Metashape Python Reference

Release 2.0.0

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CONTENTS

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.

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.buildModel(source_data=Metashape.DepthMapsData, 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 ModelViewMode**
>   >   Model view mode in [ModelViewShaded, ModelViewSolid, ModelViewWireframe, ModelViewConfidence, ModelViewTextured]

>   **class PointCloudViewMode**
>   >   Point cloud view mode in [PointCloudViewSolid, PointCloudViewColor, PointCloudViewClassification, PointCloudViewIntensity, PointCloudViewElevation, PointCloudViewConfidence, PointCloudViewReturnNumber, PointCloudViewScanAngle, PointCloudViewSourceId]

>   **class TiePointsViewMode**
>   >   Tie points view mode in [TiePointsViewColor, TiePointsViewVariance]

>   **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*

>   **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

>   **tie_points_view_mode**
>   >   Tie points view mode.
>   >   >   **Type** *TiePointsViewMode*

>   **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*][, *drone_name*][, *payload_name*][, *payload_position*][, *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, "wpml": DJI WPML KML, "trinity": Asctec Trinity CSV, "autopilot": Asctec Autopilot CSV, "litchi": Litchi CSV
> >
> > - **drone_name** (`string`) – Drone model. "M300 RTK": - DJI Matrice 300 RTK, "M30": - DJI Matrice 30, "M30T": - DJI Matrice 30T, "M3E": - DJI Mavic 3E, "M3T": - DJI Mavic 3T
> >
> > - **payload_name** (`string`) – Payload model. "P1 24mm": - DJI Zenmuse P1 (24 mm lens), "P1 35mm": - DJI Zenmuse P1 (35 mm lens), "P1 50mm": - DJI Zenmuse P1 (50 mm lens), "H20": - DJI Zenmuse H20, "H20T": - DJI Zenmuse H20T, "H20N": - DJI Zenmuse H20N, "L1": - DJI Zenmuse L1, "M30": - DJI M30, "M30T": - DJI M30T, "M3E": - DJI Mavic 3E Camera, "M3T": - DJI Mavic 3T Camera
> >
> > - **payload_position** (`string`) – Payload position. For M300 RTK drone: "Front left", "Front right", "Top". For other drones: "Main gimbal"
> >
> > - **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 (tie points, model, etc)

>   - implements processing methods (matchPhotos, alignCameras, buildPointCloud, 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, addCamera-Group, 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, build-Model, 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*

>   **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($\big[$*chunk*$\big]\big[$, *frames*$\big]$, *copy_depth_maps=True*, *copy_point_cloud=True*, *copy_model=True*,
>   *copy_tiled_model=True*, *copy_elevation=True*, *copy_orthomosaic=True*$\big[$, *progress*$\big]$)
>   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_point_cloud** (*bool*) – Copy point 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($\big[$*point*$\big]$, *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.

addPointCloud()

    Add new point cloud to the chunk.

        Returns Created point cloud.

        Return type [*PointCloud*]

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*][, *point_clouds*], *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.

  - **point_clouds** (`list of int`) – List of point clouds 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.

analyzeImages([*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=PointCloudData*, *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 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 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.

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=DepthMapsData*[, *classes*], *vertex_colors=True*, *vertex_confidence=True*, *volumetric_masks=False*, *keep_depth=True*, *trimming_radius=10*[, *cameras*], *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 point cloud, tie points and depth maps.

- **classes** (*list of int*) – List of point classes to be used for surface extraction.

- **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.

- **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.

buildPointCloud(*source_data=DepthMapsData*, *point_colors=True*, *point_confidence=False*, *keep_depth=True*, *max_neighbors=100*, *uniform_sampling=True*, *points_spacing=0.1*[, *asset*], *subdivide_task=True*, *workitem_size_cameras=20*, *max_workgroup_size=100*[, *progress*])

Generate point cloud for the chunk.

> **Parameters**
>
> - **source_data** ([*DataSource*](#)) – Source data to extract points from.
>
> - **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.
>
> - **uniform_sampling** (*bool*) – Enable uniform point sampling.
>
> - **points_spacing** (*float*) – Desired point spacing (m).
>
> - **asset** (*int*) – Asset to process.
>
> - **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.

