w - estimated coordinates, U/V/W - coordinate errors, d/e/f - estimated orientation angles, D/E/F - orientation errors, p/q/r - estimated coordinates variance, i/j/k - estimated orientation angles variance, [] - group of multiple values, | - column separator within group).
Type string

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

delimiter
Column delimiter in csv format.
Type string

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

format
Export format.
Type *ReferenceFormat*

items
Items to export in CSV format.
Type *ReferenceItems*

name
Task name.
Type string

path
Path to the output file.
Type string

precision
Number of digits after the decimal point (for CSV format).
Type int

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class ExportReport
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

description
Report description.
Type string

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

font_size
Font size (pt).
Type int

include_system_info
Include system information.
Type bool

name
Task name.
Type string

page_numbers
Enable page numbers.
Type bool

path
Path to output report.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

title
Report title.
Type string

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

user_settings
A list of user defined settings to include on the Processing Parameters page.
Type list of (string, string) tuples

workitem_count
Work item count.
Type int

class ExportShapes
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

crs
Output coordinate system.
Type *CoordinateSystem*

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

format
Export format.
Type *ShapesFormat*

groups
A list of shape groups to export.
Type list of int

name
Task name.
Type string

path
Path to shape file.
Type string

polygons_as_polylines
Save polygons as polylines.
Type bool

save_attributes
Export attributes.
Type bool

save_labels
Export labels.
Type bool

save_points
Export points.
Type bool

save_polygons
Export polygons.
Type bool

save_polylines
Export polylines.
Type bool

shift
Optional shift to be applied to vertex coordinates.
Type *Vector*

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class ExportTexture
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

name
Task name.
Type string

path
Path to output file.
Type string

save_alpha
Enable alpha channel export.
Type bool

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

texture_type
Texture type.
Type *Model.TextureType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class ExportTiledModel
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.

Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

clip_to_boundary
Clip tiled model to boundary shapes.

Type bool

crs
Output coordinate system.

Type *CoordinateSystem*

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

folder_depth
Tileset subdivision depth (Cesium format only).

Type int

format
Export format.

Type *TiledModelFormat*

image_compression
Image compression parameters.

Type *ImageCompression*

model_compression
Enable mesh compression (Cesium format only).

Type bool

model_format
Model format for zip export.

Type *ModelFormat*

name
Task name.

Type string

path
Path to output model.

Type string

raster_transform
Raster band transformation.

Type *RasterTransformType*

screen_space_error
Target screen space error (Cesium format only).

Type float

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

texture_format
Texture format.
Type *ImageFormat*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class FilterDenseCloud
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

asset
Dense cloud key to filter.
Type int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

name
Task name.
Type string

point_spacing
Desired point spacing (m).
Type float

supports_gpu
GPU support flag.
Type bool

target
Task target.

Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class **GenerateMasks**
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

blur_threshold
Allowed blur radius on a photo in pix (only if mask_defocus=True).
Type float

cameras
Optional list of cameras to be processed.
Type list of int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

depth_threshold
Maximum depth of masked areas in meters (only if mask_defocus=False).
Type float

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

fix_coverage
Extend masks to cover whole mesh (only if mask_defocus=True).
Type bool

mask_defocus
Mask defocus areas.
Type bool

mask_operation
Mask operation.
Type *MaskOperation*

masking_mode
Mask generation mode.
Type *MaskingMode*

name
Task name.

Type string

path
Mask file name template.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

tolerance
Background masking tolerance.
Type int

workitem_count
Work item count.
Type int

class GeneratePrescriptionMap
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

boundary_shape_group
Boundary shape group.
Type int

breakpoints
Classification breakpoints.
Type list of float

cell_size
Step of prescription grid, meters.
Type float

class_count
Number of classes.
Type int

classification_method
Index values classification method.
Type *ClassificationMethod*

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

name
Task name.
Type string

rates
Fertilizer rate for each class.
Type list of float

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class ImportCameras
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

crs
Ground coordinate system.
Type *CoordinateSystem*

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

format
File format.
Type *CamerasFormat*

image_list
Path to image list file (Bundler format only).

Type string

image_orientation
Image coordinate system (0 - X right, 1 - X up, 2 - X left, 3 - X down).
Type int

load_image_list
Enable Bundler image list import.
Type bool

name
Task name.
Type string

path
Path to the file.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class ImportLaserScans
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

filenames
List of files to import.
Type list of string

format
Point cloud format.

Type *PointsFormat*

image_path
Path template to output files.
Type string

multiplane
Import as a multi-camera system
Type bool

name
Task name.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class ImportMarkers
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

name
Task name.
Type string

path
Path to the file.
Type string

supports_gpu
GPU support flag.

Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class ImportModel
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

crs
Model coordinate system.
Type *CoordinateSystem*

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

decode_udim
Load UDIM texture layout.
Type bool

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

format
Model format.
Type *ModelFormat*

name
Task name.
Type string

path
Path to model.
Type string

shift
Optional shift to be applied to vertex coordinates.
Type *Vector*

supports_gpu
GPU support flag.

Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class ImportPoints
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

calculate_normals
Calculate point normals.
Type bool

crs
Point cloud coordinate system.
Type *CoordinateSystem*

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

format
Point cloud format.
Type *PointsFormat*

name
Task name.
Type string

path
Path to point cloud.
Type string

point_neighbors
Number of point neighbors to use for normal estimation.
Type int

shift
Optional shift to be applied to point coordinates.

Type *Vector*

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

traj_columns
Trajectory file column order (t - time, x/y/z - coordinates, 0 - skip column).
Type string

traj_delimiter
Trajectory file delimiter.
Type string

traj_path
Trajectory file path.
Type string

traj_skip_rows
Trajectory file number of rows to skip.
Type int

use_trajectory
Use trajectory file or origin.
Type bool

workitem_count
Work item count.
Type int

class ImportRaster
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

crs
Default coordinate system if not specified in GeoTIFF file.
Type *CoordinateSystem*

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

has_nodata_value
No-data value valid flag.
Type bool

name
Task name.
Type string

nodata_value
No-data value.
Type float

path
Path to elevation model in GeoTIFF format.
Type string

raster_type
Type of raster layer to import.
Type *DataSource*

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class ImportReference
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

columns
Column order in csv format (n - label, o - enabled flag, x/y/z - coordinates, X/Y/Z - coordinate accuracy, a/b/c - rotation angles, A/B/C - rotation angle accuracy, [] - group of multiple values, | - column separator within group).
Type string

create_markers
Create markers for missing entries (csv format only).
Type bool

crs
Reference data coordinate system (csv format only).

Type *CoordinateSystem*

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

delimiter
Column delimiter in csv format.
Type string

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

format
File format.
Type *ReferenceFormat*

group_delimiters
Combine consequitive delimiters in csv format.
Type bool

ignore_labels
Matches reference data based on coordinates alone (csv format only).
Type bool

items
List of items to load reference for (csv format only).
Type *ReferenceItems*

name
Task name.
Type string

path
Path to the file with reference data.
Type string

shutter_lag
Shutter lag in seconds (APM format only).
Type float

skip_rows
Number of rows to skip in (csv format only).
Type int

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

threshold
Error threshold in meters used when ignore_labels is set (csv format only).
Type float

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class ImportShapes
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

boundary_type
Boundary type to be applied to imported shapes.
Type *Shape.BoundaryType*

columns
Column order in csv format (n - label, x/y/z - coordinates, d - description, [] - group of multiple values, | - column separator within group).
Type string

crs
Reference data coordinate system (csv format only).
Type *CoordinateSystem*

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

delimiter
Column delimiter in csv format.
Type string

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

format
Shapes format.
Type *ShapesFormat*

group_delimiters
Combine consequitive delimiters in csv format.
Type bool

name
Task name.
Type string

path
Path to shape file.

Type string

replace
Replace current shapes with new data.
Type bool

skip_rows
Number of rows to skip in (csv format only).
Type int

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class ImportTiledModel
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

name
Task name.
Type string

path
Path to tiled model.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.

Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class **InvertMasks**
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

cameras
List of cameras to process.
Type list of int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

name
Task name.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class **LoadProject**
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters

- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

archive
Override project format when using non-standard file extension.
Type bool

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

name
Task name.
Type string

path
Path to project file.
Type string

read_only
Open project in read only mode.
Type bool

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask(*objects*)
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class MatchPhotos
Task class containing processing parameters.

apply(*object*, *workitem*, *progress*)
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

cameras
List of cameras to match.
Type list of int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

downscale
Image alignment accuracy.
Type int

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

filter_mask
Filter points by mask.
Type bool

filter_stationary_points
Exclude tie points which are stationary across images.
Type bool

generic_preselection
Enable generic preselection.
Type bool

guided_matching
Enable guided image matching.
Type bool

keep_keypoints
Store keypoints in the project.
Type bool

keypoint_limit
Key point limit.
Type int

keypoint_limit_per_mpx
Key point limit per megapixel.
Type int

mask_tiepoints
Apply mask filter to tie points.
Type bool

max_workgroup_size
Maximum workgroup size.
Type int

name
Task name.
Type string

pairs
User defined list of camera pairs to match.
Type list of (int, int) tuples

reference_preselection
Enable reference preselection.

Type bool

reference_preselection_mode
Reference preselection mode.
Type *ReferencePreselectionMode*

reset_matches
Reset current matches.
Type bool

subdivide_task
Enable fine-level task subdivision.
Type bool

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

tiepoint_limit
Tie point limit.
Type int

toNetworkTask(*[objects]*)
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

workitem_size_cameras
Number of cameras in a workitem.
Type int

workitem_size_pairs
Number of image pairs in a workitem.
Type int

class MergeAssets
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

assets
List of assets to process.
Type list of int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

name
Task name.
Type string

source_data
Asset type.
Type *DataSource*

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class MergeChunks
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

chunks
List of chunks to process.
Type list of int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

merge_dense_clouds
Merge dense clouds.
Type bool

merge_depth_maps
Merge depth maps.