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=DepthMapsData*, *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 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 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*[, *point_cloud*][, *progress*])

Calculate point cloud normals.

> **Parameters**
>
> - **point_neighbors** (*int*) – Number of point neighbors to use for normal estimation.
> - **point_cloud** (*int*) – Point cloud key to process.
> - **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*](#)

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.

colorizePointCloud(*source_data=ImagesData*, *workitem_size_cameras=20*, *max_workgroup_size=100*, *subdivide_task=True*[, *point_cloud*][, *progress*])
> Calculate point colors for the point cloud.

> > **Parameters**

> > > • **source_data** ([*DataSource*](#)) – Source data to extract colors from.

> > > • **workitem_size_cameras** (*int*) – Number of cameras in a workitem.

> > > • **max_workgroup_size** (*int*) – Maximum workgroup size.

> > > • **subdivide_task** (*bool*) – Enable fine-level task subdivision.

> > > • **point_cloud** (*int*) – Point cloud key to colorize.

> > > • **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.

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=100*, *max_quantization_error=0.01*, *use_model=True*[, *progress*])
> Detect powerlines for the chunk.
>
>> **Parameters**
>>
>> - **min_altitude** (*float*) – Minimum altitude for reconstructed powerlines.

- **n_points_per_line** (*int*) – Maximum number of vertices per detected line.

- **max_quantization_error** (*float*) – Maximum allowed distance between polyline and smooth continuous curve.

- **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 COORDI-NATE 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.

exportPointCloud(*path='', source_data=PointCloudData*[, *point_cloud*], *binary=True,*
                save_point_color=True, save_point_normal=True, save_point_intensity=True,
                save_point_classification=True, save_point_confidence=True,
                save_point_return_number=True, save_point_scan_angle=True,
                save_point_source_id=True, save_point_timestamp=True, save_point_index=True,
                raster_transform=RasterTransformNone, colors_rgb_8bit=True, comment='',
                save_comment=True, format=PointCloudFormatNone,
                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 point cloud and tie points. If not specified, uses point cloud if available.
>
> - **point_cloud** (*int*) – Point cloud key to export.
>
> - **binary** (*bool*) – Enables/disables binary encoding for selected format (if applicable).
>
> - **save_point_color** (*bool*) – Enables/disables export of point color.
>
> - **save_point_normal** (*bool*) – Enables/disables export of point normal.
>
> - **save_point_intensity** (*bool*) – Enables/disables export of point intensity.
>
> - **save_point_classification** (*bool*) – Enables/disables export of point classification.
>
> - **save_point_confidence** (*bool*) – Enables/disables export of point confidence.
>
> - **save_point_return_number** (*bool*) – Enables/disables export of point return number.
>
> - **save_point_scan_angle** (*bool*) – Enables/disables export of point scan angle.
>
> - **save_point_source_id** (*bool*) – Enables/disables export of point source ID.
>
> - **save_point_timestamp** (*bool*) – Enables/disables export of point timestamp.
>
> - **save_point_index** (*bool*) – Enables/disables export of point row and column indices.
>
> - **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** (*PointCloudFormat*) – 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 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*, *raster_transform=RasterTransformNone*, *save_alpha=False*[, *progress*])

Export model texture to file.

> **Parameters**
>
> - **path** (*string*) – Path to output file.
>
> - **texture_type** (*Model.TextureType*) – Texture type.
>
> - **raster_transform** (*RasterTransformType*) – Raster band transformation.
>
> - **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*, *use_rtc_center=False*, *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).
> - **use_rtc_center** (*bool*) – Use RTC_CENTER offset instead of root tile transform (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.

filterPointCloud(*point_spacing=0*[, *point_cloud*][, *progress*])
> Reduce point cloud points number.
>
> > **Parameters**
> >
> > - **point_spacing** (*float*) – Desired point spacing (m).
> > - **point_cloud** (*int*) – Point 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*

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*

findPointCloud(*key*)
> Find point cloud by its key.
>
> > **Returns** Found point cloud.
> >
> > **Return type** *PointCloud*

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.

importDepthImages(*format=PointCloudFormatNone*[, *filenames*][, *color_filenames*], *image_path=''*, *multiplane=False*[, *progress*])
:   Import images with depth data.