Type bool

merge_elevations
Merge DEMs.
Type bool

merge_markers
Merge markers.
Type bool

merge_models
Merge models.
Type bool

merge_orthomosaics
Merge orthomosaics.
Type bool

merge_tiepoints
Merge tie points.
Type bool

name
Task name.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask(*objects*[])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class OptimizeCameras
Task class containing processing parameters.

adaptive_fitting
Enable adaptive fitting of distortion coefficients.
Type bool

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

fit_b1
Enable optimization of aspect ratio.
Type bool

fit_b2
Enable optimization of skew coefficient.
Type bool

fit_corrections
Enable optimization of additional corrections.
Type bool

fit_cx
Enable optimization of X principal point coordinates.
Type bool

fit_cy
Enable optimization of Y principal point coordinates.
Type bool

fit_f
Enable optimization of focal length coefficient.
Type bool

fit_k1
Enable optimization of k1 radial distortion coefficient.
Type bool

fit_k2
Enable optimization of k2 radial distortion coefficient.
Type bool

fit_k3
Enable optimization of k3 radial distortion coefficient.
Type bool

fit_k4
Enable optimization of k3 radial distortion coefficient.
Type bool

fit_p1
Enable optimization of p1 tangential distortion coefficient.
Type bool

fit_p2
Enable optimization of p2 tangential distortion coefficient.
Type bool

name
Task name.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

tiepoint_covariance
Estimate tie point covariance matrices.
Type bool

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class PlanMission
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

attach_viewpoints
Generate additional viewpoints to increase coverage.
Type bool

capture_distance
Image capture distance (m).
Type float

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

group_attached_viewpoints
Ignore minimum waypoint spacing for additional viewpoints.
Type bool

home_point
Home point shape key.
Type int

horizontal_zigzags
Cover surface with horizontal zigzags instead of vertical.
Type bool

interesting_zone
Interesting zone shape layer key.
Type int

max_pitch
Maximum camera pitch angle.
Type int

min_altitude
Minimum altitude (m).
Type float

min_pitch
Minimum camera pitch angle.
Type int

min_waypoint_spacing
Minimum waypoint spacing (m).
Type float

name
Task name.
Type string

overlap
Overlap percent.
Type int

powerlines
Powerlines shape layer key.
Type int

restricted_zone
Restricted zone shape layer key.
Type int

safety_distance
Safety distance (m).
Type float

safety_zone
Safety zone shape layer key.
Type int

sensor
Sensor key.
Type int

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

use_selection
Focus on model selection.
Type bool

workitem_count
Work item count.
Type int

class PublishData
Task class containing processing parameters.

account
Account name (Melown service).
Type string

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

description
Dataset description.
Type string

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

hostname
Service hostname (4DMapper service).
Type string

image_compression
Image compression parameters.
Type *ImageCompression*

is_draft
Mark dataset as draft (Sketchfab service).
Type bool

is_private
Set dataset access to private (Pointbox and Sketchfab services).
Type bool

is_protected
Set dataset access to protected (Pointbox service).
Type bool

max_zoom_level
Maximum zoom level.
Type int

min_zoom_level
Minimum zoom level.
Type int

name
Task name.
Type string

owner
Account owner (Cesium and Mapbox services).
Type string

password
Account password (4DMapper, Melown, Pointscene and Sketchfab services).
Type string

point_classes
List of dense point classes to be exported.
Type list of int

projection
Output projection.
Type *CoordinateSystem*

raster_transform
Raster band transformation.
Type *RasterTransformType*

resolution
Output resolution in meters.
Type float

save_camera_track
Enables/disables export of camera track.
Type bool

save_point_colors
Enables/disables export of point colors.
Type bool

service
Service to upload on.
Type *ServiceType*

source_data
Asset type to upload.
Type *DataSource*

supports_gpu
GPU support flag.
Type bool

tags
Dataset tags.
Type string

target
Task target.
Type *Tasks.TargetType*

tile_size
Tile size in pixels.
Type int

title
Dataset title.
Type string

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

token
Account token (Cesium, Mapbox, Picterra, Pointbox and Sketchfab services).
Type string

username
Account username (4DMapper, Melown and Pointscene services).
Type string

workitem_count
Work item count.
Type int

class ReduceOverlap
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

name
Task name.
Type string

overlap
Target number of cameras observing each point of the surface.
Type int

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

use_selection
Focus on model selection.
Type bool

workitem_count
Work item count.
Type int

class RefineMesh
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

cameras
List of cameras to process.
Type list of int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

downscale
Refinement quality.
Type int

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

iterations
Number of refinement iterations.
Type int

name
Task name.
Type string

smoothness
Smoothing strength. Should be in range [0, 1].
Type float

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class RemoveLighting
Task class containing processing parameters.

ambient_occlusion_multiplier
Ambient occlusion multiplier. Should be in range [0.25, 4].
Type float

ambient_occlusion_path
Path to ambient occlusion texture atlas. Can be empty.
Type string

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

color_mode
Enable multi-color processing mode.
Type bool

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

internal_blur
Internal blur. Should be in range [0, 4].
Type float

mesh_noise_suppression
Mesh normals noise suppression strength. Should be in range [0, 4].
Type float

name
Task name.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class ResetMasks
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

cameras
List of cameras to process.
Type list of int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

name
Task name.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class RunScript
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

args
Script arguments.
Type string

code
Script code.
Type string

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

name
Task name.
Type string

path
Script path.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class SaveProject
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

archive
Override project format when using non-standard file extension.
Type bool

chunks
List of chunks to be saved.
Type list of int

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

name
Task name.
Type string

path
Path to project.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

version
Project version to save.
Type string

workitem_count
Work item count.
Type int

class SmoothModel
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

apply_to_selection
Apply to selected faces.
Type bool

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

fix_borders
Fix borders.
Type bool

name
Task name.
Type string

preserve_edges
Preserve edges.
Type bool

strength
Smoothing strength.
Type float

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class TargetType
Task target type in [DocumentTarget, ChunkTarget, FrameTarget]

class TrackMarkers
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

first_frame
Starting frame index.

Type int

last_frame
Ending frame index.
Type int

name
Task name.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

class TransformRaster
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

asset
Asset key to transform.
Type int

data_source
Selects between DEM and orthomosaic.
Type *DataSource*

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

height
Raster height.
Type int

name
Task name.

Type string

nodata_value
No-data value (DEM export only).
Type float

north_up
Use north-up orientation for export.
Type bool

operand_asset
Operand asset key.
Type int

operand_chunk
Operand chunk key.
Type int

operand_frame
Operand frame key.
Type int

projection
Output projection.
Type *OrthoProjection*

region
Region to be processed.
Type *BBox*

resolution
Output resolution in meters.
Type float

resolution_x
Pixel size in the X dimension in projected units.
Type float

resolution_y
Pixel size in the Y dimension in projected units.
Type float

subtract
Subtraction flag.
Type bool

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

width
Raster width.
Type int

workitem_count
Work item count.
Type int

world_transform
2x3 raster-to-world transformation matrix.
Type *Matrix*

class TriangulatePoints
Task class containing processing parameters.

apply(*object*[, *workitem*][, *progress*])
Apply task to specified object.
Parameters
- **object** (*Chunk* or *Document*) – Chunk or Document object to be processed.
- **workitem** (*int*) – Workitem index.
- **progress** (*Callable[[float], None]*) – Progress callback.

decode(*dict*)
Initialize task parameters with a dictionary.

decodeJSON(*json*)
Initialize task parameters from a JSON string.

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

max_error
Reprojection error threshold.
Type float

min_image
Minimum number of point projections.
Type int

name
Task name.
Type string

supports_gpu
GPU support flag.
Type bool

target
Task target.
Type *Tasks.TargetType*

toNetworkTask([*objects*])
Convert task to *NetworkTask* to be applied to specified objects.
Parameters **objects** (*Document*, *Chunk* or list of *Chunk*) – Objects to be processed.

workitem_count
Work item count.
Type int

createTask(*name*)
Create task object by its name.

Parameters **name** (*string*) – Task name.

Returns Task object.

Return type object

class Metashape.**Thumbnail**
Thumbnail instance

copy()
Returns a copy of thumbnail.

Returns Copy of thumbnail.

Return type *Thumbnail*

image()
Returns image data.

Returns Image data.

Return type *Image*

load(*path*[, *layer*])
Loads thumbnail from file.

Parameters

- **path** (*string*) – Path to the image file to be loaded.
- **layer** (*int*) – Optional layer index in case of multipage files.

setImage(*image*)

Parameters **image** (*Image*) – Image object with thumbnail data.

class Metashape.**Thumbnails**
A set of thumbnails generated for a chunk frame.

items()
List of items.

keys()
List of item keys.

meta
Thumbnails meta data.

Type *MetaData*

modified
Modified flag.

Type bool

values()
List of item values.

class Metashape.**TiledModel**
Tiled model data.

class FaceCount
Tiled model face count in [LowFaceCount, MediumFaceCount, HighFaceCount]

bands
List of color bands.

Type list of string

clear()
Clears tiled model data.

copy()
Create a copy of the tiled model.

Returns Copy of the tiled model.

Return type *TiledModel*

crs
Reference coordinate system.

Type *CoordinateSystem* or None

data_type
Data type used to store color values.

Type *DataType*

key
Tiled model identifier.

Type int

label
Tiled model label.

Type string

meta
Tiled model meta data.

Type *MetaData*

modified
Modified flag.

Type bool

pickPoint(*origin*, *target*, *endpoints=1*)
Returns ray intersection with the tiled model.

Parameters

- **origin** (*Vector*) – Ray origin.
- **target** (*Vector*) – Point on the ray.
- **endpoints** (*int*) – Number of endpoints to check for (0 - line, 1 - ray, 2 - segment).

Returns Coordinates of the intersection point.

Return type *Vector*

renderDepth(*transform*, *calibration*, *resolution=1*, *cull_faces=True*, *add_alpha=True*)
Render tiled model depth image for specified viewpoint.

Parameters

- **transform** (*Matrix*) – Camera location.
- **calibration** (*Calibration*) – Camera calibration.
- **resolution** (*float*) – Level of detail resolution in screen pixels.
- **cull_faces** (*bool*) – Enable back-face culling.

- **add_alpha** (*bool*) – Generate image with alpha channel.

Returns Rendered image.

Return type *Image*

renderImage(*transform*, *calibration*, *resolution=1*, *cull_faces=True*, *add_alpha=True*, *raster_transform=RasterTransformNone*)

Render tiled model image for specified viewpoint.

Parameters

- **transform** (*Matrix*) – Camera location.
- **calibration** (*Calibration*) – Camera calibration.
- **resolution** (*float*) – Level of detail resolution in screen pixels.
- **cull_faces** (*bool*) – Enable back-face culling.
- **add_alpha** (*bool*) – Generate image with alpha channel.
- **raster_transform** (*RasterTransformType*) – Raster band transformation.

Returns Rendered image.

Return type *Image*

renderMask(*transform*, *calibration*, *resolution=1*, *cull_faces=True*)

Render tiled model mask image for specified viewpoint.

Parameters

- **transform** (*Matrix*) – Camera location.
- **calibration** (*Calibration*) – Camera calibration.
- **resolution** (*float*) – Level of detail resolution in screen pixels.
- **cull_faces** (*bool*) – Enable back-face culling.

Returns Rendered image.

Return type *Image*

renderNormalMap(*transform*, *calibration*, *resolution=1*, *cull_faces=True*, *add_alpha=True*)

Render image with tiled model normals for specified viewpoint.

Parameters

- **transform** (*Matrix*) – Camera location.
- **calibration** (*Calibration*) – Camera calibration.
- **resolution** (*float*) – Level of detail resolution in screen pixels.
- **cull_faces** (*bool*) – Enable back-face culling.
- **add_alpha** (*bool*) – Generate image with alpha channel.

Returns Rendered image.

Return type *Image*

renderPreview(*width = 2048*, *height = 2048*[, *transform*][, *progress*])

Generate tiled model preview image.

Parameters

- **width** (*int*) – Preview image width.

- **height** (*int*) – Preview image height.
- **transform** (*Matrix*) – 4x4 viewpoint transformation matrix.
- **progress** (*Callable[[float], None]*) – Progress callback.

Returns Preview image.

Return type *Image*

transform
4x4 tiled model transformation matrix.

Type *Matrix*

class Metashape.**TiledModelFormat**
Tiled model format in [TiledModelFormatNone, TiledModelFormatTLS, TiledModelFormatLOD, TiledModelFormatZIP, TiledModelFormatCesium, TiledModelFormatSLPK, TiledModelFormatOSGB, TiledModelFormatOSGT]

class Metashape.**Utils**
Utility functions.

createChessboardImage(*calib*, *cell_size=150*, *max_tilt=30*)
Synthesizes photo of a chessboard.

Parameters

- **calib** (*Calibration*) – Camera calibration.
- **cell_size** (*float*) – Chessboard cell size.
- **max_tilt** (*float*) – Maximum camera tilt in degrees.

Returns Resulting image.

Return type *Image*

createDifferenceMask(*image*, *background*, *tolerance=10*, *fit_colors=True*)
Creates mask from a pair of images or an image and specified color.

Parameters

- **image** (*Image*) – Image to be masked.
- **background** (*Image* or color tuple) – Background image or color value.
- **tolerance** (*int*) – Tolerance value.
- **fit_colors** (*bool*) – Enables white balance correction.

Returns Resulting mask.

Return type *Image*

createMarkers(*chunk*, *projections*)
Creates markers from a list of non coded projections.

Parameters

- **chunk** (*Chunk*) – Chunk to create markers in.
- **projections** (list of (*Camera*, *Target*) tuples) – List of marker projections.

detectTargets(*image*, *type=TargetCircular12bit*, *tolerance=50*, *inverted=False*, *noparity=False*[, *minimum_size*][, *minimum_dist*])
Detect targets on the image.

Parameters

- **image** (*Image*) – Image to process.
- **type** (*TargetType*) – Type of targets.
- **tolerance** (*int*) – Detector tolerance (0 - 100).
- **inverted** (*bool*) – Detect markers on black background.
- **noparity** (*bool*) – Disable parity checking.
- **minimum_size** (*int*) – Minimum target radius in pixels to be detected (CrossTarget type only).
- **minimum_dist** (*int*) – Minimum distance between targets in pixels (CrossTarget type only).

Returns List of detected targets.

Return type list of *Target*

dmat2euler(*R*, *dR*, *euler_angles=EulerAnglesYPR*)

Calculate tangent euler rotation vector from tangent rotation matrix.

Parameters

- **R** (*Matrix*) – Rotation matrix.
- **dR** (*Matrix*) – Tangent rotation matrix.
- **euler_angles** (*EulerAngles*) – Euler angles to use.

Returns Tangent rotation angles in degrees.

Return type *Vector*

estimateImageQuality(*image*[, *mask*])

Estimate image sharpness.

Parameters

- **image** (*Image*) – Image to be analyzed.
- **mask** (*Image*) – Mask of the analyzed image region.

Returns Quality metric.

Return type float

euler2mat(*rotation*, *euler_angles=EulerAnglesYPR*)

Calculate camera to world rotation matrix from euler rotation angles.

Parameters

- **rotation** (*Vector*) – Rotation vector.
- **euler_angles** (*EulerAngles*) – Euler angles to use.

Returns Rotation matrix.

Return type *Matrix*

mat2euler(*R*, *euler_angles=EulerAnglesYPR*)

Calculate euler rotation angles from camera to world rotation matrix.

Parameters

- **R** (*Matrix*) – Rotation matrix.

- **euler_angles** (*EulerAngles*) – Euler angles to use.

Returns Rotation angles in degrees.

Return type *Vector*

mat2opk(*R*)

Calculate omega, phi, kappa from camera to world rotation matrix.

Parameters **R** (*Matrix*) – Rotation matrix.

Returns Omega, phi, kappa angles in degrees.

Return type *Vector*

mat2ypr(*R*)

Calculate yaw, pitch, roll from camera to world rotation matrix.

Parameters **R** (*Matrix*) – Rotation matrix.

Returns Yaw, pitch roll angles in degrees.

Return type *Vector*

opk2mat(*angles*)

Calculate camera to world rotation matrix from omega, phi, kappa angles.

Parameters **angles** (*Vector*) – Omega, phi, kappa angles in degrees.

Returns Rotation matrix.

Return type *Matrix*

ypr2mat(*angles*)

Calculate camera to world rotation matrix from yaw, pitch, roll angles.

Parameters **angles** (*Vector*) – Yaw, pitch, roll angles in degrees.

Returns Rotation matrix.

Return type *Matrix*

class Metashape.**Vector**

n-component vector

```
>>> import Metashape
>>> vect = Metashape.Vector( (1, 2, 3) )
>>> vect2 = vect.copy()
>>> vect2.size = 4
>>> vect2.w = 5
>>> vect2 *= -1.5
>>> vect.size = 4
>>> vect.normalize()
>>> Metashape.app.messageBox("Scalar product is " + str(vect2 * vect))
```

copy()

Return a copy of the vector.

Returns A copy of the vector.

Return type *Vector*

cross(*a*, *b*)

Cross product of 2 vectors.

Parameters

- **a** (*Vector*) – First vector.
- **b** (*Vector*) – Second vector.

Returns Cross product.

Return type *Vector*

norm()
Return norm of the vector.

norm2()
Return squared norm of the vector.

normalize()
Normalize vector to the unit length.

normalized()
Return a new, normalized vector.

Returns a normalized copy of the vector

Return type *Vector*

size
Vector dimensions.

Type int

w
Vector W component.

Type float

x
Vector X component.

Type float

y
Vector Y component.

Type float

z
Vector Z component.

Type float

zero()
Set all elements to zero.

class Metashape.**Version**
Version object contains application version numbers.

build
Build number.

Type int

copy()
Return a copy of the object.

Returns A copy of the object.

Return type *Version*

major
Major version number.

Type int

micro
Micro version number.

Type int

minor
Minor version number.

Type int

class Metashape.**Viewpoint**(*app*)
Represents viewpoint in the model view

center
Camera center.

Type *Vector*

coo
Center of orbit.

Type *Vector*

copy()
Return a copy of the object.

Returns A copy of the object.

Return type *Viewpoint*

fov
Camera vertical field of view in degrees.

Type float

height
OpenGL window height.

Type int

mag
Camera magnification defined by distance to the center of rotation.

Type float

rot
Camera rotation matrix.

Type *Matrix*

width
OpenGL window width.

Type int

class Metashape.**Vignetting**
Vignetting polynomial

copy()
Return a copy of the object.

Returns A copy of the object.

Return type *Vignetting*

CHAPTER

THREE

PYTHON API CHANGE LOG

3.1 Metashape version 1.8.5

- Added DetectPowerlines class
- Added Chunk.detectPowerlines() method
- Added CameraTrack.interpolate() method
- Added generic_detector, right_angle_detector, fiducials_position_corners and fiducials_position_sides attributes to DetectFiducials class
- Added archive attribute to LoadProject and SaveProject classes
- Added generic_detector, right_angle_detector, fiducials_position_corners and fiducials_position_sides arguments to Chunk.detectFiducials() method
- Added archive argument to Document.open() and Document.save() methods

3.2 Metashape version 1.8.4

- Added Shutter.Model enum
- Added ImageFormatBZ2, ImageFormatASCII and ImageFormatKTX to ImageFormat enum
- Added Shape.areaFitted() method
- Added ExportPoints.folder_depth and ExportTiledModel.folder_depth attributes
- Added ImportLaserScans.multiplane attribute
- Added folder_depth argument to Chunk.exportPoints() and Chunk.exportTiledModel() methods
- Added multiplane argument to Chunk.importLaserScans() method
- Changed type of Sensor.rolling_shutter attribute to Shutter.Model
- Fixed Antenna.location and Antenna.rotation attributes to return non-None values

3.3 Metashape version 1.8.3

- Added CloudClient class
- Added PublishData class
- Added CalibrationFormatSTMap to CalibrationFormat enum
- Reorganized arguments of Chunk.publishData() method

3.4 Metashape version 1.8.2

No Python API changes

3.5 Metashape version 1.8.1

- Added CamerasFormatMA to CamerasFormat enum
- Added global_profile attribute to ExportRaster class
- Added traj_columns, traj_delimiter, traj_path, traj_skip_rows and use_trajectory attributes to ImportPoints class
- Added global_profile argument to Chunk.exportRaster() method
- Added use_trajectory, traj_path, traj_columns, traj_delimiter and traj_skip_rows arguments to Chunk.importPoints() method
- Removed fix_pixel_aspect, fix_principal_point, and remove_distortions attributes from ConvertImages class

3.6 Metashape version 1.8.0

- Added BuildPanorama and CalculatePointNormals classes
- Added ImageFormatJXL to ImageFormat enum
- Added Cylindrical to Sensor.Type enum
- Added Chunk.buildPanorama(), Chunk.calculatePointNormals() and Chunk.filterDenseCloud() methods
- Added findCamera(), findCameraGroup(), findCameraTrack(), findDenseCloud(), findDepthMaps(), findElevation(), findMarker(), findMarkerGroup(), findModel(), findOrthomosaic(), findScalebar(), findScalebarGroup(), findSensor() and findTiledModel() methods to Chunk class
- Added NetworkClient.serverStatus() method
- Added NetworkClient.setBatchPaused() and NetworkClient.setNodePaused() methods
- Added Settings.project_absolute_paths and Settings.project_compression attributes
- Added CloseHoles.apply_to_selection attribute
- Added ConvertImages.merge_planes attribute
- Added ExportPoints.screen_space_error and ExportTiledModel.screen_space_error attributes
- Added ExportReport.font_size attribute
- Added ImportPoints.point_neighbors attribute

- Added home_point, interesting_zone, powerlines, restricted_zone and safety_zone attributes to PlanMission class
- Added apply_to_selection argument to Model.closeHoles() method
- Added file_format and max_waypoints arguments to CameraTrack.save() method
- Added screen_space_error argument to Chunk.exportPoints() and Chunk.exportTiledModel() methods
- Added font_size argument to Chunk.exportReport() method
- Added point_neighbors argument to Chunk.importPoints() method
- Removed Shape.Type enum
- Removed ExportPanorama class
- Removed has_z, type, vertex_ids and vertices attributes from Shape class
- Removed pauseBatch(), resumeBatch(), pauseNode() and resumeNode() methods from NetworkClient class
- Removed PlanMission.max_waypoints attribute
- Removed SaveProject.absolute_paths and SaveProject.compression attributes
- Removed compression and absolute_paths arguments from Document.save() method
- Changed default value of BuildTiledModel.face_count attribute to 20000
- Changed default value of face_count argument in Chunk.buildTiledModel() method to 20000

3.7 Metashape version 1.7.6

- Added Cylindrical to Sensor.Type enum

3.8 Metashape version 1.7.5

- Added ClassifyGroundPoints.erosion_radius attribute
- Added erosion_radius argument to DenseCloud.classifyGroundPoints() method

3.9 Metashape version 1.7.4

- Added ServiceCesium to ServiceType enum
- Added ImportLaserScans class
- Added Chunk.colorizeDenseCloud() and Chunk.colorizeModel() methods
- Added Chunk.exportTexture() and Chunk.importLaserScans() methods
- Added breakpoints and rates attributed to GeneratePrescriptionMap class
- Added SmoothModel.preserve_edges attribute
- Added breakpoints and rates arguments to Chunk.generatePrescriptionMap() method
- Added preserve_edges argument to Chunk.smoothModel method
- Renamed ClusteringMethod enum to ClassificationMethod

- Renamed cluster_count, clustering_method and boundary attributes in GeneratePrescriptionMap class
- Renamed cluster_count, clustering_method and boundary arguments in Chunk.generatePrescriptionMap() method
- Removed ServiceSputnik from ServiceType enum
- Removed min_value, max_value and grid_azimuth attributes from GeneratePrescriptionMap class
- Removed min_value, max_value and grid_azimuth arguments from Chunk.generatePrescriptionMap() method