    Parameters

    - **format** ([*PointCloudFormat*]) – Point cloud format.

    - **filenames** (`list of string`) – List of files to import.

    - **color_filenames** (`list of string`) – List of corresponding color files, if present.

    - **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.

importPointCloud(*path='', format=PointCloudFormatNone*[, *crs*][, *shift*], *precision=0, is_laser_scan=False, replace_asset=False, import_images=True, calculate_normals=True, point_neighbors=28, scanner_at_origin=False, ignore_scanner_origin=False, ignore_trajectory=False*[, *trajectory*][, *frame_paths*][, *progress*])
Import point cloud from file.

> **Parameters**
>
> - **path** (*string*) – Path to point cloud.
>
> - **format** (*PointCloudFormat*) – Point cloud format.
>
> - **crs** (*CoordinateSystem*) – Point cloud coordinate system.
>
> - **shift** (*Vector*) – Optional shift to be applied to point coordinates.
>
> - **precision** (*float*) – Coordinate precision (m).
>
> - **is_laser_scan** (*bool*) – Import point clouds as laser scans.
>
> - **replace_asset** (*bool*) – Replace default asset with imported point cloud.
>
> - **import_images** (*bool*) – Import images embedded in laser scan.
>
> - **calculate_normals** (*bool*) – Calculate point normals.
>
> - **point_neighbors** (*int*) – Number of point neighbors to use for normal estimation.
>
> - **scanner_at_origin** (*bool*) – Use laser scan origin as scanner position for unstructured point clouds.
>
> - **ignore_scanner_origin** (*bool*) – Do not use laser scan origin as scanner position for structured point clouds.
>
> - **ignore_trajectory** (*bool*) – Do not attach trajectory to imported point cloud.
>
> - **trajectory** (*int*) – Trajectory key to attach.
>
> - **frame_paths** (*list of string*) – List of point cloud paths to import in each frame of a multiframe chunk.
>
> - **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 consecutive 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 consecutive 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.

importTrajectory(*path='', format=TrajectoryFormatNone, columns='txyz', delimiter=' ', skip_rows=0*[, *crs*][, *shift*], *replace_asset=False*[, *progress*])
> Import trajectory from file.

>> **Parameters**

>>> • **path** (*string*) – Trajectory file path.

>>> • **format** (*TrajectoryFormat*) – Trajectory format.

>>> • **columns** (*string*) – Column order (t - time, x/y/z - coordinates, space - skip column).

>>> • **delimiter** (*string*) – CSV delimiter.

>>> • **skip_rows** (*int*) – Number of rows to skip.

>>> • **crs** (*CoordinateSystem*) – Point cloud coordinate system.

>>> • **shift** (*Vector*) – Optional shift to be applied to point coordinates.

>>> • **replace_asset** (*bool*) – Replace default asset with imported point cloud.

>>> • **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 tie points / 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
    Default point cloud for the current frame.

    Type *PointCloud*

point_clouds
    List of point clouds for the current frame.

    Type list of *PointCloud*

primary_channel
    Primary channel index (-1 for default).

    Type int

publishData(*service=ServiceSketchfab*, *source_data=TiePointsData*,
        raster_transform=RasterTransformNone, *save_point_color=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_color** (*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 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.

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.

thinTiePoints(*point_limit=1000*)
>   Remove excessive tracks from the tie point cloud.
>
>> **Parameters** **point_limit** (*int*) – Maximum number of points for each photo.

thumbnails
>   Image thumbnails.
>
>> **Type** *Thumbnails*

tie_points
>   Generated tie point cloud.
>
>> **Type** *TiePoints*

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.

triangulateTiePoints(*max_error=10*, *min_image=2*[, *progress*])
  Rebuild tie 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 [TiePointsData, PointCloudData, 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.**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($\begin{bmatrix} level \end{bmatrix}$)