3.10 Metashape version 1.7.3

- Added ModelFormatOSGT and ModelFormatLandXML to ModelFormat enum
- Added TiledModelFormatOSGT to TiledModelFormat enum
- Added CoordinateSystem.datumTransform() method
- Added DenseCloud.selectPointsByShapes() method
- Added Sensor.makeMaster() method
- Added Utils.dmat2euler() method
- Added Settings.lanuage attribute
- Added ShapeGroup.meta attribute
- Added Shapes.group attribute
- Added ExportPoints.compression attribute
- Added ExportTiledModel.model_compression attribute
- Added ImportModel.decode_udim attribute
- Added MatchPhotos.keypoint_limit_per_mpx attribute
- Added compression argument to Chunk.exportPoints() method
- Added model_compression argument to Chunk.exportTiledModel() method
- Added decode_udim argument to Chunk.importModel() method
- Added keypoint_limit_per_mpx argument to Chunk.matchPhotos() method
- Added uniform_sampling argument to Chunk.samplePoints() method

3.11 Metashape version 1.7.2

- Added ClusteringMethod enum
- Added PointsFormatSLPK to PointsFormat enum
- Added DuplicateAsset and GeneratePrescriptionMap classes
- Added Chunk.generatePrescriptionMap() method
- Added merge, operand_chunk, operand_frame and operand_asset attributes to BuildTiledModel class
- Added ExportReport.include_system_info attribute
- Added GenerateMasks.depth_threshold attribute

- Added merge, operand_chunk, operand_frame and operand_asset arguments to Chunk.buildTiledModel() method
- Added include_system_info argument to Chunk.exportReport() method
- Added depth_threshold argument to Chunk.generateMasks() method

3.12 Metashape version 1.7.1

- Removed LegacyMapping from MappingMode enum
- Removed ReduceOverlap.sensor attribute
- Removed sensor argument from Chunk.reduceOverlap() method

3.13 Metashape version 1.7.0

- Added Geometry and AttachedGeometry classes
- Added FrameStep enum
- Added ServiceType enum
- Added Chunk.importVideo(), Chunk.publishData() and Chunk.samplePoints() methods
- Added Shape.geometry and Shape.is_attached attributes
- Added alpha component to ShapeGroup.color attribute value
- Added ImportRaster.nodata_value and ImportRaster.has_nodata_value attributes
- Added MatchPhotos.filter_stationary_points attribute
- Added BuildOrthomosaic.ghosting_filter attribute
- Added attach_viewpoints, group_attached_viewpoints and horizontal_zigzags attributes to PlanMission class
- Added ReduceOverlap.sensor attribute
- Added dir argument to Application.getExistingDirectory(), getOpenFileName(), getOpenFileNames() and getSaveFileName() methods
- Added nodata_value and has_nodata_value arguments to Chunk.importRaster() method
- Added filter_stationary_points argument to Chunk.matchPhotos() method
- Added ghosting_filter argument to Chunk.buildOrthomosaic() method
- Added sensor argument to Chunk.reduceOverlap() method
- Renamed ImportMasks class to GenerateMasks
- Renamed MaskSource enum to MaskingMode
- Renamed Chunk.importMasks() method to Chunk.generateMasks()
- Removed ReduceOverlap.max_cameras attribute
- Removed max_cameras argument from Chunk.reduceOverlap() method

3.14 Metashape version 1.6.6

- Added Tasks.TransformRaster class
- Added ExportReference.precision attribute
- Added toNetworkTask() method to task classes
- Added Chunk.transformRaster() method
- Added precision argument to Chunk.exportReference() method

3.15 Metashape version 1.6.5

- Added Sensor.meta attribute

3.16 Metashape version 1.6.4

- Added Model.Vertex.confidence attribute
- Added ConvertImages.use_initial_calibration attribute
- Added image_orientation, save_invalid_matches and use_initial_calibration attributes to ExportCameras class
- Added ExportModel.save_confidence attribute
- Added crs and image_orientation attributes to ImportCameras class
- Added CalibrationFormatPhotomod to CalibrationFormat enum
- Added save_invalid_matches, use_initial_calibration and image_orientation arguments to Chunk.exportCameras() method
- Added save_confidence argument to Chunk.exportModel() method
- Added crs and image_orientation arguments to Chunk.importCameras() method
- Removed BuildUV.adaptive_resolution attribute
- Removed adaptive_resolution argument from Chunk.buildUV() method

3.17 Metashape version 1.6.3

- Added renderPreview() methods to DenseCloud, Model, Orthomosaic, PointCloud and TiledModel classes
- Added BuildUV.texture_size attribute
- Added DecimateModel.apply_to_selection attribute
- Added DetectFiducials.cameras, DetectFiducials.frames and DetectFiducials.generate_masks attributes
- Added ExportModel.embed_texture attribute
- Added clip_to_boundary attribute to ExportPoints, ExportModel, ExportTiledModel and ExportRaster classes
- Added RasterFormatGeoPackage to RasterFormat enum
- Added ShapesFormatGeoPackage to ShapesFormat enum

- Added source argument to Chunk.addSensor() method
- Added texture_size argument to Chunk.buildUV() method
- Added apply_to_selection argument to Chunk.decimateModel() method
- Added generate_masks, cameras and frames arguments to Chunk.detectFiducials() method
- Added embed_texture argument to Chunk.exportModel() method
- Added width, height, point_size and progress arguments to Chunk.renderPreview() method
- Added clip_to_boundary argument to Chunk.exportPoints(), Chunk.exportModel(), Chunk.exportTiledModel() and Chunk.exportRaster() methods
- Added meta argument to NetworkClient.createBatch() method
- Removed CalibrateLens.fit_p3 and CalibrateLens.fit_p4 attributes

3.18 Metashape version 1.6.2

- Added Application.ModelView and Application.OrthoView classes
- Added Application.removeMenuItem() method
- Added Model.transform() method
- Added PointCloud.cleanup() method
- Added Application.model_view and Application.ortho_view attributes
- Added BuildTexture.transfer_texture attribute
- Added PlanMission.min_pitch and PlanMission.max_pitch attributes
- Added columns, crs, delimiter, group_delimiters and skip_rows attributes to ImportShapes class
- Added CamerasFormatNVM to CamerasFormat enum
- Added PointsFormatPTX to PointsFormat enum
- Added ShapesFormatCSV to ShapesFormat enum
- Added transfer_texture argument to Chunk.buildTexture() method
- Added columns, crs, delimiter, group_delimiters and skip_rows arguments to Chunk.importShapes() method
- Moved ModelViewMode enum to ModelView class
- Renamed Application.console attribute to console_pane
- Renamed Application.captureModelView() method to ModelView.captureView()
- Renamed Application.captureOrthoView() method to OrthoView.captureView()
- Renamed Application.viewpoint attribute to ModelView.viewpoint
- Removed ReduceOverlap.capture_distance attribute
- Removed capture_distance argument from Chunk.reduceOverlap() method
- Changed default values of AlignCameras.reset_alignment and MatchPhotos.reset_matches attributes to False
- Changed default value of reset_alignment argument in Chunk.alignCameras() method to False
- Changed default value of reset_matches argument in Chunk.matchPhotos() method to False

3.19 Metashape version 1.6.1

- Added Application.releaseFreeMemory() method
- Added CoordinateSystem.towgs84 attribute
- Added Marker.enabled attribute
- Added BuildModel.subdivide_task attribute
- Added subdivide_task argument to Chunk.buildModel() method
- Changed default value of keep_depth argument in Chunk.buildModel() and Chunk.buildTiledModel() to True

3.20 Metashape version 1.6.0

- Added BBox, ImageCompression, RPCModel and Model.Texture classes
- Added Tasks.ImportTiledModel and Task.ColorizeModel classes
- Added CalibrationFormat and ReferencePreselectionMode enums
- Added Model.addTexture() and Model.remove() methods
- Added Model.getActiveTexture() and Model.setActiveTexture() methods
- Added NetworkClient.setMasterServer() method
- Added setClassesFilter(), setConfidenceFilter(), setSelectionFilter() and resetFilters() methods to DenseCloud class
- Added renderDepth(), renderImage(), renderMask() and renderNormalMap() methods to PointCloud, DenseCloud and TiledModel classes
- Added Chunk.renderPreview() method
- Added Utils.euler2mat() and Utils.mat2euler() methods
- Added Calibration.rpc attribute
- Added Marker.position_covariance attribute
- Added Model.textures attribute
- Added TiledModel.crs and TiledModel.transform attributes
- Added EulerAnglesPOK and EulerAnglesANK values to EulerAngles enum
- Added PointsFormatPCD to PointsFormat enum
- Added ShapesFormatGeoJSON to ShapesFormat enum
- Added RPC to Sensor.Type enum
- Added image_compression attribute to ExportOrthophotos, ExportRaster, ExportTiledModel and UndistortPhotos classes
- Added AddPhotos.load_rpc_txt attribute
- Added AlignCameras.min_image attribute
- Added BuildDenseCloud.point_confidence attribute
- Added BuildModel.vertex_confidence, BuildModel.max_workgroup_size and BuildModel.workitem_size_cameras attributes

- Added BuildTexture.source_model and BuildTexture.texture_type attributes
- Added BuildUV.adaptive_resolution attribute
- Added DecimateModel.asset attribute
- Added ExportPanorama.image_compression attribute
- Added ExportPoints.save_classes and ExportPoints.save_confidence attributes
- Added ExportTexture.texture_type attribute
- Added ExportTiledModel.crs attribute
- Added ImportCameras.image_list and ImportCameras.load_image_list attributes
- Added ImportPoints.calculate_normals attribute
- Added MatchPhotos.guided_matching and MatchPhotos.reference_preselection_mode attributes
- Added MergeChunks.merge_depth_maps, MergeChunks.merge_elevations and MergeChunks.merge_orthomosaics attributes
- Added OptimizeCameras.fit_corrections attribute
- Added TriangulatePoints.max_error and TriangulatePoints.min_image attributes
- Added endpoints argument to PointCloud.pickPoint(), DenseCloud.pickPoint(), Model.pickPoint() and TiledModel.pickPoint() methods
- Added compression argument to Image.save() method
- Added cull_faces and add_alpha arguments to Model.renderDepth() method
- Added cull_faces, add_alpha and raster_transform arguments to Model.renderImage() method
- Added cull_faces argument to Model.renderMask() method
- Added cull_faces and add_alpha arguments to Model.renderNormalMap() method
- Moved TiffCompression enum to ImageCompression class
- Renamed Tasks.UndistortPhotos class to Tasks.ConvertImages
- Renamed Chunk.estimateImageQuality() method to Chunk.analyzePhotos()
- Renamed Chunk.buildPoints() method to Chunk.triangulatePoints()
- Renamed Chunk.loadReference() method to Chunk.importReference()
- Renamed Chunk.saveReference() method to Chunk.exportReference()
- Renamed Chunk.refineModel() method to Chunk.refineMesh()
- Renamed network_distribute tasks attribute to subdivide_task
- Renamed AlignChunks.align_method attribute to method
- Renamed AlignChunks.match_downscale attribute to downscale
- Renamed AlignChunks.match_filter_mask attribute to filter_mask
- Renamed AlignChunks.match_mask_tiepoints attribute to mask_tiepoints
- Renamed AlignChunks.match_point_limit attribute to keypoint_limit
- Renamed AlignChunks.match_select_pairs attribute to generic_preselection
- Renamed BuildDenseCloud.store_depth attribute to keep_depth
- Renamed BuildModel.store_depth attribute to keep_depth

- Renamed BuildOrthomosaic.ortho_surface attribute to surface_data
- Renamed BuildTiledModel.store_depth attribute to keep_depth
- Renamed BuildUV.texture_count attribute to page_count
- Renamed CalibrateColors.data_source attribute to source_data
- Renamed CalibrateColors.calibrate_color_balance attribute to white_balance
- Renamed ClassifyGroundPoints.cls_from attribute to source_class
- Renamed ClassifyPoints.cls_from attribute to source_class
- Renamed ClassifyPoints.cls_to attribute to target_classes
- Renamed DecimateModel.target_face_count attribute to face_count
- Renamed DuplicateChunk.copy_dense_cloud attribute to copy_dense_clouds
- Renamed ClassifyPoints.copy_elevation attribute to copy_elevations
- Renamed ClassifyPoints.copy_model attribute to copy_models
- Renamed ClassifyPoints.copy_orthomosaic attribute to copy_orthomosaics
- Renamed ClassifyPoints.copy_tiled_model attribute to copy_tiled_models
- Renamed ExportCameras.bingo_export_geoin attribute to bingo_save_geoin
- Renamed ExportCameras.bingo_export_gps attribute to bingo_save_gps
- Renamed ExportCameras.bingo_export_image attribute to bingo_save_image
- Renamed ExportCameras.bingo_export_itera attribute to bingo_save_itera
- Renamed ExportCameras.bundler_export_list attribute to bundler_save_list
- Renamed ExportCameras.chan_order_rotate attribute to chan_rotation_order
- Renamed ExportCameras.coordinates attribute to crs
- Renamed ExportCameras.export_markers attribute to save_markers
- Renamed ExportCameras.export_points attribute to save_points
- Renamed ExportMarkers.coordinates attribute to crs
- Renamed ExportModel.coordinates attribute to crs
- Renamed ExportModel.export_alpha attribute to save_alpha
- Renamed ExportModel.export_cameras attribute to save_cameras
- Renamed ExportModel.export_colors attribute to save_colors
- Renamed ExportModel.export_comment attribute to save_comment
- Renamed ExportModel.export_markers attribute to save_markers
- Renamed ExportModel.export_normals attribute to save_normals
- Renamed ExportModel.export_texture attribute to save_texture
- Renamed ExportModel.export_udim attribute to save_udim
- Renamed ExportModel.export_uv attribute to save_uv
- Renamed ExportOrthophotos.write_alpha attribute to save_alpha
- Renamed ExportOrthophotos.write_kml attribute to save_kml

- Renamed ExportOrthophotos.write_world attribute to save_world
- Renamed ExportPoints.coordinates attribute to crs
- Renamed ExportPoints.data_source attribute to source_data
- Renamed ExportPoints.export_colors attribute to save_colors
- Renamed ExportPoints.export_comment attribute to save_comment
- Renamed ExportPoints.export_images attribute to save_images
- Renamed ExportPoints.export_normals attribute to save_normals
- Renamed ExportPoints.tile_height attribute to block_height
- Renamed ExportPoints.tile_width attribute to block_width
- Renamed ExportPoints.write_tiles attribute to split_in_blocks
- Renamed ExportRaster.data_source attribute to source_data
- Renamed ExportRaster.kmz_section_enable attribute to network_links
- Renamed ExportRaster.tile_width attribute to block_width
- Renamed ExportRaster.tile_height attribute to block_height
- Renamed ExportRaster.write_alpha attribute to save_alpha
- Renamed ExportRaster.write_kml attribute to save_kml
- Renamed ExportRaster.write_scheme attribute to save_scheme
- Renamed ExportRaster.write_tiles attribute to split_in_blocks
- Renamed ExportRaster.write_world attribute to save_world
- Renamed ExportRaster.xyz_level_min attribute to min_zoom_level
- Renamed ExportRaster.xyz_level_max attribute to max_zoom_level
- Renamed ExportShapes.coordinates attribute to crs
- Renamed ExportShapes.export_attributes attribute to save_attributes
- Renamed ExportShapes.export_labels attribute to save_labels
- Renamed ExportShapes.export_points attribute to save_points
- Renamed ExportShapes.export_polygons attribute to save_polygons
- Renamed ExportShapes.export_polylines attribute to save_polylines
- Renamed ExportTexture.write_alpha attribute to save_alpha
- Renamed ExportTiledModel.mesh_format attribute to model_format
- Renamed ImportMasks.method attribute to source
- Renamed ImportModel.coordinates attribute to crs
- Renamed ImportPoints.coordinates attribute to crs
- Renamed ImportReference.coordinates attribute to crs
- Renamed MatchPhotos.preselection_generic attribute to generic_preselection
- Renamed MatchPhotos.preselection_reference attribute to reference_preselection
- Renamed MatchPhotos.store_keypoints attribute to keep_keypoints

- Renamed RefineMesh.niterations attribute to iterations
- Renamed SmoothModel.apply_to_selected attribute to apply_to_selection
- Renamed TrackMarkers.frame_start attribute to first_frame
- Renamed TrackMarkers.frame_end attribute to last_frame
- Renamed processing methods arguments to match task parameters names (e.g. dx/dy -> resolution_x/resolution_y, write_xxx -> save_xxx, export_xxx -> save_xxx, import_xxx -> load_xxx, preselection_generic -> generic_preselection, preselection_reference -> reference_preselection, source_data -> data_source, etc.)
- Replaced Chunk.importDem() method with Chunk.importRaster() method
- Replaced Chunk.exportDem() and Chunk.exportOrthomosaic() methods with Chunk.exportRaster() method
- Removed Accuracy and Quality enums
- Removed Model.texture() and Model.setTexture() methods
- Removed ExportPoints.precision attribute
- Removed OptimizeCameras.fit_p3 and OptimizeCameras.fit_p4 attributes
- Removed PlanMission.max_cameras and PlanMission.use_cameras attributes
- Removed tiff_big, tiff_tiled and tiff_overviews attributes from ExportOrthophotos and ExportRaster classes
- Removed tiff_compression attribute from ExportOrthophotos, ExportRaster and UndistortPhotos classes
- Removed jpeg_quality attribute from ExportOrthophotos, ExportRaster, ExportTiledModel and UndistortPhotos classes

3.21 Metashape version 1.5.5

No Python API changes

3.22 Metashape version 1.5.4

- Added Tasks.FilterDenseCloud class
- Added TiledModel.FaceCount enum
- Added copy() method to Antenna, Calibration, ChunkTransform, CirTransform, CoordinateSystem, Document, MetaData, OrthoProjection, RasterTransform, Region, Shutter, Target, Version, Viewpoint and Vignetting classes
- Added CameraTrack.save() and CameraTrack.load() methods
- Added Chunk.reduceOverlap() method
- Added location_enabled and rotation_enabled attributes to Sensor.Reference class
- Added CameraTrack.chunk and CameraTrack.meta attributes
- Added BuildTiledModel.ghosting_filter and BuildTiledModel.transfer_texture attributes
- Added ExportPoints.network_distribute and ExportPoints.region attributes
- Added ExportTiledModel.jpeg_quality and ExportTiledModel.texture_format attributes
- Added prevent_intersections argument to Chunk.buildContours() method

- Added transfer_texture argument to Chunk.buildTiledModel() method
- Added region argument to Chunk.exportPoints() method
- Added texture_format and jpeg_quality arguments to Chunk.exportTiledModel() method
- Added progress argument to Chunk.importMarkers() method
- Added ImageFormatWebP to ImageFormat enum

3.23 Metashape version 1.5.3

- Added DepthMap.getCalibration() and DepthMap.setCalibration() methods
- Added NetworkClient.dumpBatches(), NetworkClient.loadBatches() and NetworkClient.setBatchNodeLimit() methods
- Added location_enabled and rotation_enabled attributes to Camera.Reference class
- Added keep_depth argument to Chunk.buildTiledModel() method
- Added uv argument to Chunk.exportModel() method
- Added level argument to DepthMap.image() and DepthMap.setImage() methods
- Changed default value of keep_depth argument in Chunk.buildDenseCloud() and Chunk.buildModel() methods to True
- Changed default value of max_neighbors argument in Chunk.buildDenseCloud() method to 100

3.24 Metashape version 1.5.2

- Added CameraTrack class
- Added Tasks.PlanMission and Tasks.ReduceOverlap classes
- Added Camera.Type enum
- Added Chunk.addCameraTrack() method
- Added Application.title attribute
- Added Camera.type attribute
- Added Chunk.camera_track and Chunk.camera_tracks attributes
- Added BuildModel.trimming_radius attribute
- Added DetectMarkers.filter_mask attribute
- Added ImportReference.shutter_lag attribute
- Added Bundler and BINGO specific attributes to ExportCameras class
- Added supports_gpu attribute to task classes
- Added x, y, w, h arguments to Image.open() method
- Added filter_mask argument to Chunk.detectMarkers() method
- Added image_list argument to Chunk.importCameras() method
- Added shutter_lag argument to Chunk.loadReference() method

- Added ImageFormatBIL, ImageFormatXYZ, ImageFormatDDS to ImageFormat enum
- Removed Tasks.PlanMotion class
- Removed Animation class
- Removed Chunk.animation attribute
- Removed smoothness attribute from Tasks.BuildModel and Tasks.BuildTiledModel classes
- Removed quality and reuse_depth arguments from Chunk.buildModel() method
- Removed downscale, filter_mode, max_neighbors, max_workgroup_size, network_distribute, reuse_depth, workitem_size_cameras from Tasks.BuildModel class

3.25 Metashape version 1.5.1

- Added License class
- Added Tasks.MergeAssets class
- Added Metashape.license attribute
- Renamed Tasks.OptimizeCoverage class to Tasks.PlanMotion

3.26 Metashape version 1.5.0

- Added Sensor.Reference class
- Added Tasks.ClassifyPoints and Tasks.OptimizeCoverage classes
- Added DataType enum
- Added Model.TextureType enum
- Added Tasks.TargetType enum
- Added Animation.Track.resize() method
- Added Chunk.findFrame() method
- Added DenseCloud.classifyPoints() method
- Added Document.findChunk() method
- Added Model.Faces.resize(), Model.Vertices.resize() and Model.TexVertices.resize() methods
- Added Tasks.createTask() method
- Added decode(), decodeJSON(), encodeJSON() methods to task classes
- Added Antenna.location_covariance and Antenna.rotation_covariance attributes
- Added Camera.calibration, Camera.location_covariance and Camera.rotation_covariance attributes
- Added Chunk.image_contrast attribute
- Added DenseCloud.bands and DenseCloud.data_type attributes
- Added Model.bands and Model.data_type attributes
- Added Elevation.palette attribute
- Added Model.Face.tex_index attribute