> 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($\big[$*chunks*$\big]\big[$, *reference* $\big]$, *method=0*, *fit_scale=True*, *downscale=1*, *generic_preselection=False*, *filter_mask=False*, *mask_tiepoints=False*, *keypoint_limit=40000*$\big[$, *markers* $\big]\big[$, *progress* $\big]$)
        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*$\big[$, *chunks* $\big]\big[$, *progress* $\big]$)
        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(*copy_laser_scans=True*, *copy_depth_maps=False*, *copy_point_clouds=False*,
> *copy_models=False*, *copy_tiled_models=False*, *copy_elevations=False*,
> *copy_orthomosaics=False*, *merge_markers=False*, *merge_tiepoints=False*,
> *merge_assets=False*[, *chunks*][, *progress*])
> Merge specified set of chunks.

> > **Parameters**

> > - **copy_laser_scans** (*bool*) – Copy laser scans.
> > - **copy_depth_maps** (*bool*) – Copy depth maps.
> > - **copy_point_clouds** (*bool*) – Copy point clouds.
> > - **copy_models** (*bool*) – Copy models.
> > - **copy_tiled_models** (*bool*) – Copy tiled models.
> > - **copy_elevations** (*bool*) – Copy DEMs.
> > - **copy_orthomosaics** (*bool*) – Copy orthomosaics.
> > - **merge_markers** (*bool*) – Merge markers.
> > - **merge_tiepoints** (*bool*) – Merge tie points.
> > - **merge_assets** (*bool*) – Merge default assets.
> > - **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]] )
>>> 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, DisplacementMap]

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()
>>> 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**
> 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_class*][, *return_number*], *keep_existing=False*[, *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_class** ([*PointClass*](#)) – Class of points to be re-classified.
> >
> > - **return_number** (`int`) – Point return number to use (0 - any return, 1 - first return, -1 - last return).
> >
> > - **keep_existing** (`bool`) – Keep existing ground points.

- **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 point cloud data.

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

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

copy()
    Create a copy of the point cloud.

> **Returns** Copy of the point cloud.
>
> **Return type** *PointCloud*

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
    Point cloud identifier.

> **Type** int

label
    Point cloud label.

> **Type** string

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*

point_count

Number of points in point 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 point 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 point 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 point 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 point 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 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](#)*

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 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 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 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 point cloud transformation matrix.

Type *Matrix*

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

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

class `Metashape.PointCloudFormat`
Point cloud format in [PointCloudFormatNone, PointCloudFormatOBJ, PointCloudFormatPLY, PointCloud-FormatXYZ, PointCloudFormatLAS, PointCloudFormatExpe, PointCloudFormatU3D, PointCloudFormatPDF, PointCloudFormatE57, PointCloudFormatOC3, PointCloudFormatPotree, PointCloudFormatLAZ, PointCloud-FormatCL3, PointCloudFormatPTS, PointCloudFormatPTX, PointCloudFormatDXF, PointCloudFormatCe-sium, PointCloudFormatPCD, PointCloudFormatSLPK]

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 Shape-Group 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_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_point_cloud
   Copy point cloud.
      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

point_clouds
>   List of point clouds to align.
>   **Type** list of int

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**($\big[$*objects*$\big]$)
> > 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 AnalyzeImages
> Task class containing processing parameters.

> **apply**(*object*$\big[$, *workitem*$\big]\big[$, *progress*$\big]$)
> > 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($\big[$*objects*$\big]$)
>   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*$\big[$, *workitem*$\big]$$\big[$, *progress*$\big]$)
>   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 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 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 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($objects$)
>   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 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 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($\big[$*objects*$\big]$)
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($\big[$*objects*$\big]$)
> 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*$\big[$, *workitem*$\big]$$\big[$, *progress*$\big]$)
> 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 BuildPointCloud

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 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.

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

points_spacing

Desired point spacing (m).

> **Type** float

source_data

Source data to extract points from.