- Added Orthomosaic.bands and Orthomosaic.data_type attributes
- Added PointCloud.Point.cov attribute
- Added PointCloud.bands and PointCloud.data_type attributes
- Added Sensor.data_type, Sensor.film_camera, Sensor.location_covariance, Sensor.reference and Sensor.rotation_covariance attributes
- Added Sensor.fixed_params and Sensor.photo_params attributes
- Added TiledModel.bands and TiledModel.data_type attributes
- Added AlignChunks.markers and AlignChunks.match_mask_tiepoints attributes
- Added BuildOrthomosaic.refine_seamlines attribute
- Added DetectMarkers.cameras and DetectMarkers.maximum_residual attributes
- Added ExportModel.colors_rgb_8bit and ExportPoints.colors_rgb_8bit attributes
- Added ExportOrthophotos.tiff_tiled and ExportRaster.tiff_tiled attributes
- Added OptimizeCameras.tiepoint_covariance attribute
- Added BuildModel.smoothness and BuildTiledModel.smoothness attributes
- Added target and workitem_count attributes to task classes
- Added max_workgroup_size and workitem_size_tiles attributes to Tasks.BuildDem class
- Added max_workgroup_size and workitem_size_cameras attributes to Tasks.BuildDenseCloud class
- Added max_workgroup_size and workitem_size_cameras attributes to Tasks.BuildDepthMaps class
- Added max_workgroup_size and workitem_size_cameras attributes to Tasks.BuildModel class
- Added max_workgroup_size, workitem_size_cameras and workitem_size_tiles attributes to Tasks.BuildOrthomosaic class
- Added max_workgroup_size, workitem_size_cameras and face_count attributes attributes to Tasks.BuildTiledModel class
- Added max_workgroup_size, workitem_size_cameras and workitem_size_pairs attributes to Tasks.MatchPhotos class
- Added refine_seamlines argument to Chunk.buildOrthomosaic() method
- Added face_count argument to Chunk.buildTiledModel() method
- Added keypoints argument to Chunk.copy() method
- Added maximum_residual and cameras arguments to Chunk.detectMarkers() method
- Added tiff_tiled argument to Chunk.exportDem(), Chunk.exportOrthomosaic() and Chunk.exportOrthophotos() methods
- Added colors_rgb_8bit argument to Chunk.exportModel() and Chunk.exportPoints() methods
- Added tiepoint_covariance argument to Chunk.optimizeCameras() method
- Added confidence argument to DenseCloud.classifyPoints() method
- Added mask_tiepoints and markers arguments to Document.alignChunks() method
- Added ignore_lock argument to Document.open() method
- Added type argument to Model.setTexture() and Model.texture() methods
- Added workitem argument to Task.apply() method

- Added ModelFormatGLTF and ModelFormatX3D to ModelFormat enum
- Added Car and Manmade to PointClass enum
- Changed default value of filter argument in Chunk.buildDepthMaps() to MildFiltering
- Removed Tasks.BuildModel.visibility_mesh attribute

3.27 PhotoScan version 1.4.4

- Added AddPhotos.strip_extensions attribute
- Added ExportRaster.image_description attribute
- Added ExportShapes.export_attributes, ExportShapes.export_labels and ExportShapes.polygons_as_polylines attributes
- Added image_description argument to Chunk.exportDem() and Chunk.exportOrthomosaic() methods
- Added format, polygons_as_polylines, export_labels and export_attributes arguments to Chunk.exportShapes() method
- Added format argument to Chunk.importShapes() method
- Added RasterFormatTMS to RasterFormat enum

3.28 PhotoScan version 1.4.3

- Added Version class
- Added Tasks.DetectFiducials class
- Added Chunk.detectFiducials() method
- Added Sensor.calibrateFiducials() method
- Added CoordinateSystem.addGeoid() method
- Added PhotoScan.version attribute
- Added Sensor.normalize_to_float attribute
- Added minimum_dist attribute to Tasks.DetectMarkers class
- Added minimum_dist argument to Chunk.detectMarkers() and Utils.detectTargets() methods
- Added keypoints argument to PointCloud.copy() method
- Changed default value of adaptive_fitting argument in Chunk.alignCameras() to False

3.29 PhotoScan version 1.4.2

- Added Tasks.ColorizeDenseCloud class
- Added PointCloud.removeKeypoints() method
- Added CoordinateSystem.transformationMatrix() method
- Added Vector.cross() method
- Added Shapes.updateAltitudes() method
- Added log_enable, log_path, network_enable, network_host, network_path and network_port attributes to Application.Settings class
- Added covariance_matrix and covariance_params attributes to Calibration class
- Added flip_x, flip_y, flip_z attributes to Tasks.BuildDem and Tasks.BuildOrthomosaic classes
- Added max_neighbors attribute to Tasks.BuildDenseCloud, Tasks.BuildDepthMaps and Tasks.BuildModel classes
- Added jpeg_quality, tiff_compression and update_gps_tags attributes to Tasks.UndistortPhotos class
- Added copy_keypoints attribute to Tasks.DuplicateChunk class
- Added width, height and world_transform attributes to Tasks.ExportRaster class
- Added store_depth attribute to Tasks.BuildTiledModel class
- Added DenseCloud.crs and DenseCloud.transform attributes
- Added CoordinateSystem.wkt2 attribute
- Added keep_keypoints argument to Chunk.matchPhotos() method
- Added flip_x, flip_y, flip_z arguments to Chunk.buildDem() and Chunk.buildOrthomosaic() methods
- Added max_neighbors argument to Chunk.buildDenseCloud() and Chunk.buildDepthMaps() methods
- Added cull_faces argument to Chunk.buildOrthomosaic() method
- Added reuse_depth and ghosting_filter arguments to Chunk.buildTiledModel() method
- Added use_reflectance_panels and use_sun_sensor arguments to Chunk.calibrateReflectance() method
- Added width, height and world_transform arguments to Chunk.exportDem() and Chunk.exportOrthomosaic() methods
- Added filter_mask argument to Chunk.estimateImageQuality() method
- Added revision argument to NetworkClient.nodeList() method
- Added ImagesData to DataSource enum
- Added ModelFormatOSGB to ModelFormat enum
- Added TiledModelFormatOSGB to TiledModelFormat enum

3.30 PhotoScan version 1.4.1

- Added OrthoProjection.Type enum
- Added Camera.image() method
- Added Chunk.loadReflectancePanelCalibration() method
- Added PointCloud.Points.copy() and PointCloud.Points.resize() methods
- Added PointCloud.Projections.resize() method
- Added PointCloud.Tracks.copy() and PointCloud.Tracks.resize() methods
- Added OrthoProjection.matrix, OrthoProjection.radius and OrthoProjection.type attributes
- Added Tasks.AnalyzePhotos.filter_mask attribute
- Added Tasks.CalibrateReflectance.use_reflectance_panels and Tasks.CalibrateReflectance.use_sun_sensor attributes
- Added Tasks.MatchPhotos.mask_tiepoints attribute
- Added Tasks.OptimizeCameras.adaptive_fitting attribute
- Added strip_extensions argument to Chunk.addPhotos() method
- Added keep_depth argument to Chunk.buildDenseCloud() method
- Added adaptive_resolution argument to Chunk.buildUV() method
- Added alpha argument to Chunk.exportModel() method
- Added mask_tiepoints argument to Chunk.matchPhotos() method
- Added adaptive_fitting argument to Chunk.optimizeCameras() method
- Added mask argument to Utils.estimateImageQuality() method
- Added CamerasFormatABC and CamerasFormatFBX to CamerasFormat enum
- Added ImageFormatJP2 to ImageFormat enum
- Added LegacyMapping to MappingMode enum

3.31 PhotoScan version 1.4.0

- Added Tasks classes
- Added Animation, OrthoProjection, Target and Vignetting classes
- Added ShapesFormat enum
- Added Marker.Type enum
- Added Chunk.calibrateColors(), Chunk.calibrateReflectance() and Chunk.locateReflectancePanels() methods
- Added Chunk.buildDepthMaps(), Chunk.importPoints(), Chunk.refineModel() and Chunk.removeLighting() methods
- Added Chunk.addDenseCloud(), Chunk.addDepthMaps(), Chunk.addElevation(), Chunk.addModel(), Chunk.addOrthomosaic() and Chunk.addTiledModel() methods
- Added Chunk.sortCameras(), Chunk.sortMarkers() and Chunk.sortScalebars() methods
- Added DenseCloud.clear() method

- Added DepthMaps.clear() and DepthMaps.copy() methods
- Added Elevation.clear() and Elevation.copy() methods
- Added Model.clear() method
- Added Orthomosaic.clear() and Orthomosaic.copy() methods
- Added TiledModel.clear() and TiledModel.copy() methods
- Added Image.gaussianBlur() and Image.uniformNoise() methods
- Added NetworkTask.encode() method
- Added Utils.createChessboardImage() and Utils.detectTargets() methods
- Added Camera.Reference.location_accuracy and Camera.Reference.rotation_accuracy attributes
- Added Camera.layer_index, Camera.master and Camera.vignetting attributes
- Added Chunk.dense_clouds, Chunk.depth_maps_sets, Chunk.elevations, Chunk.models, Chunk.orthomosaics and Chunk.tiled_models attributes
- Added Chunk.animation, Chunk.camera_crs, Chunk.marker_crs and Chunk.world_crs attributes
- Added CoordinateSystem.geoccs and CoordinateSystem.geoid_height attributes
- Added Marker.Projection.valid attribute
- Added Sensor.black_level, Sensor.fiducials, Sensor.fixed_calibration, Sensor.fixed_location, Sensor.fixed_rotation, Sensor.layer_index, Sensor.location, Sensor.master, Sensor.normalize_sensitivity, Sensor.rolling_shutter, Sensor.rotation, Sensor.sensitivity and Sensor.vignetting attributes
- Added Camera.chunk, Marker.chunk, Scalebar.chunk and Sensor.chunk attributes
- Added Marker.sensor and Marker.type attributes
- Added Elevation.projection, Orthomosaic.projection and Shapes.projection attributes
- Added DenseCloud.key and DenseCloud.label attributes
- Added DepthMaps.key and DepthMaps.label attributes
- Added Elevation.key and Elevation.label attributes
- Added Model.key and Model.label attributes
- Added Orthomosaic.key and Orthomosaic.label attributes
- Added TiledModel.key and TiledModel.label attributes
- Added point_colors argument to Chunk.buildDenseCloud() method
- Added ghosting_filter argument to Chunk.buildTexture() method
- Added minimum_size argument to Chunk.detectMarkers() method
- Added raster_transform argument to Chunk.exportModel(), Chunk.exportPoints(), Chunk.exportTiledModel() methods
- Added tiff_overviews argument to Chunk.exportDem(), Chunk.exportOrthomosaic() and Chunk.exportOrthophotos() methods
- Added min_zoom_level and max_zoom_level arguments to Chunk.exportDem() and Chunk.exportOrthomosaic() methods
- Added cameras argument to Chunk.exportOrthophotos() method
- Added image_format argument to Chunk.exportPoints() method

- Added page_numbers argument to Chunk.exportReport() method
- Added items, crs, ignore_labels, threshold and progress arguments to Chunk.loadReference() method
- Added create_markers argument to Chunk.loadReference() method
- Added progress argument to Chunk.saveReference() method
- Added quality, volumetric_masks, keep_depth and reuse_depth arguments to Chunk.buildModel() method
- Added selected_faces and fix_borders arguments to Chunk.smoothModel() method
- Added export_points, export_markers, use_labels and progress arguments to Chunk.exportCameras() method
- Added channels and datatype arguments to Photo.image() method
- Added CamerasFormatBlocksExchange and CamerasFormatORIMA to CamerasFormat enum
- Added ImageFormatNone to ImageFormat enum
- Added UndefinedLayout to ImageLayout enum
- Added ModelFormatNone and ModelFormatABC to ModelFormat enum
- Added PointsFormatNone and PointsFormatCesium to PointsFormat enum
- Added RasterFormatNone to RasterFormat enum
- Added ReferenceFormatNone and ReferenceFormatAPM to ReferenceFormat enum
- Added TiledModelFormatNone, TiledModelFormatCesium and TiledModelFormatSLPK to TiledModelFormat enum
- Renamed Chunk.master_channel attribute to Chunk.primary_channel
- Removed MatchesFormat enum
- Removed Chunk.exportMatches() method
- Removed Camera.Reference.accuracy_ypr attribute
- Removed quality, filter, cameras, keep_depth, reuse_depth arguments from Chunk.buildDenseCloud() method
- Removed color_correction argument from Chunk.buildOrthomosaic() and Chunk.buildTexture() methods
- Removed fit_shutter argument from Chunk.optimizeCameras() method

3.32 PhotoScan version 1.3.5

No Python API changes

3.33 PhotoScan version 1.3.4

No Python API changes

3.34 PhotoScan version 1.3.3

- Added network_links argument to Chunk.exportDem() and Chunk.exportOrthomosaic() methods
- Added read_only argument to Document.open() method
- Added NetworkClient.setNodeCPUEnable() and NetworkClient.setNodeGPUMask() methods
- Added Chunk.modified, DenseCloud.modified, DepthMaps.modified, Document.modified, Elevation.modified, Masks.modified, Model.modified, Orthomosaic.modified, PointCloud.modified, Shapes.modified, Thumbnails.modified, TiledModel.modified attributes
- Added Document.read_only attribute
- Added CamerasFormatSummit to CamerasFormat enum

3.35 PhotoScan version 1.3.2

- Added vertex_colors argument to Chunk.buildModel() method
- Added Shape.vertex_ids attribute

3.36 PhotoScan version 1.3.1

- Added Settings and TiledModel classes
- Added Application.getBool() method
- Added Camera.unproject() method
- Added Chunk.addFrames(), Chunk.addMarkerGroup(), Chunk.addScalebarGroup() and Chunk.buildSeamlines() methods
- Added DenseCloud.pickPoint() and DenseCloud.updateStatistics() methods
- Added Elevation.altitude() method
- Added Matrix.svd() method
- Added Model.pickPoint() method
- Added Orthomosaic.reset() and Orthomosaic.update() methods
- Added PointCloud.pickPoint() method
- Added filter argument to Application.getOpenFileName(), Application.getOpenFileNames() and Application.getSaveFileName() methods
- Added point and visibility arguments to Chunk.addMarker() method
- Added raster_transform and write_scheme arguments to Chunk.exportDem() method
- Added write_scheme and white_background arguments to Chunk.exportOrthomosaic() method
- Added white_background argument to Chunk.exportOrthophotos() method
- Added projection argument to Chunk.exportMarkers() method
- Added markers argument to Chunk.exportModel() method
- Added pairs argument to Chunk.matchPhotos() method

- Added columns and delimiter arguments to Chunk.saveReference() method
- Added version argument to Document.save() method
- Renamed npasses argument in Chunk.smoothModel() method to strength and changed its type to float
- Renamed from and to arguments in CoordinateSystem.transform(), DenseCloud.assignClass(), DenseCloud.assignClassToSelection() and DenseCloud.classifyGroundPoints() methods to avoid collision with reserved words
- Added Application.settings attribute
- Added Chunk.tiled_model attribute
- Added ShapeGroup.color and ShapeGroup.show_labels attributes
- Added ImageFormatTGA to ImageFormat enum

3.37 PhotoScan version 1.3.0

- Added MarkerGroup, Masks, ScalebarGroup, Shutter and Thumbnails classes
- Added Application.PhotosPane class
- Added Model.Statistics class
- Added Orthomosaic.Patch and Orthomosaic.Patches classes
- Added PointCloud.Filter class
- Added CamerasFormat, EulerAngles, ImageFormat, ImageLayout, MaskOperation, MaskSource, MatchesFormat, ModelFormat, ModelViewMode, PointClass, PointsFormat, RasterFormat, ReferenceFormat, ReferenceItems, RotationOrder, TiffCompression, TiledModelFormat enums
- Added Application.captureOrthoView() method
- Added Chunk.refineMarkers() method
- Added CoordinateSystem.listBuiltinCRS() class method
- Added Matrix.translation() method
- Added Model.statistics() method
- Added NetworkClient.serverInfo(), NetworkClient.nodeStatus(), NetworkClient.setNodeCapability() and NetworkClient.quitNode() methods
- Added Photo.imageMeta() method
- Added Shape.area(), Shape.perimeter2D(), Shape.perimeter3D() and Shape.volume() methods
- Added Utils.createMarkers() method
- Added source argument to Application.captureModelView() method
- Added image_format argument to Chunk.exportDem() mehod
- Added write_alpha argument to Chunk.exportOrthophotos() method
- Added image_format and write_alpha arguments to Chunk.exportOrthomosaic() method
- Added groups, projection, shift and progress arguments to Chunk.exportShapes() method
- Added items and progress arguments to Chunk.copy() method
- Added sensor argument to Chunk.addCamera() method

- Added layout argument to Chunk.addPhotos() method
- Added jpeg_quality argument to Chunk.exportOrthomosaic() and Chunk.exportOrthophotos() methods
- Added fill_holes argument to Chunk.buildOrthomosaic() method
- Added fit_shutter argument to Chunk.optimizeCameras() method
- Added settings argument to Chunk.exportReport() method
- Added progress argument to various DenseCloud methods
- Added from argument to DenseCloud.classifyGroundPoints() method
- Added chunks and progress arguments to Document.append() method
- Added progress argument to Document.alignChunks() and Document.mergeChunks() methods
- Added revision argument to NetworkClient.batchList(), NetworkClient.batchStatus() methods
- Added Application.photos_pane attribute
- Added Camera.shutter attribute
- Added Chunk.masks and Chunk.thumbnails attributes
- Added Chunk.marker_groups and Chunk.scalebar_groups attributes
- Added Chunk.euler_angles and Chunk.scalebar_accuracy attributes
- Added CoordinateSystem.name attribute
- Added Marker.group and Scalebar.group attributes
- Added Orthomosaic.patches attribute
- Added RasterTransform.false_color attribute
- Added Sensor.bands attribute
- Added Shape.attributes attribute
- Added DepthMapsData, TiledModelData and OrthomosaicData to DataSource enum
- Added CircularTarget14bit to TargetType enum
- Renamed CameraReference class to Camera.Reference
- Renamed ConsolePane class to Application.ConsolePane
- Renamed MarkerProjection class to Marker.Projection
- Renamed MarkerProjections class to Marker.Projections
- Renamed MarkerReference class Marker.Reference
- Renamed MeshFace class to Model.Face
- Renamed MeshFaces class to Model.Faces
- Renamed MeshTexVertex class to Model.TexVertex
- Renamed MeshTexVertices class to Model.TexVertices
- Renamed MeshVertex class to Model.Vertex
- Renamed MeshVertices class to Model.Vertices
- Renamed PointCloudCameras class to PointCloud.Cameras
- Renamed PointCloudPoint class to PointCloud.Point

- Renamed PointCloudPoints class to PointCloud.Points
- Renamed PointCloudProjection class to PointCloud.Projection
- Renamed PointCloudProjections class to PointCloud.Projections
- Renamed PointCloudTrack class to PointCloud.Track
- Renamed PointCloudTracks class to PointCloud.Tracks
- Renamed ScalebarReference class to Scalebar.Reference
- Renamed ShapeVertices class to Shape.Vertices
- Renamed Application.enumOpenCLDevices() method to Application.enumGPUDevices()
- Renamed Shape.boundary attribute to Shape.boundary_type
- Renamed Chunk.accuracy_cameras to Chunk.camera_location_accuracy
- Renamed Chunk.accuracy_cameras_ypr to Chunk.camera_rotation_accuracy
- Renamed Chunk.accuracy_markers to Chunk.marker_location_accuracy
- Renamed Chunk.accuracy_projections to Chunk.marker_projection_accuracy
- Renamed Chunk.accuracy_tiepoints to Chunk.tiepoint_accuracy
- Renamed method argument in Chunk.importMasks() method to source and changed its type to MaskSource
- Replaced preselection argument with generic_preselection and reference_preselection arguments in Chunk.matchPhotos() method
- Replaced fit_cxcy argument with fit_cx and fit_cy arguments in Chunk.optimizeCameras() method
- Replaced fit_k1k2k3 argument with fit_k1, fit_k2 and fit_k3 arguments in Chunk.optimizeCameras() method
- Replaced fit_p1p2 argument with fit_p1 and fit_p2 arguments in Chunk.optimizeCameras() method
- Replaced Application.cpu_cores_inactive with Application.cpu_enable attribute
- Changed type of source_data argument in Chunk.buildContours() to DataSource
- Changed type of format argument in Chunk.importCameras() and Chunk.exportCameras() methods to CamerasFormat
- Changed type of rotation_order argument in Chunk.exportCameras() to RotationOrder
- Changed type of format argument in Chunk.exportDem() and Chunk.exportOrthomosaic() methods to RasterFormat
- Changed type of format argument in Chunk.exportMatches() method to MatchesFormat
- Changed type of texture_format argument in Chunk.exportModel() method to ImageFormat
- Changed type of format argument in Chunk.importModel() and Chunk.exportModel() methods to ModelFormat
- Changed type of format argument in Chunk.exportPoints() method to PointsFormat
- Changed type of tiff_compression argument in Chunk.exportOrthomosaic() and Chunk.exportOrthophotos() methods to TiffCompression
- Changed type of items argument in Chunk.exportShapes() method to Shape.Type
- Changed type of format argument in Chunk.exportTiledModel() method to TiledModelFormat
- Changed type of mesh_format argument in Chunk.exportTiledModel() method to ModelFormat
- Changed type of operation argument in Chunk.importMasks() method to MaskOperation

- Changed type of format argument in Chunk.loadReference() and Chunk.saveReference() methods to ReferenceFormat
- Changed type of items argument in Chunk.saveReference() method to ReferenceItems
- Removed return values from Camera.open(), Chunk.addPhotos(), Chunk.alignCameras(), Chunk.buildContours(), Chunk.buildDem(), Chunk.buildDenseCloud(), Chunk.buildModel(), Chunk.buildOrthomosaic(), Chunk.buildPoints(), Chunk.buildTexture(), Chunk.buildTiledModel(), Chunk.buildUV(), Chunk.decimateModel(), Chunk.detectMarkers(), Chunk.estimateImageQuality(), Chunk.exportCameras(), Chunk.exportDem(), Chunk.exportMarkers(), Chunk.exportMatches(), Chunk.exportModel(), Chunk.exportOrthomosaic(), Chunk.exportOrthophotos(), Chunk.exportPoints(), Chunk.exportReport(), Chunk.exportShapes(), Chunk.exportTiledModel(), Chunk.importCameras(), Chunk.importDem(), Chunk.importMarkers(), Chunk.importMasks(), Chunk.importModel(), Chunk.importShapes(), Chunk.loadReference(), Chunk.loadReferenceExif(), Chunk.matchPhotos(), Chunk.optimizeCameras(), Chunk.remove(), Chunk.saveReference(), Chunk.smoothModel(), Chunk.thinPointCloud(), Chunk.trackMarkers(), CirTransform.calibrate(), CoordinateSystem.init(), DenseCloud.classifyGroundPoints(), DenseCloud.compactPoints(), DenseCloud.selectMaskedPoints(), DenseCloud.selectPointsByColor(), Document.alignChunks(), Document.append(), Document.clear(), Document.mergeChunks(), Document.open(), Document.remove(), Document.save(), Mask.load(), Model.closeHoles(), Model.fixTopology(), Model.loadTexture(), Model.removeComponents(), Model.saveTexture(), Model.setTexture(), NetworkClient.abortBatch(), NetworkClient.abortNode(), NetworkClient.connect(), NetworkClient.pauseBatch(), NetworkClient.pauseNode(), NetworkClient.resumeBatch(), NetworkClient.resumeNode(), NetworkClient.setBatchPriority(), NetworkClient.setNodePriority(), Photo.open(), PointCloud.export(), RasterTransform.calibrateRange(), Thumbnail.load() methods in favor of exceptions
- Removed Chunk.exportContours() method
- Removed obsolete Matrix.diag() and Matrix.translation() class methods
- Removed unused focal_length argument from Calibration.save() method
- Modified Utils.mat2opk() and Utils.opk2mat() methods to work with camera to world rotation matrices