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

uniform_sampling
Enable uniform point sampling.
Type bool

workitem_count
Work item count.
Type int

workitem_size_cameras
Number of cameras in a workitem.
Type int

class BuildSeamlines
Task class containing processing parameters.

apply(*object*$\big[$, *workitem*$\big]\big[$, *progress*$\big]$)
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**($\big[$*objects*$\big]$)
> > > 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*$\big[$, *workitem*$\big]\big[$, *progress*$\big]$)
> > > 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 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 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_cloud
>   Point cloud key to process.
>> **Type** int

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 CalibrateCamera
>   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 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 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

keep_existing
> Keep existing ground points.
> > **Type** bool

max_angle
> Maximum angle (degrees).
> > **Type** float

max_distance
> Maximum distance (meters).
> > **Type** float

name
> Task name.
> > **Type** string

point_cloud
> Point cloud key to classify.
> > **Type** int

return_number
> Point return number to use (0 - any return, 1 - first return, -1 - last return).
> > **Type** int

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

point_cloud

Point cloud key to classify.

Type int

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 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 ColorizePointCloud
>   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_workgroup_size**
>>   Maximum workgroup size.
>>> **Type** int

name
> Task name.
> > **Type** string

point_cloud
> Point cloud key to colorize.
> > **Type** int

source_data
> Source data to extract colors from.
> > **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($\left[\textit{objects}\,\right]$)
> 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 CompactPointCloud
> Task class containing processing parameters.

> **apply**(*object*$\left[\textit{, workitem}\,\right]\left[\textit{, progress}\,\right]$)
> > 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_cloud
> Point cloud key to process.
> > **Type** int

supports_gpu
> GPU support flag.
> > **Type** bool

target
> Task target.
> > **Type** *Tasks.TargetType*

toNetworkTask($\big[$*objects*$\big]$)
> 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*$\big[$, *workitem*$\big]$$\big[$, *progress*$\big]$)
> > 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($\left[objects\right]$)
> 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*$\left[, workitem \right]\left[, progress \right]$)
> 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($\big[$*objects*$\big]$)
>   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*$\big[$, *workitem*$\big]$$\big[$, *progress*$\big]$)
>   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_quantization_error
> Maximum allowed distance between polyline and smooth continuous curve.
>> **Type** float

min_altitude
> Minimum altitude for reconstructed powerlines.
>> **Type** float

n_points_per_line
> Maximum 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_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_point_clouds
> Copy point clouds.
> > **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 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($\big[$*objects*$\big]$)
> 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($\big[$*objects*$\big]$)
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 ExportPointCloud
Task class containing processing parameters.

apply(*object*$\big[$, *workitem*$\big]$$\big[$, *progress*$\big]$)
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 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** *PointCloudFormat*

image_format
>   Image data format.
>   > **Type** *ImageFormat*

name
>   Task name.
>   > **Type** string

path
>   Path to output file.
>   > **Type** string

point_cloud
>   Point cloud key to export.
>   > **Type** int

raster_transform
>   Raster band transformation.
>   > **Type** *RasterTransformType*

region
>   Region to be exported.

> **Type** *BBox*

save_comment
> Enable comment export.
> > **Type** bool

save_images
> Enable image export.
> > **Type** bool

save_point_classification
> Enables/disables export of point classification.
> > **Type** bool

save_point_color
> Enables/disables export of point color.
> > **Type** bool

save_point_confidence
> Enables/disables export of point confidence.
> > **Type** bool

save_point_index
> Enables/disables export of point row and column indices.
> > **Type** bool

save_point_intensity
> Enables/disables export of point intensity.
> > **Type** bool

save_point_normal
> Enables/disables export of point normal.
> > **Type** bool

save_point_return_number
> Enables/disables export of point return number.
> > **Type** bool

save_point_scan_angle
> Enables/disables export of point scan angle.
> > **Type** bool

save_point_source_id
> Enables/disables export of point source ID.
> > **Type** bool

save_point_timestamp
> Enables/disables export of point timestamp.
> > **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 point cloud and tie points. If not specified, uses point 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

> **raster_transform**
> > Raster band transformation.
> > > **Type** *RasterTransformType*

> **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.

use_rtc_center
    Use RTC_CENTER offset instead of root tile transform (Cesium format only).
        Type bool

workitem_count
    Work item count.
        Type int

class FilterPointCloud
    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_cloud
    Point cloud key to filter.
        Type int

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 ImportDepthImages
>   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.