3.38 PhotoScan version 1.2.6

No Python API changes

3.39 PhotoScan version 1.2.5

- Added ShapeGroup and ShapeVertices classes
- Added CoordinateSystem.proj4 and CoordinateSystem.geogcs attributes
- Added Shapes.shapes and Shapes.groups attributes
- Added Shape.label, Shape.vertices, Shape.group, Shape.has_z, Shape.key and Shape.selected attributes
- Added Shapes.addGroup(), Shapes.addShape() and Shapes.remove() methods
- Added CoordinateSystem.transform() method
- Added Matrix.Diag(), Matrix.Rotation(), Matrix.Translation() and Matrix.Scale() class methods
- Added Matrix.rotation() and Matrix.scale() methods
- Added DenseCloud.restorePoints() and DenseCloud.selectPointsByColor() methods

- Added Application.captureModelView() method
- Added Mask.invert() method
- Added adaptive_fitting parameter to Chunk.alignCameras() method
- Added load_rotation and load_accuracy parameters to Chunk.loadReferenceExif() method
- Added source parameter to Chunk.buildTiledModel() method
- Added fill_holes parameter to Chunk.buildTexture() method

3.40 PhotoScan version 1.2.4

- Added NetworkClient and NetworkTask classes
- Added Calibration.f, Calibration.b1, Calibration.b2 attributes
- Added Chunk.exportMatches() method
- Added DenseCloud.compactPoints() method
- Added Orthomosaic.removeOrthophotos() method
- Added fit_b1 and fit_b2 parameters to Chunk.optimizeCameras() method
- Added tiff_big parameter to Chunk.exportOrthomosaic(), Chunk.exportDem() and Chunk.exportOrthophotos() methods
- Added classes parameter to Chunk.exportPoints() method
- Added progress parameter to processing methods
- Removed Calibration.fx, Calibration.fy, Calibration.skew attributes

3.41 PhotoScan version 1.2.3

- Added tiff_compression parameter to Chunk.exportOrthomosaic() and Chunk.exportOrthophotos() methods

3.42 PhotoScan version 1.2.2

- Added Camera.orientation attribute
- Added chunks parameter to Document.save() method

3.43 PhotoScan version 1.2.1

- Added CirTransform and RasterTransform classes
- Added Chunk.cir_transform and Chunk.raster_transform attributes
- Added Chunk.exportOrthophotos() method
- Added udim parameter to Chunk.exportModel() method
- Renamed RasterTransform enum to RasterTransformType

3.44 PhotoScan version 1.2.0

- Added Elevation and Orthomosaic classes
- Added Shape and Shapes classes
- Added Antenna class
- Added DataSource enum
- Added Camera.error() method
- Added Chunk.buildContours() and Chunk.exportContours() methods
- Added Chunk.importShapes() and Chunk.exportShapes() methods
- Added Chunk.exportMarkers() and Chunk.importMarkers() methods
- Added Chunk.importDem() method
- Added Chunk.buildDem(), Chunk.buildOrthomosaic() and Chunk.buildTiledModel() methods
- Added PointCloud.removeSelectedPoints() and PointCloud.cropSelectedPoints() methods
- Added Utils.mat2opk(), Utils.mat2ypr(), Utils.opk2mat() and Utils.ypr2mat() methods
- Added Chunk.elevation, Chunk.orthomosaic and Chunk.shapes attributes
- Added Chunk.accuracy_cameras_ypr attribute
- Added Sensor.antenna, Sensor.plane_count and Sensor.planes attributes
- Added Calibration.p3 and Calibration.p4 attributes
- Added Camera.planes attribute
- Added CameraReference.accuracy_ypr attribute
- Added CameraReference.accuracy, MarkerReference.accuracy and ScalebarReference.accuracy attributes
- Added Application.activated attribute
- Added Chunk.image_brightness attribute
- Added fit_p3 and fit_p4 parameters to Chunk.optimizeCameras() method
- Added icon parameter to Application.addMenuItem() method
- Added title and description parameters to Chunk.exportReport() method
- Added operation parameter to Chunk.importMasks() method
- Added columns, delimiter, group_delimiters, skip_rows parameters to Chunk.loadReference() method
- Added items parameter to Chunk.saveReference() method
- Renamed Chunk.exportModelTiled() to Chunk.exportTiledModel()
- Renamed Chunk.exportOrthophoto() to Chunk.exportOrthomosaic()
- Removed OrthoSurface and PointsSource enums
- Removed PointCloud.groups attribute
- Removed Chunk.camera_offset attribute

3.45 PhotoScan version 1.1.1

- Added Chunk.exportModelTiles() method
- Added noparity parameter to Chunk.detectMarkers() method
- Added blockw and blockh parameters to Chunk.exportPoints() method

3.46 PhotoScan version 1.1.0

- Added CameraOffset and ConsolePane classes
- Added CameraGroup, CameraReference, ChunkTransform, DepthMap, DepthMaps, MarkerReference, MarkerProjection, Mask, PointCloudGroups, PointCloudTrack, PointCloudTracks, ScalebarReference, Thumbnail classes
- Added Chunk.key, Sensor.key, Camera.key, Marker.key and Scalebar.key attributes
- Added Application.console attribute
- Added Application.addMenuSeparator() method
- Added Chunk.importMasks() method
- Added Chunk.addSensor(), Chunk.addCameraGroup(), Chunk.addCamera(), Chunk.addMarker(), Chunk.addScalebar() methods
- Added Chunk.addPhotos(), Chunk.addFrame() methods
- Added Chunk.master_channel and Chunk.camera_offset attributes
- Added Calibration.error() method
- Added Matrix.mulp() and Matrix.mulv() methods
- Added DenseCloud.assignClass(), DenseCloud.assignClassToSelection(), DenseCloud.removePoints() methods
- Added DenseCloud.classifyGroundPoints() and DenseCloud.selectMaskedPoints() methods
- Added Model.renderNormalMap() method
- Added DenseCloud.meta and Model.meta attributes
- Added PointCloud.tracks, PointCloud.groups attributes
- Added Image.tostring() and Image.fromstring() methods
- Added Image.channels property
- Added U16 data type support in Image class
- Added classes parameter to Chunk.buildModel() method
- Added crop_borders parameter to Chunk.exportDem() method
- Added chunk parameter to Document.addChunk() method
- Added format parameter to Calibration.save() and Calibration.load() methods
- Moved OpenCL settings into Application class
- Converted string constants to enum objects
- Removed Cameras, Chunks, DenseClouds, Frame, Frames, GroundControl, GroundControlLocations, GroundControlLocation, Markers, MarkerPositions, Models, Scalebars, Sensors classes

3.47 PhotoScan version 1.0.0

- Added DenseCloud and DenseClouds classes
- Added Chunk.exportModel() and Chunk.importModel() methods
- Added Chunk.estimateImageQuality() method
- Added Chunk.buildDenseCloud() and Chunk.smoothModel() methods
- Added Photo.thumbnail() method
- Added Image.resize() method
- Added Application.enumOpenCLDevices() method
- Added Utils.estimateImageQuality() method
- Added Camera.meta, Marker.meta, Scalebar.meta and Photo.meta attributes
- Added Chunk.dense_cloud and Chunk.dense_clouds attributes
- Added page parameter to Model.setTexture() and Model.texture() methods
- Added shortcut parameter to Application.addMenuItem() method
- Added absolute_paths parameter to Document.save() method
- Added fit_f, fit_cxcy, fit_k1k2k3 and fit_k4 parameters to Chunk.optimizePhotos() method
- Changed parameters of Chunk.buildModel() and Chunk.buildTexture() methods
- Changed parameters of Chunk.exportPoints() method
- Changed parameters of Model.save() method
- Changed return value of Chunks.add() method
- Removed Chunk.buildDepth() method
- Removed Camera.depth() and Camera.setDepth() methods
- Removed Frame.depth() and Frame.setDepth() methods
- Removed Frame.depth_calib attribute

3.48 PhotoScan version 0.9.1

- Added Sensor, Scalebar and MetaData classes
- Added Camera.sensor attribute
- Added Chunk.sensors attribute
- Added Calibration.width, Calibration.height and Calibration.k4 attributes
- Added Chunk.refineMatches() method
- Added Model.area() and Model.volume() methods
- Added Model.renderDepth(), Model.renderImage() and Model.renderMask() methods
- Added Chunk.meta and Document.meta attributes
- Added Calibration.project() and Calibration.unproject() methods
- Added Application.addMenuItem() method

- Added Model.closeHoles() and Model.fixTopology() methods

3.49 PhotoScan version 0.9.0

- Added Camera, Frame and CoordinateSystem classes
- Added Chunk.exportReport() method
- Added Chunk.trackMarkers() and Chunk.detectMarkers() methods
- Added Chunk.extractFrames() and Chunk.removeFrames() methods
- Added Chunk.matchPhotos() method
- Added Chunk.buildDepth() and Chunk.resetDepth() methods
- Added Chunk.cameras property
- Added Utils.createDifferenceMask() method
- Revised Chunk.alignPhotos() method
- Revised Chunk.buildPoints() method
- Revised Chunk.buildModel() method
- Removed Photo class (deprecated)
- Removed GeoProjection class (deprecated)
- Removed Chunk.photos property (deprecated)

3.50 PhotoScan version 0.8.5

- Added Chunk.fix_calibration property
- Added Chunk.exportCameras() method
- Added Chunk.exportPoints() method for dense/sparse point cloud export
- Added accuracy_cameras, accuracy_markers and accuracy_projections properties to the GroundControl class
- Added Image.undistort() method
- Added PointCloudPoint.selected and PointCloudPoint.valid properties
- Added GeoProjection.authority property
- Added GeoProjection.init() method
- Moved GroundControl.optimize() method to Chunk.optimize()
- Removed “fix_calibration” parameter from Chunk.alignPhotos() method
- Removed GeoProjection.epsg property

3.51 PhotoScan version 0.8.4

- Added GroundControl.optimize() method
- Command line scripting support removed

3.52 PhotoScan version 0.8.3

Initial version of PhotoScan Python API

PYTHON MODULE INDEX