>   **color_filenames**
>   >   List of corresponding color files, if present.
>   >   >   **Type** list of 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.

filenames
    List of files to import.
        Type list of string

format
    Point cloud format.
        Type *PointCloudFormat*

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*

NetworkTask

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($\big[$*objects*$\big]$)
> 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 ImportPointCloud
> Task class containing processing parameters.
>
> **apply**(*object*$\big[$, *workitem*$\big]\big[$, *progress*$\big]$)
>> 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** *PointCloudFormat*

frame_paths
    List of point cloud paths to import in each frame of a multiframe chunk.
        Type list of string

ignore_scanner_origin
    Do not use laser scan origin as scanner position for structured point clouds.
        Type bool

ignore_trajectory
    Do not attach trajectory to imported point cloud.
        Type bool

import_images
    Import images embedded in laser scan.
        Type bool

is_laser_scan
    Import point clouds as laser scans.
        Type bool

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

precision
    Coordinate precision (m).
        Type float

replace_asset
    Replace default asset with imported point cloud.
        Type bool

scanner_at_origin
    Use laser scan origin as scanner position for unstructured point clouds.
        Type bool

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.

> **trajectory**
>> Trajectory key to attach.
>>> **Type** int

> **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 consecutive 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($\left[objects\right]$)
> 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*$\left[, workitem\right]\left[, progress\right]$)
> 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 ImportTrajectory
    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 (t - time, x/y/z - coordinates, space - skip column).
        Type string

crs
    Point cloud coordinate system.
        Type *CoordinateSystem*

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

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

delimiter
CSV delimiter.
> **Type** string

encode()
Create a dictionary with task parameters.

encodeJSON()
Create a JSON string with task parameters.

format
Trajectory format.
> **Type** *TrajectoryFormat*

name
Task name.
> **Type** string

path
Trajectory file path.
> **Type** string

replace_asset
Replace default asset with imported point cloud.
> **Type** bool

shift
Optional shift to be applied to point coordinates.
> **Type** *Vector*

skip_rows
Number of rows to skip.
> **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 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($\big[$*objects*$\big]$)
>   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*$\big[$, *workitem*$\big]$$\big[$, *progress*$\big]$)
>>   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

>   **copy_depth_maps**
>>   Copy depth maps.
>>>   **Type** bool

>   **copy_elevations**
>>   Copy DEMs.
>>>   **Type** bool

>   **copy_laser_scans**
>>   Copy laser scans.
>>>   **Type** bool

>   **copy_models**
>>   Copy models.
>>>   **Type** bool

>   **copy_orthomosaics**
>>   Copy orthomosaics.
>>>   **Type** bool

>   **copy_point_clouds**
>>   Copy point clouds.
>>>   **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.

merge_assets
>   Merge default assets.
>   >   **Type** bool

merge_markers
>   Merge markers.
>   >   **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($\left[\,objects\,\right]$)
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 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_color
> 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 RenderDepthMaps
>   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 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($\big[$*objects*$\big]$)
>   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*$\big[$, *workitem* $\big]$$\big[$, *progress* $\big]$)
>   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($\big[$*objects*$\big]$)
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*$\big[$, *workitem*$\big]\big[$, *progress*$\big]$)
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($\big[$*objects*$\big]$)
> 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*$\big[$, *workitem*$\big]\big[$, *progress*$\big]$)
>> 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 TriangulateTiePoints

> 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.**TiePoints**
>   Tie point cloud instance

>   **class Cameras**
>   >   Collection of *TiePoints.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.TiePoints.Filter()
>>> f.init(chunk, criterion = Metashape.TiePoints.Filter.ReprojectionError)
>>> f.selectPoints(threshold)
```

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

>   >   **init**(*points*, *criterion*, *progress*)
>   >   >   Initialize tie points filter based on specified criterion.
>   >   >   >   **Parameters**
>   >   >   >   - **points** (*TiePoints* or *Chunk*) – Tie points to filter.
>   >   >   >   - **criterion** (*TiePoints.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 tie 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 tie point cloud

> **copy()**
> > Returns a copy of points buffer.
> > > **Returns** Copy of points buffer.
> > > **Return type** *TiePoints.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 *TiePoints.Projection* for the camera

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

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

class Track
> Track in the tie point cloud

> **color**
> > Track color.
> > > **Type** tuple of 3 int

class Tracks
> Collection of tracks in the tie point cloud

copy()

> Returns a copy of tracks buffer.
>
> > **Returns** Copy of tracks buffer.
> >
> > **Return type** *TiePoints.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 tie point cloud.
>
> > **Parameters keypoints** (*bool*) – copy key points data.
> >
> > **Returns** Copy of the tie point cloud.
> >
> > **Return type** *TiePoints*

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 tie points.
>
> > **Parameters**
> >
> > - **path** (*string*) – Path to output file.
> >
> > - **format** (*string*) – Export format in ['obj', 'ply'].
> >
> > - **projection** (*Matrix* or *CoordinateSystem*) – Sets output projection.

meta

> Tie points meta data.
>
> > **Type** *MetaData*

modified

> Modified flag.
>
> > **Type** bool

pickPoint(*origin*, *target*, *endpoints=1*)

> Returns ray intersection with the tie 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 [*TiePoints.Points*](#)

projections
 Point projections for each photo.

  Type [*TiePoints.Projections*](#)

removeKeypoints()
 Remove keypoints from tie point cloud.

removeSelectedPoints()
 Remove selected points.

removeSelectedTracks()
 Remove selected tie points.

renderDepth(*transform*, *calibration*, *point_size=1*, *cull_points=False*, *add_alpha=True*)
 Render tie points 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 tie points 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 tie points 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 tie points 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 tie points 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** [*TiePoints.Tracks*](#)

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.**TrajectoryFormat**
>   Trajectory format in [TrajectoryFormatNone, TrajectoryFormatCSV, TrajectoryFormatSBET, TrajectoryFormatSOL, TrajectoryFormatTRJ]

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*

PYTHON API CHANGE LOG

3.1 Metashape version 2.0.0

- Added TrajectoryFormat enum
- Added DisplacementMap to Model.TextureType enum
- Added ImportTrajectory class
- Added ImportDepthImages class
- Added Chunk.importTrajectory() method
- Added Chunk.importDepthImages() method
- Added AlignCameras.point_clouds attribute
- Added ImportDepthImages.color_filenames attribute
- Added precision, is_laser_scan, replace_asset, import_images, scanner_at_origin, ignore_scanner_origin, ignore_trajectory, trajectory and frame_paths attributes to ImportPointCloud class
- Added keep_existing, return_number and point_cloud attributes to ClassifyGroundPoints class
- Added point_cloud attribute to ClassifyPoints, ColorizePointCloud, CalculatePointNormals, CompactPointCloud and ExportPointCloud classes
- Added max_quantization_error attribute to DetectPowerlines class
- Added use_rtc_center attribute to ExportTiledModel class
- Added merge_assets, copy_laser_scans, copy_depth_maps, copy_point_clouds, copy_models, copy_tiled_models, copy_elevations and copy_orthomosaics attributes to MergeChunks class
- Added point_clouds argument to Chunk.alignCameras() method
- Added color_filenames argument to Chunk.importDepthImages() method
- Added precision, is_laser_scan, replace_asset, import_images, scanner_at_origin, ignore_scanner_origin, ignore_trajectory, trajectory and frame_paths arguments to Chunk.importPointCloud() method
- Added point_cloud argument to Chunk.calculatePointNormals(), Chunk.colorizePointCloud() and Chunk.exportPointCloud() methods
- Added max_quantization_error argument to Chunk.detectPowerlines() method
- Added keep_existing and return_number arguments to PointCloud.classifyGroundPoints() method
- Added use_rtc_center argument to Chunk.exportTiledModel() method
- Added merge_assets, copy_laser_scans, copy_depth_maps, copy_point_clouds, copy_models, copy_tiled_models, copy_elevations and copy_orthomosaics arguments to Document.mergeChunks() method

- Added drone_name, payload_name and payload_position arguments to CameraTrack.save() method

- Change default source_data argument value for Chunk.buildModel() and Chunk.buildTiledModel() methods to DepthMapsData

- Renamed PointsFormat enum to PointCloudFormat

- Renamed ModelView.PointCloudViewMode enum to ModelView.TiePointsViewMode

- Renamed ModelView.DenseCloudViewMode enum to ModelView.PointCloudViewMode and added Point-CloudViewSolid, PointCloudViewIntensity, PointCloudViewElevation, PointCloudViewReturnNumber, Point-CloudViewScanAngle, PointCloudViewSourceId enumeration values

- Renamed DataSource.PointCloudData enum value to DataSource.TiePointsData

- Renamed DataSource.DenseCloudData enum value to DataSource.PointCloudData

- Renamed PointCloud class to TiePoints

- Renamed DenseCloud class to PointCloud

- Renamed AnalyzePhotos class to AnalyzeImages

- Renamed BuildDenseCloud class to BuildPointCloud

- Renamed CalibrateLens class to CalibrateCamera

- Renamed ColorizeDenseCloud class to ColorizePointCloud

- Renamed CompactDenseCloud class to CompactPointCloud

- Renamed ExportDepth class to RenderDepthMaps

- Renamed ExportPoints class to ExportPointCloud

- Renamed FilterDenseCloud class to FilterPointCloud

- Renamed ImportPoints class to ImportPointCloud

- Renamed TriangulatePoints class to TriangulateTiePoints

- Renamed Chunk.addDenseCloud() method to addPointCloud()

- Renamed Chunk.analyzePhotos() method to analyzeImages()

- Renamed Chunk.buildDenseCloud() method to buildPointCloud()

- Renamed Chunk.colorizeDenseCloud() method to colorizePointCloud()

- Renamed Chunk.exportPoints() method to exportPointCloud()

- Renamed Chunk.filterDenseCloud() method to filterPointCloud()

- Renamed Chunk.findDenseCloud() method to findPointCloud()

- Renamed Chunk.importPoints() method to importPointCloud()

- Renamed Chunk.thinPointCloud() method to thinTiePoints()

- Renamed Chunk.triangulatePoints() method to triangulateTiePoints()

- Renamed Chunk.point_cloud attribute to tie_points

- Renamed Chunk.dense_cloud attribute to point_cloud

- Renamed Chunk.dense_clouds attribute to point_clouds

- Renamed ModelView.point_cloud_view_mode attribute to tie_points_view_mode

- Renamed ModelView.dense_cloud_view_mode attribute to point_cloud_view_mode

- Renamed AddFrames.copy_dense_cloud attribute to copy_point_cloud
- Renamed DuplicateChunk.copy_dense_clouds attribute to copy_point_clouds
- Renamed FilterPointCloud.asset attribute to point_cloud
- Renamed PublishData.save_point_colors attribute to save_point_color
- Renamed copy_dense_cloud argument in Chunk.addFrames() method to copy_point_cloud
- Renamed save_point_colors argument in Chunk.publishData() method to save_point_color
- Renamed asset argument in Chunk.filterPointCloud() method to point_cloud
- Renamed source argument in PointCloud.classifyGroundPoints() method to source_class
- Revised parameter names for point attributes in ExportPointCloud class and Chunk.exportPointCloud() methods
- Removed ImportLaserScans class
- Removed Chunk.importLaserScans() method
- Removed Chunk.samplePoints() method
- Removed use_trajectory, traj_path, traj_columns, traj_delimiter and traj_skip_rows attributes from ImportPointCloud class
- Removed use_trajectory, traj_path, traj_columns, traj_delimiter and traj_skip_rows arguments from Chunk.importPointCloud() method
- Removed merge_depth_maps, merge_dense_clouds, merge_models, merge_elevations and merge_orthomosaics attributes from MergeChunks class
- Removed merge_depth_maps, merge_dense_clouds, merge_models, merge_elevations and merge_orthomosaics arguments from Document.mergeChunks() method

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 get-SaveFileName() 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 Tiled-Model.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(), Dense-Cloud.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 Cameras-Format

- Changed type of rotation_order argument in Chunk.exportCameras() to RotationOrder

- Changed type of format argument in Chunk.exportDem() and Chunk.exportOrthomosaic() methods to Raster-Format

- 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 Reference-Format

- 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(), Network-Client.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

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